National Park Service
U.S. Department of the Interior

Long Range Transportation Plan

September 2016

Midwest Region

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Cover Photos (clockwise from upper left): Mississippi National River and Recreation Area, Cuyahoga Valley National Park, Badlands National Park, Fort Smith National Historic Site, Apostle Islands National Lakeshore and Mississippi National River and Recreation Area

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This first *Midwest Region Long Range Transportation Plan* was prepared as a collaborative effort between the Washington Support Office Facilities Planning Branch, Midwest Regional Office, Denver Service Center, and the Federal Highway Administration's Eastern and Central Federal Lands Highway Divisions and John A Volpe National Transportation Systems Center.

Following a 30-day stakeholder review period, the final version of the *Midwest Region Long Range Transportation Plan* is hereby accepted by the Midwest Regional Director as of the date shown below.

9/29/20

ACCEPTED — Date

Cameron H. Sholly, Regional Director, Midwest Region

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Acronyms

ABA	Architectural Barriers Act
API	Asset Priority Index
BHI	Bridge Health Index
BIP	Bridge Inspection Program
CIS	Capital Investment Strategy
CMS	Congestion Management System
CR	Component Renewal
CRV	Current Replacement Value
DM	Deferred Maintenance
DOI	Department of the Interior
DOT	Department of Transportation
DSC	Denver Service Center
EPA	United States Environmental Protection Agency
FAST Act	Fixing America's Surface Transportation Act
FBMS	Financial and Business Management System
FC	Functional Classification
FCI	Facility Condition Index
FHWA	Federal Highway Administration
FLAP	Federal Lands Access Program
FLMA	Federal Land Management Agency
FLTP	Federal Lands Transportation Program
FMSS	Facility Management Software System
FO	Facility Operations
FTA	Federal Transit Administration
FY	Fiscal Year
GHG	Greenhouse Gas
HPMA	Highway Pavement Management Application
IMARS	Incident Management and Reporting System
ITS	Intelligent Transportation Systems
LRTP	Long Range Transportation Plan
MAP-21	Moving Ahead for Progress in the 21st Century Act
MPO	Metropolitan Planning Organization
MTCO2E	Metric Ton of Carbon Dioxide Equivalent
MWR	Midwest Region
NAAQS	National Ambient Air Quality Standards
NHL	National Historic Landmark
NPS	National Park Service
NRL	National Register Listed
O&M	Operations and Maintenance
OB	Optimizer Band
OMB	Office of Management and Budget
PCR	Pavement Condition Rating
PFMD	Park Facility Management Division
PM	Preventive Maintenance
RIP	Road Inventory Program
RM	Recurring Maintenance
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
TRIP	Paul S. Sarbanes Transit in Parks Program
WASO	Washington Support Office

Map of NPS Midwest Region Park Units

Executive Summary

The National Park Service (NPS) Midwest Region (MWR) administers 66 park units in 13 states extending in the east-west direction from Ohio to Nebraska and in the north-south direction from the Canadian border to Arkansas. Approximately 24 million visitors annually explore the natural, cultural and recreational resources of the MWR. The region's transportation system consists of assets critical to the dual NPS mission of resource protection and visitor experience, which are dispersed throughout these 66 park units. In support of this mission, the MWR maintains a diverse inventory of transportation assets that facilitate the movement of visitors, staff and equipment around its park units.

Purpose of the Plan

The MWR Long Range Transportation Plan (LRTP) provides a comprehensive assessment of the regional transportation system's current condition, capital rehabilitation and maintenance needs and projected funding availability over a 20-year planning horizon. The LRTP was developed with the participation of multidisciplinary subject matter experts from the Midwest Regional Office, park units and other agency planning and transportation programs. Additional technical assistance was provided by representatives of the Central and Eastern Federal Lands Highway Division offices of the US Department of Transportation (DOT) Federal Highway Administration (FHWA), the US DOT John A. Volpe National Transportation Systems Center and other contractors of the NPS Denver Service Center (DSC) and Washington Support Office (WASO) Park Facility Management Division (PFMD) Facilities Planning Branch. The MWR LRTP identifies region-specific goals, objectives, programmatic strategies and a regional investment strategy to guide transportation decision makers at multiple levels within the agency.

During final development of this LRTP, Congress passed the Fixing America's Surface Transportation Act (FAST Act) in December 2015. The FAST Act increases annual surface transportation funding for the NPS to $268 million in 2016 (from an average of $240 million per year during the FY2013-FY2015 period) with an eventual anticipated increase to $300 million in 2020. The financial baseline and financial strategy modeling in this LRTP is primarily based on funding allocation provided through the prior surface transportation legislation, Moving Ahead for Progress in the 21st Century (MAP-21). Under MAP-21, annual surface transportation funding for the NPS averaged $240 million. It has not yet been determined what portion of the FAST Act's increased funding will be allocated to the MWR, but some increase in transportation funding to the region is likely.

Decline in MWR Asset Condition over Time

Total MWR Annual Need	$53.9 million
Total Annual Future Funding	$20.0 million
Forecasted Funding Gap	$33.9 million

Sleeping Bear Dunes National Lakeshore

Midwest Region LRTP Vision

The NPS maintains a mission-focused transportation system that enables safe and seamless access to high-quality visitor experiences while protecting park resources and values. The service responsibly plans and effectively manages this transportation system to accommodate changing environmental, social and financial conditions. The following goal statements further define the vision and organizational framework for the MWR LRTP.

ASSET MANAGEMENT
Sustainably manage NPS transportation assets and services to improve performance and maximize the asset life cycle

TRANSPORTATION FINANCE
Maximize the amount, variety and flexibility of transportation fund sources and allocate these funds wisely

RESOURCE PROTECTION
Design and administer the transportation system in a way that protects and preserves natural and cultural resources

VISITOR EXPERIENCE
Improve the ease of access to, within and through park units for all people to maintain and enhance the quality of transportation-related visitor experiences

SAFETY
Provide a safe transportation system for all users

PARTNERSHIPS
Support expanded partner relationships and community engagement to maintain and improve the transportation system

These goal statements are supported by a series of objectives and strategies presented in Chapter 1: Planning Framework and Findings. The objectives add an additional layer of regional specificity to the more general goals and provide the framework for identifying the specific implementation-level LRTP strategies. The strategies, which are discussed briefly here, and in more detail in Chapter 1, are the actionable and measurable means by which the region will work toward its goals and objectives and implement the LRTP.

Summary of Findings

The total annual funding needs of the MWR transportation portfolio are estimated to be $53.9 million. This total includes modeled needs for roads, bridges and other transportation assets, as well as those needs documented in NPS project and maintenance management systems of record. The annual future funding for transportation in the region is forecasted to be 20.0 million from both Title 54 and Title 23 sources. The result of this forecasted funding level is an anticipated annual gap of $33.9 million, the consequence of which will be a decline in asset condition over time.

To more strategically manage the forecasted funding gap, the MWR will implement the NPS Capital Investment Strategy (CIS) policy by investing the majority of its transportation funding on its highest- and high-priority assets to address critical maintenance, repair and programmatic needs, in a manner consistent with the National LRTP. Lower-priority assets will experience a decrease in funding, with a corresponding decline in condition. Additionally, the MWR will set marginally lower condition targets for its highest- and high-priority pavement assets relative to those that currently exist to free up approximately $2 million annually to help fund the programmatic strategies developed as part of this LRTP. Implementation of these strategies is the core focus of this regional LRTP.

Many of the strategies in this LRTP will influence project selection and the focus of the regional transportation program, including leveraging partner funds, working with partners to improve transportation connections, systematically addressing safety and congestion issues, improving visitor wayfinding and guidance tools and minimizing conflicts with park natural and cultural resources. Because many of those strategies are not reflected in the CIS, regional managers will supplement the CIS with these strategies to aid in project selection and further leverage multiple fund sources to achieve the goals and objectives outlined in the LRTP.

Moving forward, regional fund source managers will collaborate closely to maximize the benefit of each fund source through improved economies of scale, optimal coordination and sequencing of project phases and the potential reallocation of funds among capital and maintenance activities. This increased level of collaboration will be a major new initiative of the regional transportation program.

A second set of plan strategies will support MWR activities to enhance management of its regional transportation network. The MWR desires to increase its capacity to focus on strategically planning for and managing transportation fund sources and project delivery. Increased regional capacity is also needed to assist individual park units with tracking transportation system performance and data, building the required work orders in the Facility Management Software System (FMSS) database, bundling those work orders into Project Management Information System projects and funding and completing those projects. These strategies are also designed to increase the regional office's capacity to assist park units with seeking out and successfully securing external or partnership funding sources for transportation improvements. To meet this second set of plan strategies, the MWR will seek to augment its capacity to plan and coordinate with park units through expanded staffing. These strategies are described in greater detail in Chapter 1: Planning Framework and Findings.

Homestead National Monument of America

Voyageurs National Park

Chapter 1

Planning Framework & Findings

Midwest Region Long Range Transportation Plan

Planning Framework and Findings

The MWR LRTP serves as a comprehensive overview of the transportation system condition, needs and strategies, both currently and for the planning period over the next 20 years. This document considers national and region-specific goals, existing system needs, future investment projections and desired system improvements and identifies financial strategies to guide transportation decision makers at multiple levels of the NPS.

The Project Approach

This regional LRTP was developed primarily during three advisory committee workshops with input from multidisciplinary subject matter experts from the Midwest Regional Office, park units and other NPS and FHWA planning and transportation programs. Associated technical analysis activities occurred in preparation for, and in response to, these workshop activities.

The first workshop, held in December 2014, focused on identifying the plan goals and objectives, in addition to identifying the issues and opportunities to be researched and addressed in the LRTP. The goal area chapters within the LRTP describe these region-specific issues and opportunities and additional baseline research activities.

Following the first workshop, MWR park unit superintendents were surveyed to evaluate the relative importance and severity of the transportation-related issues and opportunities the advisory committee identified. The results of this survey (see Appendix A) were used to refine the scope of issues and opportunities explored within the LRTP.

The second workshop, held in May 2015, focused on reviewing the results of the MWR superintendent survey and identifying potential strategies to address the regional transportation issues and meet the plan goals and objectives. These strategies are presented in this chapter and are also listed in each goal area chapter underneath the issue or opportunity the strategy was designed to address.

The third workshop, held in November 2015, focused on the development of the regional transportation investment strategy, in addition to identifying refinements to the regional goals, objectives and strategies. The regional transportation investment strategy is presented in this chapter.

THE MWR LRTP FOCUSES ON SIX GOAL AREAS:

- **Asset Management**
- **Transportation Finance**
- **Resource Protection**
- **Visitor Experience**
- **Safety**
- **Partnerships**

The plan identifies a broad range of regional transportation issues and time-bound priorities to create the framework for long-term investment strategies and performance measures.

To provide a context to evaluate issues, objectives and strategies that may be vital to a subset of regional park units but that would not apply universally across the region, regional clusters of park units were formed to organize the issues, needs and priorities. Clusters represent units with similar transportation and visitor experience-related characteristics. The MWR park units were divided into five regional clusters:

- Great Lakes
- Great Plains: Historic and Rural Park Units
- Great Rivers and Trails
- Urban Park Units
- Black Hills.

Appendix B describes the characteristic definitions and alignment of MWR park units under each of these regional clusters.

The regional plan grew out of the progression of regional goal setting to a comprehensive system assessment and fiscal analysis and culminated in the definition of a group of prioritized strategic investments to help achieve both the NPS mission and the goals and objectives of the MWR LRTP.

Transportation in the Midwest Region

Nationally, the NPS transportation assets connect more than 430 million annual visitors to the extraordinary experiences found in America's more than 400 national park units and play a vital role in serving the agency's mission. The MWR manages the transportation-related assets spanning 66 distinct park units dispersed throughout 13 states that are critical to the dual NPS mission of resource protection and visitor experience.

In support of this mission, the MWR maintains a diverse inventory of transportation assets that facilitate the movement of visitors, staff and equipment around its park units. These assets include roads, bridges, trails, support buildings, marine facilities, railroads and alternative transportation systems. The MWR transportation assets are the means by which most visitors access and explore these nationally significant resources.

Apostle Islands National Lakeshore

Transportation Assets

To understand the breadth and scope of the MWR transportation portfolio, a comprehensive inventory of assets was identified and tracked through the NPS FMSS, the FHWA Road Inventory Program (RIP) and the FHWA Bridge Inspection Program (BIP). The assets fall into two categories: core and multimodal transportation assets. For additional details and an inventory breakdown, refer to Chapter 2: Asset Management. The following characterize the MWR transportation system:

- Approximately 600 miles of paved and unpaved roads
- More than 11 million square feet of paved and unpaved parking areas (including one parking garage at Mount Rushmore National Memorial)
- A combined total of 45 bridges and tunnel structures
- More than 580 miles of front country trails with 54 trail bridges and tunnels
- Three public transportation conveyance systems (e.g., specialized trains and elevators)
- Approximately 135 acres of transportation-related maintained landscapes
- A combined total of 241 docks and marinas
- Approximately 29 miles of railroad track and 20 railroad bridges
- A combined total of 12 transit systems (boat, aviation, bus or train related).

Midwest Region LRTP Financial Investment Strategy

As part of the NPS National LRTP development effort (2013-2016), five distinct financial strategies were modeled to determine their impact on future transportation asset condition. These financial strategies were adapted to the MWR as a starting point for the development of a regional financial strategy as part of this LRTP. (See Appendix C for more about the financial strategy modeling process.) The "current strategy" reflects a continuation of the historic regional approach to the allocation of transportation funds. The four other strategies, collectively referred to as "action" strategies, reflect specific changes to this approach.

Condition projections were developed under MAP-21 transportation funding assumptions. The recently enacted FAST Act could increase funding to the region, which would result in improved asset condition over time.

When comparing the model results of the "action" strategies relative to the current investment strategy, one key outcome is evident in the comparison of strategies shown in Table 1-1: The condition of highest priority assets is consistently better, with the exception of the operations and maintenance (O&M) strategy, while the condition of lower-priority assets is typically worse. This difference reflects the powerful influence of incorporating the NPS CIS into each "action" strategy, as well as the extremely large funding gap facing the region. Essentially, the region anticipates adequate funding available to improve and sustain the condition of its highest priority transportation assets, but not enough resources to improve or even sustain the current condition of other transportation assets in the regional portfolio. The project team noted that the outcomes for the four "action" strategies were so strikingly similar that the application of a particular strategy is unlikely to significantly change the condition outcome given the total number of dollars available for transportation assets overall.

Mount Rushmore National Memorial

Instead of applying a single strategy, the MWR will implement the CIS by investing the majority of its forecasted available transportation funding on highest and high-priority assets to address critical maintenance, repair and programmatic needs.

Lower-priority assets will receive less funding and incur a corresponding decline in condition. Rather than simply selecting one of five modeled strategies shown in Table 1-1, the MWR will establish a pavement condition rating (PCR) target of 82 for functional classification (FC) 1, 2 and 7 roads and parking areas and a PCR target of 63 for all other types of pavement. Setting these marginally lower targets will free up approximately $2 million annually in funds to address the other programmatic strategies in this LRTP rather than attempt to achieve a minimal, imperceptible improvement in pavement condition.

Many of the recommended LRTP strategies will influence the regional project selection process and the focus of the regional transportation program, including leveraging partner funds, working with partners to improve transportation connections, systematically addressing safety and congestion issues, improving visitor wayfinding and guidance tools and minimizing conflicts with park resources.

Many of those strategies are not explicitly reflected in the CIS or the financial modeling applications used for this exercise. As a result, regional NPS program managers will supplement the CIS with these strategies to aid in project selection and further leverage multiple fund sources to achieve the goals and objectives outlined in the LRTP.

These financial strategies will need to be applied to all transportation funding sources available to the MWR in accordance with their specific funding source guidelines. For example, as Title 23 funds cannot be spent on O&M activities, these funds will be focused on capital improvements and major rehabilitation projects while Title 54 funds will fund O&M activities. In addition, new rules for the Recreation Fee program require that a specific share of its funds be dedicated to addressing deferred maintenance (DM) projects on high priority assets. Fund source managers will collaborate closely to maximize the benefit from a given funding level through improved economies of scale,

Table 1-1. Fiscal Year (FY) 2021 Condition Outcomes of Five Financial Strategies Adapted from the National LRTP

Asset Category and Priority	Current Conditions	Current Strategy	Current Strategy + CIS	Address DM+ CIS	Address O&M + CIS	Multimodal + CIS
Roads and Parking (PCR)						
Highest and High Priority (FC 1,2,7)	83	82	85	87	83	83
Other Priority (FC 3, 4, 5, 6, 8)	75	77	63	63	63	63
Other Facilities (FCI)						
Highest Priority	0.07	0.20	0.17	0.15	0.23	0.11
High Priority	0.13	0.24	0.27	0.27	0.27	0.27
Other Priority	0.10	0.75	0.76	0.76	0.76	0.76

optimal coordination and sequencing of project phases and the potential reallocation of funds across capital and maintenance activities. This improved coordination between fund source managers will be a major new initiative of the regional transportation program.

A second set of recommended programmatic strategies will support MWR activities to enhance management of its regional transportation network. The MWR desires to increase its capacity to assist parks with tracking transportation system performance and condition data, building the required work orders in the FMSS database, bundling those work orders into Project Management Information System projects and funding and completing those projects. These strategies are also designed to increase the regional office's capacity to assist park units with seeking out and successfully securing external or partnership funding sources for transportation improvements. To this end, the MWR will augment its capacity to coordinate with parks through expanded staffing and task forces. Task forces will help with the following:

- Developing a Condition Assessment/Resource Risk Assessment Code Task Force
- Identifying a program assistant to better navigate the WASO, DSC, FHWA and other fund programs
- Identifying a shared pool of experienced park maintenance staff for major one-time needs and project execution at various locations across the region.

A key focus of the region should be to identify all available funding sources that can be applied to transportation assets and services and work with parks and partners to aggressively pursue those sources. Additionally, regional staff can assist with coordinating fund source managers, park units and partners for efficiency and carrying out administrative functions, such as project development and oversight.

Theodore Roosevelt National Park

Goals and Objectives

The following goal statements and objectives build on the five goal areas identified in the LRTP. The goal statements describe desired conditions. The objectives add specificity and offer a framework for identifying the specific implementation-level LRTP strategies and developing plan performance measures.

ASSET MANAGEMENT

Goal Statement

Sustainably manage NPS transportation assets and services to improve performance and maximize the asset life cycle

Objectives

- Develop guidelines for the selection and prioritization of transportation asset projects
- Maintain and enhance critical transportation assets and services through targeted investments
- Reduce the deferred maintenance backlog for high priority transportation assets
- Optimize annual operations and maintenance activities to better align with available funding
- Increase the capacity to perform and manage maintenance activities within MWR park units
- Adapt to and plan for present and future risks affecting transportation systems in the region, including climate change, major storm events and site-specific hazards
- Provide sustainable transportation options that promote energy conservation and resource protection

TRANSPORTATION FINANCE

Goal Statement

Maximize the amount, variety and flexibility of transportation fund sources and allocate these funds wisely

Objectives

- Identify and prioritize transportation system investments based on NPS mission, life-cycle costs and anticipated future funding
- Coordinate transportation system investments across all available fund sources
- Grow and leverage transportation system investments through appropriate partnerships and innovative financing approaches
- Establish the institutional capacity within the MWR to meet the goals of the regional and National LRTPs

Badlands National Park

RESOURCE PROTECTION

Goal Statement

Design and administer the transportation system in a way that protects and preserves natural and cultural resources

Objectives

- Avoid, minimize or mitigate transportation system impacts to park unit resources by using best management practices along with scientific research and emerging technologies
- Protect environmental resources at an ecosystem scale through collaborative partnerships to ensure that transportation impacts are understood and mitigated across both physical and jurisdictional borders
- Minimize and mitigate the greenhouse gas emissions of the NPS transportation system
- Provide sustainable transportation options that promote energy conservation and resource protection

VISITOR EXPERIENCE

Goal Statement

Improve the ease of access to, within and through park units for all people to maintain and enhance the quality of transportation-related visitor experiences

Objectives

- Meet the physical, programmatic and technological needs of increasingly diverse visitors and those with disabilities
- Provide state-of-the-art traveler information, wayfinding, information for linking related park units and—where appropriate—interpretation and education opportunities that complement transportation opportunities
- Manage congestion
- Minimize the impacts of traffic and congestion where it interferes with the visitor experience

Isle Royale National Park

SAFETY

Goal Statement
Provide a safe transportation system for all users

Objectives

- Maximize transportation safety across all modes while preserving scenic, cultural and natural resources and values
- Support the implementation of the NPS Transportation Safety Program
- Reduce transportation-related incidents and prepare for emergencies and special events
- Develop a better understanding of the current transportation safety hazards within the region
- Promote the "Four E's" (engineering, enforcement, education and emergency services) of transportation safety

PARTNERSHIPS

Goal Statement
Support expanded partner relationships and community engagement to maintain and improve the transportation system

Objectives

- Use the NPS transportation planning process to strengthen partner and community relationships, support collaborative community goals and ensure enhanced opportunities for public engagement
- Broaden partnerships and cooperative planning to improve the visitor experience, public access and resource protection and safety at the community, regional, state, tribal and federal levels
- Develop cooperative relationships to leverage funding and provide transportation facilities and services with mutual benefits for NPS, other federal land management agencies and tribes and gateway communities

Pictured Rocks National Lakeshore

Strategies

To achieve the goals and objectives of the plan, and to address transportation related issues and opportunities in the region, the project team identified a number of programmatic strategies. Adoption and implementation of the strategies is at the core of the MWR LRTP.

Strategies were identified by implementation time frame as near term, medium term or continual (see Table 1-2). Near-term strategies are considered highly actionable and feasible with a high degree of impact; they would be adopted or implemented in the next one to three years. Medium-term strategies, like near-term strategies, may also have a high degree of impact, but may be dependent on the completion or initiation of near term strategies or other agency initiatives; they would be implemented or adopted in the next three to seven years. Continual strategies are considered common-sense best management practices that park units and regional program managers should adhere to when planning for, constructing or operating transportation systems in the region.

George Rogers Clark National Historic Park

Table 1-2. MWR LRTP Implementation: Near Term, Medium-Term and Continual Strategies

Near-Term Strategies (1–3 years) Goal Area	Strategy
Asset Management	Verify that Health, Life, Safety and Resource Risk Assessment Codes are entered, current and correct for all transportation assets to ensure that resource protection factors positively influence project CIS scores.
	Ensure that a robust condition assessment program is in place and completed for all asset categories.
Transportation Finance	Create shovel-ready, scalable projects in the event new or unexpected funding becomes available.
	Develop and grow the professional staff capacity at the regional level to effectively plan, execute and monitor the overall transportation program.
	Enhance regional support for FMSS work order management—from development to closeout.
Resource Protection	Evaluate, disseminate and adhere to best management practices for areas with resource sensitivity and update these best management practices as needed based on post-project evaluations.
Visitor Experience	Provide trip planning resources on park unit websites to make visitors aware of where and when congestion and crowding occurs within park units (relates to multiple issues) and share best practices and successes across the region.
	Better use park unit websites and social media to provide up-to-date trip planning resources (e.g., what's available and how to navigate).
	Conduct a region-wide, all-unit visitor survey of trip planning information using the collaborative visitor transportation survey to identify needed improvements to park unit websites and transportation systems.
	Coordinate with gateway communities and partners to identify existing transportation gaps and to provide multimodal options (where appropriate) to improve connectivity to park units.
	Coordinate with local governments, metropolitan planning organizations (MPOs) and states to develop five-year transportation improvement programs at park units where appropriate.
	Develop and disseminate best practices of methods to safely turn walking and/or biking into viable transportation options, such as installing share the road signs or bicycle racks at key locations.
	Develop programmatic best practices for park units to coordinate with partners, streamline planning/compliance and identify fund sources (e.g., healthy communities funding) to further develop multimodal connections.
	Develop regional processes to ensure that accessibility is considered early in the planning or project scoping phase of transportation projects.
	Explore potential congestion indicators, thresholds and performance measures and methodologies to assess congestion in lieu of servicewide quantitative congestion data.
	Develop technical assistance resources to assist park units in diagnosing congestion problems and identifying appropriate solutions.
	Develop a regional congestion management strategy using information from the Congestion Management Program. (This strategy also applies to the Safety goal area.)

Near-Term Strategies (1–3 years) Goal Area	Strategy
Safety	Identify and implement unit-level, site-specific safety improvements (focusing first on high-crash park units) that include specific recommendations related to engineering, enforcement, education and emergency response.
	Conduct unit-level safety studies cyclically in park units that represent the majority of crashes and vehicle miles traveled, focusing first on high-crash park units.
	Coordinate with other federal land management agencies (FLMAs), as well as state and local jurisdictions, for shared services/response/and crash data collection.
	Ensure that park unit crash data is reported in the Department of the Interior (DOI) Incident Management and Reporting System (IMARS).
Partnerships	Share successes. Host an annual webinar or training session with park units on best practices for engaging partners and leveraging transportation funding.
	Provide for some flexibility within the regional transportation program to take advantage of unforeseen funding opportunities.
	Develop and grow the professional staff capacity in the region to assist park units with leveraging partnership dollars for transportation improvements that benefit those park units.

Voyageurs National Park

Medium-Term Strategies (3–7 years) Goal Area	Strategy
Asset Management	Develop an inventory of transportation assets that have historically or are predicted to be at risk (e.g., from flooding, erosion, washouts, landslides) within the region, using tools that the Park Facility Management Division (PFMD) Sustainable Operations and Climate Change branch is currently developing. The region is ready to conduct analysis on some parks as soon as the modeling system is expanded to provide analysis procedures for noncoastal parks, and the results will influence project selection.
Transportation Finance	Remove unnecessary, redundant or underused infrastructure to restore more important resources, reduce long-term maintenance needs and track the quantity of infrastructure removed over time.
	Consider creating or identifying a shared pool of maintenance staff at MWR park units to maximize use of facility staff across the region when opportunities arise.
	Develop relationships with partners and contractors to fill maintenance gaps.
	Consider developing a MWR Traveling Condition Assessment Team to provide condition assessment and monitoring services, project development and implementation assistance to MWR park units.
	Use "seed" money provided under the FAST Act to stimulate partnership arrangements to fund large-scale projects.
Resource Protection	Set reduction targets for visitor vehicle emissions and pursue solutions to achieve those targets.
	Develop, disseminate and adhere to best management practices for preserving culturally significant transportation assets. This guidance should include special contract requirements and compatible design solutions for the treatment of culturally significant transportation assets. These best management practices should be updated as needed based on post-project evaluations.
Visitor Experience	Participate in servicewide standardized approach to disseminate traveler information on mobile devices.
	Review MWR self-evaluation and transition plans as they are completed to identify and help prioritize transportation-related improvements.
	Support the region and its park units in pursuing discretionary funding opportunities to address gaps in non-motorized connections and between modes.
	Continue to build awareness about accessible design standards within transportation systems and the resources available to support accessible projects.
	Continue to incorporate accessibility information into trip planning resources.
Safety	Implement replacement program for signs to meet reflectivity, accessibility and NPS design standards.
Partnerships	For park units where significant partnership funding opportunities may exist, coordinate with local governments, MPOs, state departments of transportation (DOTs) and tribes to develop five-year, park-level transportation improvement programs.

Continual Strategies (Best Management Practices)	Strategy
Asset Management	Remove unnecessary, redundant, vulnerable or underused (low optimizer band [OB]) infrastructure to follow agency policy to reduce the facility footprint, restore resources and reduce long-term maintenance needs.
	Integrate risk assessment and total cost of facility ownership into future planning initiatives and project prioritization criteria.
	Implement a more holistic and flexible approach to project planning, following the guidance of the CIS while devising project scope to simultaneously achieve multiple park objectives with limited funding.
	Design and build trails following sustainable trail practices, such as the Guide to Sustainable Mountain Trails: Trail Assessment, Planning & Design Sketchbook as well as the Architectural Barriers Act Accessibility Guidelines: Outdoor Developed Areas.
	Ensure that funding is directed toward maintaining and improving designated, high-priority, frontcountry transportation trails.
Transportation Finance	Coordinate projects among fund source managers and park units to obtain economies of scale (both geographically and by project type).
	Build relationships with state DOTs and local partners to coordinate projects and financial resources.
	Ensure that regional and national program managers are aware of all identified MWR mega projects and how funding implementation may affect other regional priorities. Complete all planning, design and compliance work for these projects to ensure that they are shovel ready, enabling the MWR to react quickly to any funding increase or new funding source.
	Coordinate with partner groups to address park unit needs through Federal Lands Access Program (FLAP) projects or other means.
	Develop a standardized regional approach for funding and prioritizing partnership projects.
	Provide funding flexibility to capitalize on "sudden" or unexpected partnership funding opportunities.
	Coordinate funding and project requests across program managers and partners and clearly communicate to park units what funding options are available and appropriate.
	Maximize assistance from the WASO, DSC-Transportation and the FHWA to support project planning and implementation and to track implementation of the MWR LRTP.
Resource Protection	Gather and communicate successful actions that NPS park units or regions undertake to reduce NPS transportation system emissions.
	Support servicewide cultural resource data collection and data management efforts to ensure the proper identification of historic transportation assets.
	Ensure compliance with NPS policy on resource protection in developing transportation infrastructure.
	Ensure Interdisciplinary Team participation and the use of geographic information systems early in the planning, design and implementation of transportation projects to identify areas of potential resource impacts.
	Ensure compliance with Clean Air Act, MPO and state air quality standards early in the planning stages of transportation projects for parks that lie within defined ozone or particulate matter nonattainment or air quality maintenance areas.
	Seek implementation of innovative products and technologies to reduce greenhouse gas (GHG) emissions, such as fueling stations or solar paving.

Continual Strategies (Best Management Practices)	Strategy
Visitor Experience	Ensure that transportation system improvements or new development is designed to mitigate congestion.
	Ensure that the region takes a multidisciplinary approach to providing park units with high-use area/ related technical assistance for planning and project development.
	Ensure that transportation design and planning teams incorporate universal design principles and accessibility expertise (which may include the Accessibility Branch, the National Center on Accessibility and the involvement of people with disabilities).
	Look for ways to adapt visitor services and transportation system components in the face of changing visitor use patterns resulting from changing climates that is consistent with park unit purpose and static financial resources.
	Coordinate with partner agencies/organizations to mitigate or reduce congestion (from built systems, construction and commercial use).
	Improve wayfinding and other transportation information that is being distributed via non-NPS media (e.g., Trip Advisor, partner apps, booking agent/reservation systems, 511).
Safety	Employ best management practices, such as context-sensitive solutions and engaging with safety and law enforcement disciplines, during project development.
	Build in safety considerations, training and best management practices into all transportation and roadside projects using existing job hazard analysis form to ensure safe work zones.
	Empower employees to make daily risk management decisions.
	Employ best management practices (e.g., develop regional guidance for event safety management), including those for incident command (mock strategies) and traffic control protocols.
	Undertake regular and consistent coordination between NPS staff and state and local government transportation, law enforcement and emergency response personnel.
	Identify and develop law enforcement agreements to mitigate the risks associated with special events.
	Develop an aggressive crash collection protocol and procedures across the region (e.g., agreements with local law enforcement to report all crashes, which they then investigate using NPS standard forms).
Partnerships	Aggressively seek out and pursue opportunities to leverage partnership funding.
	Communicate NPS project priorities to the FHWA during the FLAP project selection process for each state.
	Reach out to diverse groups of partners at the tribal, federal, state and local levels to identify and capitalize on shared transportation improvement goals.
	Develop stronger relationships with state DOTs, MPOs, tribes and local governments at both park unit and regional levels.
	Encourage park units to work with their local transit agencies to develop and promote efficient and accessible public transportation connections to park units to drive greater ridership and to provide visitors with improved trip planning information on park unit websites.

Measuring System Performance

Performance measures and performance targets for each LRTP goal area were developed to track overall progress toward LRTP goals and objectives. To the degree possible, performance measures were chosen that align with existing data and reporting systems to avoid adding additional reporting requirements to MWR park units or the creation of new tracking systems. Where data are not presently available to track performance but are deemed necessary to inform future investment, the suggested target is often focused on bridging data gaps to ensure data are available when the LRTP is updated. The LRTP performance measures are listed at the end of each LRTP goal area chapter.

Apostle Islands National Lakeshore

George Rogers Clark National Historic Park

Chapter 2
Asset Management

Midwest Region Long Range Transportation Plan

Goal

Sustainably manage NPS transportation assets and services to improve performance and maximize the asset life cycle

Objectives

Develop guidelines for the selection and prioritization of transportation asset projects

Maintain and enhance critical transportation assets and services through targeted investments

Reduce the deferred maintenance backlog for transportation assets

Optimize annual operations and maintenance activities to better align with available funding

Increase the capacity to perform and manage maintenance activities within MWR park units

Adapt to and plan for present and future risks affecting transportation systems in the region, including climate change, major storm events and site-specific hazards

Provide sustainable transportation options that promote energy conservation and resource protection

Introduction

A wide variety of assets are critical to the operation of the NPS MWR transportation network. These assets represent a cumulative public investment of nearly $1.5 billion. Fifteen percent of these assets are also designated as historic while simultaneously supporting current transportation operations.

To successfully manage the viability of these assets over the short and long term, the MWR must strike the appropriate balance between expenditures on capital improvements and O&M activities. This balance is vital to avoiding the pattern of "run to failure," where new and recapitalized assets are allowed to deteriorate from a lack of proper maintenance and ultimately have a shorter lifespan. Asset life cycles can be extended and total costs lowered, with a properly funded maintenance program.

With anticipated future budget constraints, the MWR will not be able to sustain its entire portfolio of transportation assets in their current condition. The NPS CIS requires certain NPS fund programs to direct increasingly scarce project funds to high-priority assets (transportation and otherwise). These fund programs include Line Item Construction, Repair/Rehabilitation, Cyclic Maintenance and Recreation Fee Nationwide 20%. The CIS also applies to all NPS facility projects with a cost greater than $500,000. The CIS recommends that minimum percentages of required preventive maintenance (PM) be completed for these assets. This policy directive aligns with the NPS *A Call to Action* goal 24, "Invest Wisely (NPS 2014)." The implicit tradeoff of this strategy is a decline in the condition of lower-priority assets, which would in turn receive less funding in the future.

The NPS is adapting its approach to asset management to respond to climate change at both the national and regional levels. This change in approach recognizes that the effects of climate change will in many cases make the successful O&M of transportation assets more challenging. These assets were built to withstand historical climatic conditions, but not expected future changes in temperature, precipitation and sea and lake surface elevation levels. Changes in extreme meteorological events (e.g., high temperatures, floods, droughts) are expected to increase in the MWR over the next 50 to 100 years and will likely lead to new asset management challenges. Particular threats could include pavement damage caused by extreme heat; more frequent and severe flash floods washing out roads, trails and boat launches; and declining lake levels leaving dock infrastructure high and dry.

Climate change is not the only risk that MWR transportation assets face. Management of these assets must consider all types of risk, including natural hazards, safety and location-specific risks.

Baseline Condition and Trends

Inventory

The MWR maintains a diverse inventory of transportation assets that move visitors, staff and equipment around its park units. These assets fall into two major categories: core transportation assets, which include paved roads and parking, road bridges and road tunnels, and multimodal transportation assets, which include trails, marine facilities, railroads and alternative transportation systems. Alternative transportation systems include surface and water transit and intelligent transportation systems (ITS). Defining this diverse inventory is critical to understanding the O&M and rehabilitation and associated financial considerations in operating this transportation network.

Theodore Roosevelt National Park

PAVED ROADS AND PARKING

MWR park units possess a network of pavement and bridge assets that are operated and maintained in collaboration with the FHWA. This network includes 197 miles of paved roads, of which 161 miles are classified as principal and connector roads (FC 1 and 2). These classes of roads are the primary routes for visitors to access and transit through the park units, as well as to access sites of interest within these units. The remaining 36 miles are special purpose or administrative in nature, with the exception of 0.8 miles of city streets (FC 8) in Herbert Hoover National Historic Site and Theodore Roosevelt National Park. The region has 8.6 million square feet of paved parking areas, equivalent to approximately 21,500 standard-sized parking spaces (400 square feet each). These pavement assets have a total current replacement value (CRV) of $728 million. A parking structure at Mount Rushmore National Memorial has nearly 1,200 parking spaces and a CRV of $39 million.

ROAD BRIDGES AND TUNNELS

There are 28 major bridge structures and 6 road tunnels in the region, which are operated and maintained in collaboration with the FHWA. The region also owns and maintains 11 minor bridge structures. The total CRV of its bridge and tunnel structures is $97 million.

UNPAVED ROADS AND PARKING

The MWR maintains an inventory of 373 miles of unpaved roads, which provide access to more remote areas, and 2.1 million square feet of unpaved parking areas, equivalent to roughly 5,200 parking spaces. These assets have a total CRV of $169 million.

Table 2-1 and Figure 2-1 summarize the inventory of transportation assets that the NPS owns, operates and maintains in the MWR.

TRAIL ASSETS

The parks in the MWR maintain trail assets that provide visitor access to key points of interest and serve important roles in facilitating recreational activities. For this LRTP, all trails, with the exception of those designated as "backcountry," are considered to be part of the MWR multimodal transportation system. MWR parks contain 582 miles of these trails, 48 trail bridges and 6 trail tunnels. These assets have a total CRV of $140 million.

CONVEYANCES

The region has three major passenger conveyance systems, which are critical to providing visitor access to fundamental resources. These conveyance systems include the Gateway Arch Tram System at the Jefferson National Expansion Memorial and cave elevators at Wind Cave National Park and Jewel Cave National Monument.

MAINTAINED LANDSCAPES

Grounds that surround transportation assets, such as parking areas and trailheads, have significant O&M implications. They often serve as a place of transition as visitors exit personal vehicles or some alternative means of transportation and may contain encompass 135 acres of surface area and have a CRV of $10.6 million.

Table 2-1. Summary of MWR Transportation Asset Inventory

Source: FY 2014 OMB 8 Industry Standard Locations Report, January 29, 2015; 2014 NPS Pavement Condition Report (US DOT, March 2015)

Category	Count	Quantity	Unit	CRV($M)	DM ($M)	FCI
Roads–Paved	236	197	MI	$580.3	$100.5	0.17
Parking–Paved	506	8,584,224	SF	$147.9	$33.0	0.22
Parking–Garage	1	458,000	SF	$39.4	$0.0	0.00
Road Bridge	39	85,840	SF	$42.2	$3.2	0.08
Road Tunnel	6	14,828	SF	$54.7	$0.5	0.01
Core Transportation Assets	**788**			**$864.6**	**$137.1**	**0.16**
Roads–Unpaved	360	373	MI	$152.6	$11.6	0.08
Parking–Unpaved	178	2,093,082	SF	$16.4	$1.3	0.08
Trails	368	3,070,451	LF	$122.1	$8.9	0.07
Trail Bridge	48	40,893	SF	$12.6	$1.8	0.14
Trail Tunnel	6	4,038	SF	$1.8	$0.0	0.00
Conveyances	3	3	EA	$29.1	$0.6	0.02
Maintained Landscapes	38	135	AC	$10.6	$0.1	0.01
Dock/Marina	241	12,332	LF	$73.2	$4.8	0.07
Railroad Track	16	153,080	LF	$142.5	$3.3	0.02
Railroad Bridges	20	19,711	SF	$24.4	$0.4	0.02
Multimodal Transportation	**1,258**			**$585.4**	**$32.9**	**0.06**
TOTAL Transportation	**2,046**			**$1,450.0**	**$170.0**	**0.12**

MARINAS, DOCKS AND LAUNCHES

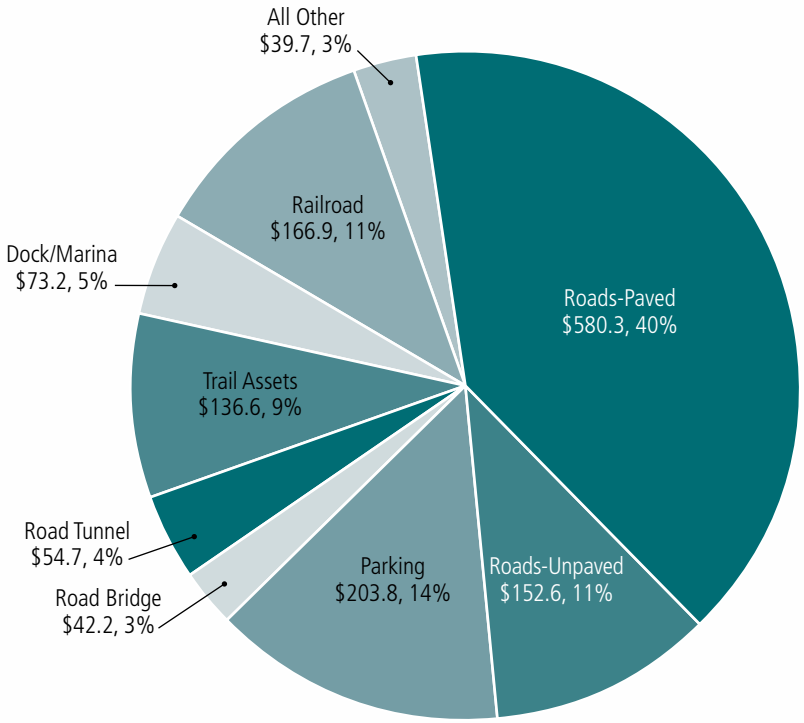
In MWR park units with lake or river frontage, assets that facilitate water transportation are especially important to visitor access and operations, and in the case of Isle Royale National Park, are the only means of access. There are 241 marinas, docks and launches in the region, with a total CRV of $73 million. Levees and seawalls are specifically excluded from this transportation asset category.

RAILROAD ASSETS

Cuyahoga Valley National Park operates a passenger railroad system that provides connectivity for visitors. This system includes 26 miles of standard gauge track and 20,000 square feet of rail bridges, which have a total CRV of $161 million. (The NPS is also responsible for signals and crossings.) A small trolley system at Isle Royale National Park adds 200 linear feet of track and $140,000 in CRV.

Figure 2-1. MWR Transportation Asset Inventory CRV ($ in Millions)

Source: FY 2014 OMB 8 Industry Standard Locations Report, January 29, 2015



INTELLIGENT TRANSPORTATION SYSTEMS

ITS consist of technologies designed to reduce vehicular congestion and provide improved traveler information. ITS include detectors, weather sensors, computer databases and variable message signs. MWR park units are using new technologies to improve the visitor experience, reduce traffic congestion on park roads and in parking areas, protect natural and cultural resources and provide traveler information.

TRANSIT SYSTEMS

The MWR includes 12 transit systems, including boat, aviation, bus and train systems, which operate in eight park units (see Table 2-2). These systems transported more than 350,000 visitors in 2013. It should be noted that these vehicles and vessels do not presently have condition or required maintenance tracked in the FMSS or in any other central facility management system, as most are not owned by the NPS.

NON-NPS OWNED TRANSPORTATION ASSETS

While difficult to quantify, a significant portion of the transportation infrastructure supporting visitation to MWR park units is not NPS owned or maintained. This infrastructure includes local-, state- and county-owned roads, bridges and trails, as well as public transit systems serving both urban park units and park units adjacent to regional train or bus lines. For example, at Mississippi National River and Recreation Area, 144 miles of the 3,000-mile Mississippi River National Millennium Trail, a key component of the park unit's alternative transportation system, is owned and managed by partners.

Table 2-2. Inventory of MWR Transit Systems

Sources: NPS National Transit Inventory (NPS 2013a)

Park	System	Vehicle Type	Agreement Type	Ownership	2013 Boardings
APIS	Excursion boat	Boat	Concession Contract	Non-NPS	28,820
CUVA	Cuyahoga Valley Scenic Railroad	Train	Cooperative Agreement	Non-NPS	186,270
ISRO	Royale Air Service Inc. float plane	Airplane	Concession Contract	Non-NPS	621
ISRO	MV Ranger III	Boat	NPS Owned & Operated	NPS	1,567
ISRO	MV Voyageur II, Sea Hunter III	Boat	Concession Contract	Non-NPS	8,094
ISRO	MV Isle Royal Queen IV	Boat	Concession Contract	Non-NPS	9,984
ISRO	MV Sandy tour	Boat	Concession Contract	Non-NPS	2,706
PIRO	Pictured Rocks Cruises	Boat	Concession Contract	Non-NPS	99,091
SCBL	Free shuttle service	Bus	NPS Owned & Operated	NPS	1,659
SLBE	Manitou Island Transit	Boat	Concession Contract	Non-NPS	10,839
TAPR	TAPR bus tour	Bus	NPS Owned & Operated	NPS	1,176
VOYA	VOYA tour boat	Boat	NPS Owned & Operated	NPS	1,640

Condition

The NPS uses industry-standard metrics to assess asset condition. For paved roads, paved parking areas, bridges and tunnels, the NPS partners with the FHWA to inspect these assets and assess their condition using computer modeling and engineering expertise. PCR is an industry-standard condition metric that the FHWA uses. Values range from 0 to 100, with higher numbers indicating pavement in better condition. Similarly, bridge condition is measured through the Bridge Health Index (BHI). Under the BHI, values range between 0 percent and 100 percent, with a higher percentage indicating a bridge structure in better condition. For other asset categories (e.g., unpaved roads and parking areas, multiuse trails, docks, boat ramps, railroad facilities), the NPS uses the Facility Condition Index (FCI), which represents the estimated cost of DM, divided by an asset's CRV. The FCI has values between 0.0 and 1.0, and an asset is considered to be in good condition if it has an FCI of 0.10 or less.

Badlands National Park

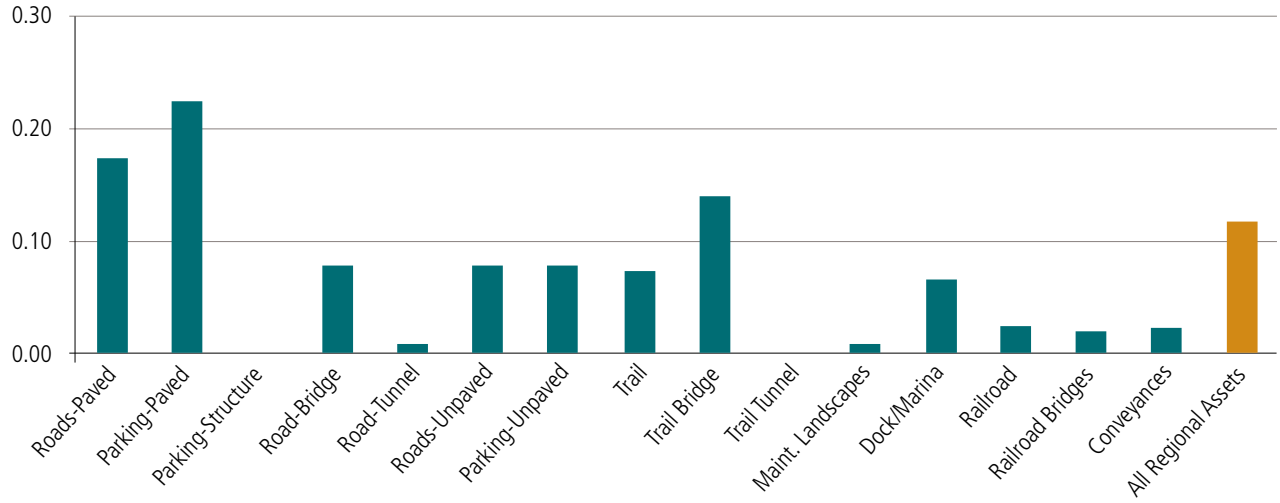
DM for all NPS assets is tracked in the FMSS, an industry-standard asset inventory and work order management and tracking software application. Condition data for road, bridge and parking assets that the FHWA inspects is transferred into the FMSS via the Roads Portal and is used to calculate the FCI, ensuring a common measure of condition across all asset categories.

In terms of replacement value, the majority of the transportation asset portfolio in the MWR is rated as being in "good" condition, as reflected by work orders entered into the FMSS and modeled condition data the FHWA supplies. Seventy-eight percent of the MWR inventory measured by replacement value has an FCI of 0.10 or less. In contrast to the NPS systemwide inventory, an even higher percentage of high-priority assets (90 percent) and culturally significant assets (85 percent) are rated as being in "good" condition in the MWR. This high percentage of assets in good condition stems in part from the relatively small share of paved roads in the MWR inventory, which, because of the qualitatively different means of measuring DM for pavement assets, tend to have a higher FCI.

Most asset categories are in the aggregate in "good" condition, as shown in Figure 2-2. Road and parking assets stand out for being in relatively worse condition than the rest of the MWR portfolio. The condition for these assets is regularly assessed, and DM is computationally modeled, which results in DM estimates that are more comprehensive, recent and thus larger than those for other asset categories.

Figure 2-2. FCI of MWR Transportation Assets, by Asset Category

Source: FY 2014 Office of Management and Budget (OMB) 8 Industry Standard Locations Report, January 29, 2015



Grand Portage National Monument

PAVEMENT AND BRIDGE CONDITION

Poor pavement quality can be uncomfortable or even jarring for visitors, lead to a diminished quality visitor experience, and can impose increased wear and tear on vehicles, decrease vehicle fuel economy and reduce roadway safety. Through regular inspection and proactive maintenance of paved assets, the NPS as a whole, and the MWR in particular, seeks to minimize total asset life-cycle ownership costs, while keeping public use roads and parking areas in good condition.

Paved roads and parking areas are jointly monitored by the NPS and FHWA through the RIP. The RIP inspects paved surfaces using automated, industry-standard equipment and provides inputs to pavement management models that project recurring maintenance (RM) and component renewal (CR) needs. This process allows for an improved targeting of funds to projects that will make the biggest improvements to system pavement condition per dollar spent. Each pavement segment in the NPS is inspected every five years using this process.

The NPS has historically sought to achieve and sustain an average PCR of 85 across the system, which is considered the threshold for "good" condition.[1] It is easier and less costly to maintain pavement already in good condition using less expensive RM and CR pavement preservation techniques than it is to make the much more costly investments in CR and capital investment (CI) necessary to improve pavement areas in poor condition.

At present, the MWR has a network PCR of 84, which is close to the NPS pavement condition target. Primary public roads in the region (FC 1 and 2) have a PCR of 85, while the PCR for other roads and parking areas is somewhat lower, as shown in Figure 2-3. The distribution of condition is desirable from an asset management standpoint, as the highest priority roads are in the best condition, while administrative roads and parking pavements are in somewhat worse condition. However, the regional PCR values will likely decline over time with current and projected future funding levels.

[1]A PCR of 85 is equivalent to an FCI of 0.08.

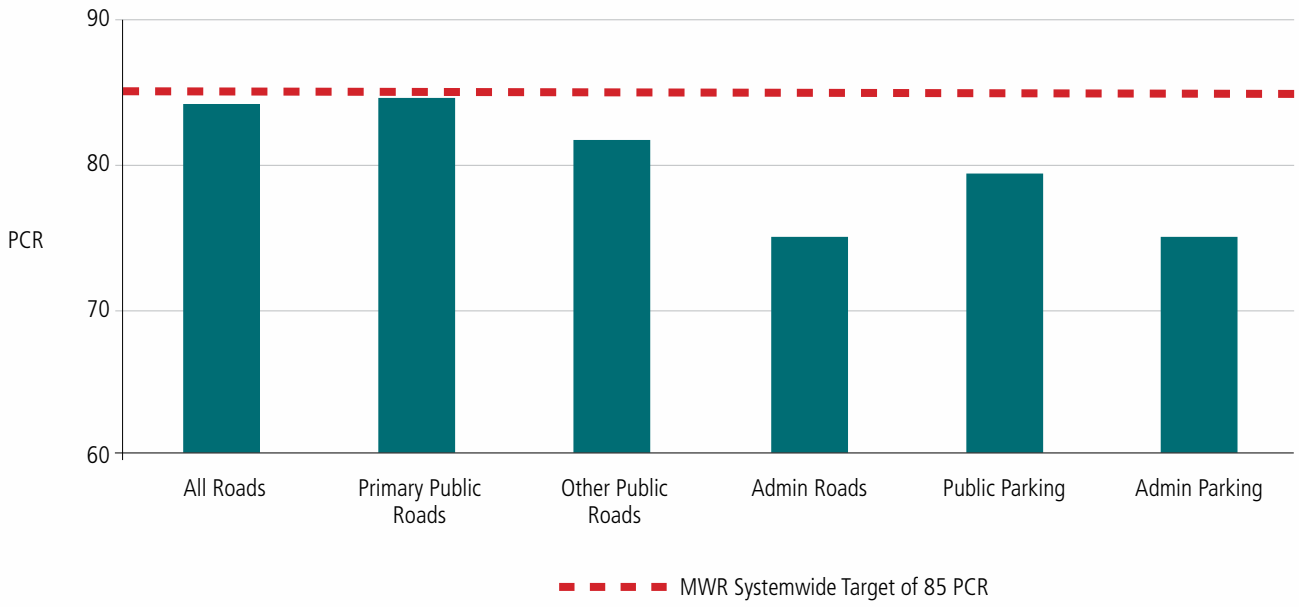
Asset-specific Condition Indexes and Associated Condition Levels

Asset Condition	PCR Range	BHI Range	FCI Range
Good	85-100	92%-100%	< = 0.10
Fair	61-84	80%-91%	0.11 - 0.14
Poor	0-61	0%-79%	0.15 - 0.49
Serious			> = 0.50

Perry's Victory International Peace Memorial

Figure 2-3. PCR for MWR Paved Roads and Parking

Source: 2014 NPS Pavement Condition Report, (US DOT 2015)



The NPS inspects and analyzes the condition of major public roadway bridges through another partnership with the FHWA, the BIP. The FHWA performs bridge inspections on a two-year cycle, assigning a BHI rating to each bridge based on models that consider structural condition, erosion around bridge piers and abutments and the rate of deterioration. The BHI values range between 0 percent and 100 percent, with 100 percent indicating perfect condition.

Similar to the RIP, the BIP uses an industry-standard modeling application (Pontis) to produce a recommended investment strategy for RM and CR bridge projects. These recommended strategies help managers prioritize the projects that will make the biggest improvements in overall network condition. In the MWR, there are 27 major bridge structures monitored with Pontis. The majority of these structures are in good condition (see Figure 2-4), with a combined BHI of 96.2 percent weighted by bridge deck area. Twenty-three structures, or 85 percent of major bridge structures, are in good condition with a BHI of greater than 92 percent.[2] There are five major bridge structures in the MWR that are in fair or poor condition, shown in Table 2-3. These structures will require repairs or significant rehabilitation to bring them up to good condition.

[2]A BHI of 92 percent is equivalent to a FCI of 0.08.

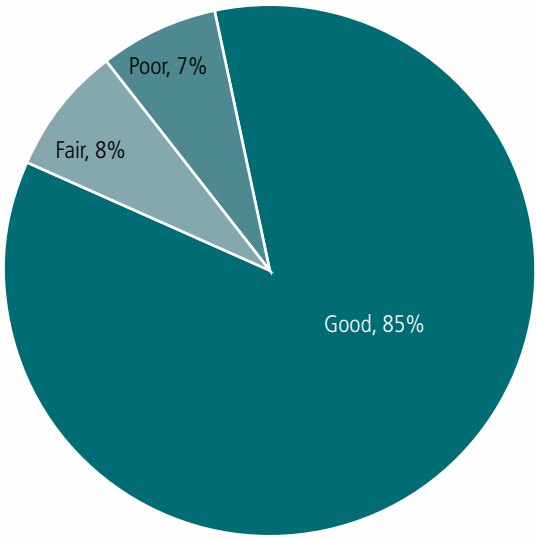
Table 2-3. MWR Bridge Structures in Fair or Poor Condition

Source: Pontis Bridge Condition Data, March 16, 2015

Park	BIP ID	Year Built	Material	BHI (%)	Condition	Optimizer Band
Buffalo National River	7150-001	1943	Concrete	40.0	Poor	3
Cuyahoga Valley National Park	6160-006	1940	Masonry	91.1	Fair	2
Ozark National Scenic Riverways	6640-001	1977	Wood/Timber	77.2	Poor	3
Pictured Rocks National Lakeshore	6320-001	1953	Steel	83.9	Fair	3
Ozark National Scenic Riverways	6640-005	1975	Wood/Timber	67.8	Poor	3

Figure 2-4. Percentage of Number of MWR Bridge Structures, by BHI Condition Rating

Source: Pontis Bridge Condition Data, March 16, 2015



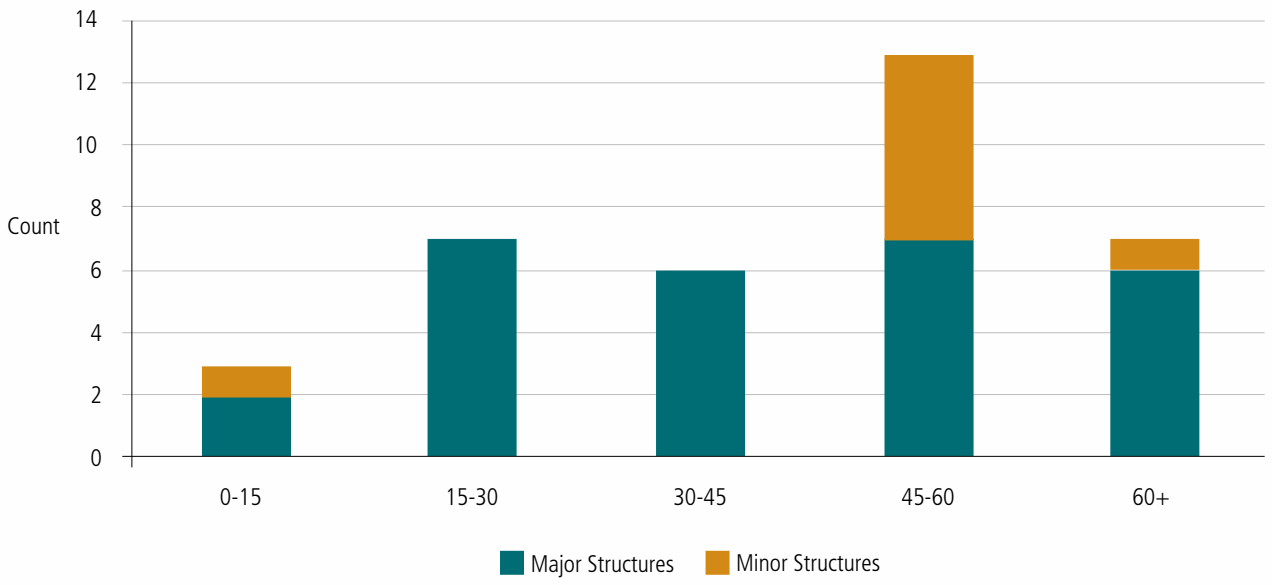
Wind Cave National Park

There are nine other bridge structures in the MWR not monitored in Pontis. Many of these structures have unpaved deck surfaces, including six structures at Ozark National Scenic Riverways. All but one of these structures are currently in good condition, each with an FCI at or near zero. One such structure at Herbert Hoover National Historic Site is rated as being in fair condition.

The possibility of bridge failure presents a critical park operations and safety issue, and bridges at risk of failure will eventually need to be closed for rehabilitation or removed from service. The possibility of a bridge closure at a key location could render an entire interconnected park unit transportation network inoperable. Across the NPS in general, and across the MWR in particular, a significant proportion of the total bridge inventory was constructed between 1940 and 1970. These structures are now entering the second half of their original design service lives. In the MWR alone, 20 major and minor bridge structures are greater than 45 years old, as shown in Figure 2-5. (The average age of all bridge structures in the region is 46.7 years.) These bridges will require more intensive investment than in the recent past just to maintain them in good operating condition. As with regional pavement assets, current and projected future funding levels are not sufficient to maintain all existing bridge structures in good condition; thus, regional bridge condition is likely to decline over time.

Figure 2-5. Count of MWR Bridge Structures, by Age (in Years)

Source: Pontis Bridge Condition Data, March 16, 2015, and FY 2014 OMB 8 Industry Standard Locations Report, January 29, 2015



Midwest Region Clusters

The composition of the transportation asset portfolio in the MWR varies significantly from that of the NPS as a whole. As the relatively small size of MWR park units results in shorter distances, core transportation assets make up a smaller share of the regional transportation portfolio, accounting for 60% of CRV versus 73% systemwide. The region also sees some significant variation across its individual park units. To better account for these differences, the MWR LRTP has developed five regional clusters, which groups together the region's park units that are similar in nature for the purposes of a more consistent analysis within this planning effort. As shown in Table 2-4, these clusters vary widely in terms of asset portfolio composition and size. (Appendix B contains a more detailed description of each regional cluster.)

Core and Multimodal Transportation Assets

On a percentage of CRV basis, the MWR transportation asset portfolio is comprised of 13 percent more multimodal assets than the NPS servicewide portfolio. Accordingly, the MWR has a lower percentage of core transportation assets.

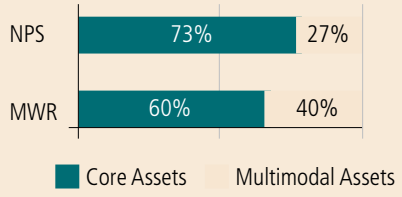


Table 2-4. Asset CRV, by Asset Category and MWR Park Cluster (in Millions)

Source: FY 2014 OMB 8 Industry Standard Locations Report, January 29, 2015

Category	Great Lakes	Great Plains	Great Rivers & Trails	Urban Park Units	Black Hills	Total MWR
Roads–Paved	$98.8	$41.0	$57.2	$50.7	$332.6	**$580.3**
Roads–Unpaved	$11.9	$5.8	$91.1	$4.8	$39.1	**$152.6**
Parking (Paved and Unpaved)	$48.1	$14.7	$21.5	$40.4	$79.1	**$203.8**
Road Bridges	$3.0	$1.2	$12.3	$17.7	$8.0	**$42.2**
Road Tunnels	$0.0	$7.5	$0.0	$47.2	$0.0	**$54.7**
Trails	$36.5	$13.8	$14.4	$37.6	$19.7	**$122.1**
Trail Bridges	$0.9	$1.6	$3.3	$6.9	$0.1	**$12.6**
Trail Tunnels	$0.0	$0.3	$0.0	$0.8	$0.6	**$1.8**
Conveyances	$0.0	$0.0	$0.0	$27.6	$1.5	**$29.1**
Maintained Landscapes	$4.0	$0.4	$1.0	$3.6	$1.6	**$10.6**
Docks/Marinas	$65.5	$0.0	$1.7	$5.9	$0.0	**$73.2**
Railroads	$0.1	$0.0	$6.7	$160.1	$0.0	**$166.9**
Total	**$268.9**	**$86.4**	**$209.2**	**$403.3**	**$482.3**	**$1,450.0**

Several key findings emerged from this cluster analysis:

- The Black Hills and Great Plains clusters have a disproportionate share of the paved road and parking inventory for the MWR, reflecting their larger size, more remote locations and use of individual vehicles as the primary means of visitor access.
- The Great Plains cluster has 36 percent of its asset CRV portfolio designated as historic, versus 15 percent for the MWR as a whole.
- The scenic passenger railroad system at Cuyahoga Valley National Park accounts for 40 percent of the asset CRV for the entire Urban Park Units cluster.
- The Great Lakes cluster contains nearly all the dock and marina assets within the MWR.
- The Great Rivers and Trails cluster accounts for nearly 60 percent of the total unpaved road mileage in the MWR, and these roads account for 41 percent of its asset CRV.

Analysis of asset condition by cluster reveals a similar pattern to that shown in Table 2-5. Across the clusters, roads and parking areas tend to have more DM associated with them, while other asset categories are mostly in good condition.

Table 2-5. Facility Condition Index, by MWR Cluster

Source: FY 2014 OMB 8 Industry Standard Locations Report, January 29, 2015

Asset Category	Black Hills	Great Lakes	Great Plains	Great Rivers & Trails	Urban	All MWR
Roads (Paved)	0.17	0.17	0.13	0.25	0.14	0.17
Roads (Unpaved)	0.05	0.11	0.02	0.09	0.07	0.08
Parking Areas	0.05	0.23	0.18	0.21	0.29	0.17
Road Bridges	0.05	0.08	0.04	0.13	0.05	0.08
Road Tunnels	*	*	0.00	*	0.01	0.01
Trails	0.02	0.07	0.05	0.11	0.10	0.07
Trail Bridges	0.01	0.13	0.01	0.03	0.22	0.14
Trail Tunnels	0.00	*	0.00	*	0.00	0.00
Conveyances	0.05	*	*	*	0.02	0.02
Maintenance Landscapes	0.00	0.01	0.00	0.04	0.00	0.01
Docks/Marinas	*	0.07	*	0.07	0.00	0.07
Railroads	*	0.00	*	0.00	0.02	0.02
Asset Category Total	**0.13**	**0.14**	**0.10**	**0.14**	**0.08**	**0.12**

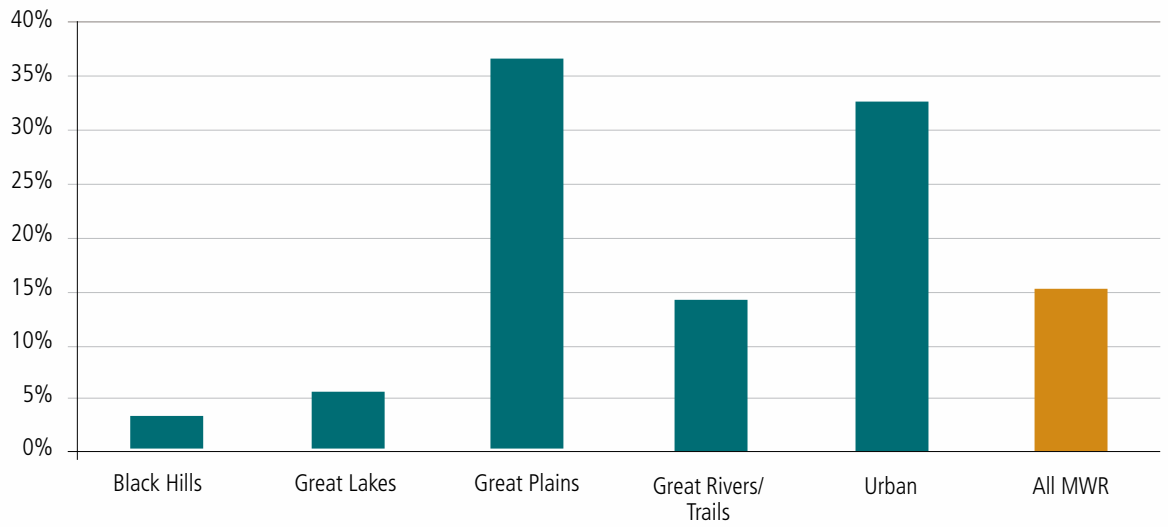
*Assets of this category not present in this cluster

FCI	Condition
0.000 - 0.109	Good
0.110 - 0.149	Fair
0.150 - 0.499	Poor
0.500+	Serious

These clusters also vary widely in terms of the share of culturally significant transportation assets in their respective inventories, from a low of 3 percent in the Black Hills cluster to a high of 36 percent in the Great Plains cluster (see Figure 2-6).

Figure 2-6. Culturally Significant Share of Asset CRV, by MWR Cluster

Source: FY 2014 OMB 8 Industry Standard Locations Report, January 29, 2015, and Federal Accounting Standards Advisory Board Location Data, 2014



Operations and Maintenance

To keep transportation assets open and in good condition, NPS units perform O&M activities across the asset life cycle, including facility operations (FO), PM and some RM, along with corrective maintenance treatments. Examples of these O&M activities include sweeping, plowing and mowing (FO activities); assessments, road shoulder and drainage system upkeep, crack sealing and hazard tree removal (PM activities); and restriping, reaggregating unpaved roads and replacing water bars on trails (RM activities). These activities do not improve the condition of assets, but rather are the day-to-day work required to keep assets open and functioning. Recommended maintenance projects are designed to make sure capital investments are sustained for as long as possible. The FO and PM stages in the asset life cycle are essential to minimizing long-term costs. In particular, properly executed PM and RM activities can significantly extend the useful life of transportation assets, reducing future needs for costly CR and CI expenditures.

For a more detailed analysis of the types and levels of O&M needs for the MWR transportation asset portfolio, please see Chapter 3: Transportation Finance.

Voyageurs National Park

Optimization of Assets

NPS park units use a combined ranking of asset importance and condition called the "optimizer band (OB)" to identify highest and high-priority assets in a unit. Optimizer bands specify the level of O&M funds a unit plans to dedicate to a given asset. This banding informs the Financial Sustainability category of NPS CIS project scores.

"Highest priority" assets are defined as those assigned to OB 1. "High-priority" assets are those assigned to OB 2. The assignment of assets to these bands represents a commitment by a park unit to funding a minimum prescribed share of recommended PM for those assets (55 percent for OB 1, 50 percent for OB 2, 25 percent for OB 3) as described in the CIS. The goal of this process is to ensure that expensive CR and CI investments in these assets will be maintained over time.

OB 1 and 2 assets account for 57 percent of the MWR transportation portfolio (by CRV) and 63 percent of the DM in part from the relatively high priority of paved roads within the inventory (see Figure 2-7). Targeting maintenance funds according to CIS guidelines should result in a reduction in the DM backlog and improvements in the condition of these assets over time. Conversely, the condition of lower priority assets will likely decline at an accelerated rate, as some of their currently allocated O&M funds are redirected to higher priority assets.

Figure 2-7. MWR Transportation Asset CRV ($ in Millions), by OB

Source: FY 2014 OMB 8 Industry Standard Locations Report, January 29, 2015

Deferred Maintenance

Because of funding shortfalls, not all necessary or recommended maintenance can be performed for all transportation assets each year. This reality leads to an increase in the value of an asset's DM, a measure of the accumulated total costs necessary to correct deficiencies resulting from unaccomplished past recommended maintenance and repairs. The estimated DM backlog for transportation assets in the MWR is $170 million, as shown in Figure 2-8. Paved roads, paved parking areas, bridges and tunnels account for $137 million of that DM and other assets account for the remaining $33 million of the total.

The distribution of DM by OB is shown in Figure 2-9. This distribution reflects the large overall share of DM associated with pavement assets. It also illustrates that pavement assets tend to be assigned to higher priority OBs than are other asset categories.

Scotts Bluff National Monument

Figure 2-8. MWR Transportation Asset DM ($ in Millions)

Source: FY 2014 OMB 8 Industry Standard Locations Report, January 29, 2015

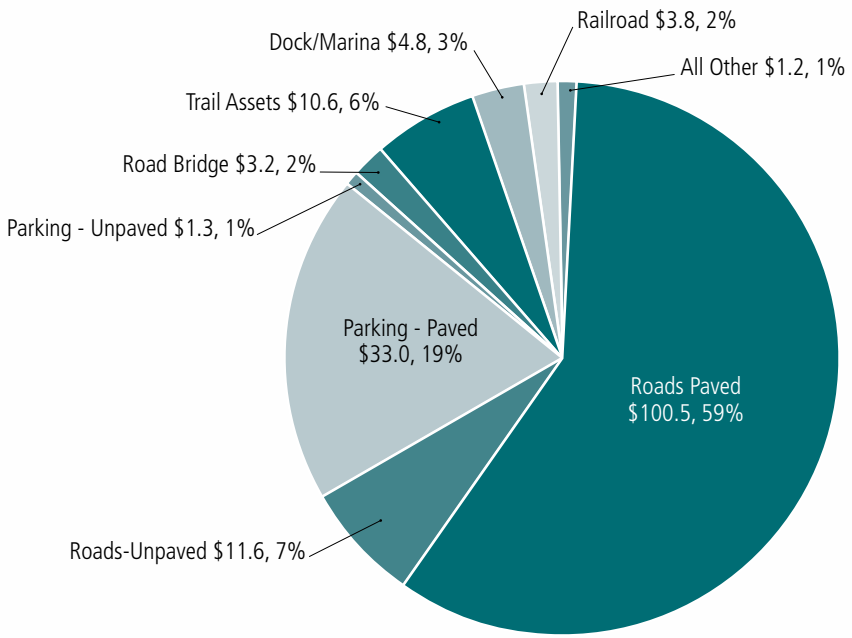


Figure 2-9. MWR Transportation Asset DM ($ in Millions), by OB

Source: FY 2014 OMB 8 Industry Standard Locations Report, January 29, 2015

Transportation Asset Climate Change Adaptation and Resilience

Transportation asset management in the MWR must consider the challenges of global climate change. Roads, marinas and other assets in the region were located and designed to withstand historical seasonal fluctuations of temperature and precipitation. If future conditions continue to exceed historical norms and do so more frequently, and extreme weather events become more commonplace, the condition, function and longevity of the region's transportation facilities may be adversely affected. Changes in temperature and precipitation, both average levels and extremes, may accelerate the degradation of transportation assets and, in the most extreme cases, may result in catastrophic damage or loss.

Impacts from climate change to transportation assets could include accelerated pavement wear from extreme temperatures and freeze-thaw cycles, docks being damaged or rendered useless by changing lake water levels and assets of all categories located in low-lying areas being damaged or lost from more frequent and extreme flood events. There is also the potential for significant disruption of regional transportation systems and major impacts to safety, visitor access and resource protection resulting from such events. In addition, changes in the duration of seasons could affect established visitor use patterns.

The impacts of climate change have already been observed at a number of park units in the MWR. As these impacts increase in severity over time, existing assets will need to be adapted to increase their resiliency to these changing conditions. Table 2-6 summarizes a range of projected climate change impacts presented in the *2014 National Climate Assessment* (Melillo, Richmond, and Yoge, Eds. 2014) and their probable implications for transportation assets (Transportation Research Board 2008).

Theodore Roosevelt National Park

Table 2-6. Climate Change Impacts and Implications for Transportation

Sources: Melillo, Richard and Yoge, Eds. (2014); Transportation Research Board (2008)

Projected Climate Change Impacts and Implications for Transportation	Implications for Transportation
Projected Impacts / Temperature	**Implications for Transportation**
• Changes vary by region, but average annual temperature is expected to continue to rise • Heat waves are projected to become more intense • The number of extremely hot days is projected to increase • Cold waves are projected to become less intense • The length of the frost-free season is projected to increase • Ice volumes on land, lakes and seas are projected to reduce, including increased melting of permafrost	• Accelerated degradation of infrastructure • Increased maintenance and rehabilitation needs • Increased safety and accessibility concerns for nonmotorized transportation • Reduced seasonal operations for over-snow/ice systems • Reduced need for plowing and salting • Changes in visitation patterns from summer to spring and fall • Changes in visitor usage of transportation assets • Changes in water levels and stream flow timing in waterways used for transportation
Projected Impacts / Precipitation	**Implications for Transportation**
• Changes vary by region, and the direction of change is uncertain • The frequency and intensity of extreme precipitation events is projected to increase • More winter and spring precipitation is projected for the northern United States and less in the southern United States	• Increased damage to infrastructure from flooding • Increases in closures from flooding • Increased maintenance and rehabilitation needs • Bridges, culverts and soil systems more frequently washed out, eroded or damaged from scour • Potential that bridges, culverts and drainage systems will be unable to accommodate higher peak stream flows and that wildlife migration paths through them will narrow or disappear

IDENTIFICATION AND MANAGEMENT OF VULNERABLE ASSETS

The MWR published a *Climate Change and Green Parks Strategy Report* in (NPS 2012a), which identified several actions related to improving facility resilience and reducing GHG emissions (summarized in Table 2-7). Vulnerable assets will be identified through geographic information systems analysis, and project selection will be modified to direct construction and maintenance funding to structures that comply with the latest sustainability guidelines.

Action 3.8 has identified 17 structures in the MWR LRTP asset inventory that will need to comply with Guiding Principles. Three of these structures are pilot test buildings, while eight are targeted for implementation beyond 2015.

In addition, the NPS Climate Change Response Program is developing and refining the Coastal Hazards and Climate Change Asset Vulnerability Assessment Tool. A key goal of this initiative is to broaden its applicability beyond coastal parks. Once the assessment tool is able to model impacts for noncoastal parks, the MWR will apply it to several pilot park units to determine the vulnerability of their assets to climate change effects.

Table 2-7. Proposed MWR Climate Change Adaptation Strategies

Sources: Climate Change and Green Parks Strategy, Midwest Region (NPS 2012a); Source: DOI Climate Change Response Program (NPS 2012b)

Action	Description
Adapting Infrastructure – Action 2.5	The MWR will use geographic information systems to map and identify park infrastructure and operations most at risk to the effects of climate change (e.g., structures and operations located near shorelines and in flood zones).
Improving Sustainability in Facilities – Action 3.7	MWR facility projects that are new construction exceeding 5,000 gross square feet or significant renovations that exceed 50% of the CRV will meet the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings (Guiding Principles). The NPS Project Sustainability Checklist for Building and Non-Building Projects will be incorporated into project designs and architectural and engineering contracts.
Improving Sustainability in Facilities – Action 3.8	The MWR will meet the Department of the Interior Sustainable Buildings Implementation Plan goal of 15% of buildings greater than 5,000 square feet complying with the Guiding Principles. Toward this goal, the MWR has completed an inventory of these facilities and will complete an evaluation of a number of these facilities to develop renovation projects to bring them into compliance with the Guiding Principles while ensuring compliance with the National Historic Preservation Act and other applicable federal laws.
Improving Sustainability in Facilities – Action 3.9	The MWR will develop and implement screen-out criteria requiring compliance with all applicable Guiding Principles in all facilities projects that receive funding from Repair/Rehabilitation, Cyclic Maintenance, Cultural Cyclic and Federal Highways fund sources and the Recreation Fee program, regardless of size.

Regional Issues and Opportunities

Addition of New Park Units

In the last decade, several new park units have been added to the MWR, specifically the Pullman National Monument (Chicago, Illinois) and the Wright Company Factory addition to the Dayton Aviation Heritage National Historical Park (Dayton, Ohio). Other sites throughout the region are currently under evaluation for NPS designation. Existing assets at these sites are being incorporated into the FMSS and will factor into the final MWR transportation asset inventory. These assets will be assigned an OB and will require the allocation of funding for operations, maintenance and in some cases, significant rehabilitation or replacement, covering the entire asset life cycle (i.e., the total cost of facility ownership). Some new construction or demolition actions may be required as well. These anticipated future costs will be identified during upcoming planning efforts associated with the continuing update phase of the MWR LRTP.

Recommended Strategies

- Ensure that a robust condition assessment program is in place and completed for all asset categories
- Develop an inventory of transportation assets that have historically, or are predicted to be at risk (e.g., from flooding, erosion, washouts, landslides) within the region, using tools that the PFMD Sustainable Operations and Climate Change branch is currently developing. The region is ready to conduct analysis on some parks as soon as the modeling system is expanded to provide analysis procedures for noncoastal parks, and the results will influence project selection
- Integrate risk assessment and total cost of facility ownership into future planning initiatives and project prioritization criteria

Dayton Aviation Heritage National Historic Site

Aging Infrastructure (including Bridge Condition)

Failures of park infrastructure could adversely impact the visitor experience, safety and regional economies. The average transportation asset age in the MWR is 51.6 years, as shown in Figure 2-10, and older assets like these tend to require more frequent and intensive maintenance and repair activities to maintain performance. The historic designation of some of these assets may require additional specialized maintenance stemming from nonstandard designs and materials. Transportation assets greater than 50 years of age account for $883 million of CRV, or 61 percent of the transportation asset total for the region.

Bridge condition is of particular concern. Overall, bridge structures in the region are in good condition, with just three bridges being rated "poor" according to the most recent BIP data. However, the majority of regional bridge structures are, at a minimum, past the halfway point of their expected lifespans, and their conditions will likely continue to deteriorate over time. Given the potentially catastrophic effects of a bridge failure, it is critical to stay in front of bridge maintenance, repair and replacement needs.

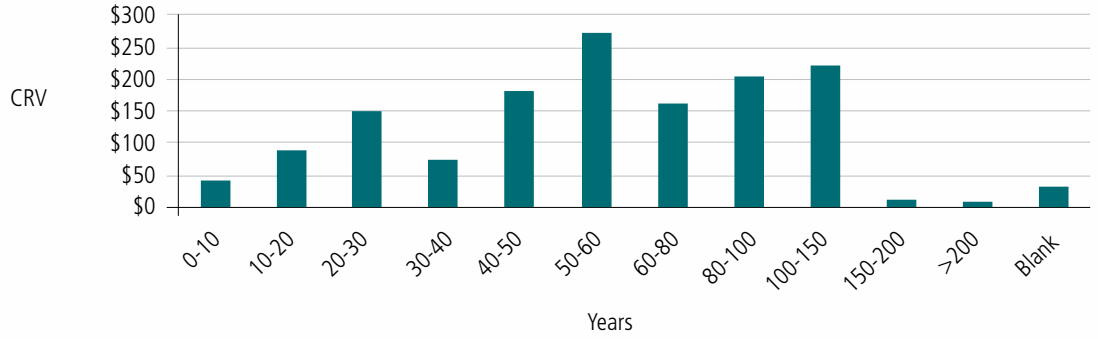
Other transportation asset categories are also of an advanced age, including roads (average age of 64 years), tunnels (average age of 77 years) and railroad assets (average age of 106 years).

Recommended Strategies

- Ensure that a robust condition assessment program is in place and completed for all asset categories
- Verify that Health, Life, Safety and Resource Risk Assessment Codes are entered, current, and correct for all transportation assets to ensure that resource protection factors positively influence project CIS scores
- Remove unnecessary, redundant, vulnerable or underused (low OB) infrastructure to follow agency policy to reduce the facility footprint, restore resources and reduce long-term maintenance needs
- Implement a more holistic and flexible approach to project planning, following the guidance of the CIS while devising project scope to simultaneously achieve multiple park objectives with limited funding

Figure 2-10. MWR Transportation Asset Age (in Years), and CRV ($ in Millions)

Source: FY 2014 OMB 8 Industry Standard Locations Report, January 29, 2015



Intentional Trail Design and Maintenance

Trails are at the core of visitor experience for the majority of parks in the MWR. The multimodal trails identified in the MWR asset inventory serve an important transportation function by providing access to key park destinations and connections to adjacent communities. While trails lack a dedicated project fund source, they are eligible for many fund sources, including Federal Lands Transportation Program (FLTP) and Recreation Fee funds. Projects tangibly connected to trails, such as river bank stabilization, are eligible for these funding sources as well.

The region must also focus construction and maintenance efforts on officially designated trails rather than visitor-created informal trails, which should be closed, and the impacted landscapes rehabilitated to reflect original, natural conditions. MWR trails have DM needs that can be eliminated with relatively small projects, which can be funded through a number of sources.

Recommended Strategies

- Design and build trails following sustainable trail practices, such as the *Guide to Sustainable Mountain Trails: Trail Assessment, Planning & Design Sketchbook*, as well as the *Architectural Barriers Act Accessibility Guidelines: Outdoor Developed Areas*
- Ensure that funding is directed toward maintaining and improving designated, high-priority, frontcountry transportation trails

Herbert Hoover National Historic Site

Risk Assessment

Transportation assets in the MWR face significant risks, including natural hazards and other site-specific risks. Identification of these risks should be a key focus of funding prioritization, design and asset disposition. As part of this effort, an improved understanding of the risks present across the region and how they relate to transportation assets is a critical first step.

Climate change is an especially important long-term threat to transportation assets in the region, as its effects are pervasive and projected to increase in the future. Such effects would likely include periods of extreme heat and its effect on paved surfaces; extreme storm events and resulting high volumes of surface runoff, which results in significant flash flooding; and changes in lake and river levels, which could render docks at least temporarily inoperable.

Recommended Strategies

- Develop an inventory of transportation assets that have historically or are predicted to be at risk (e.g., from flooding, erosion, washouts, landslides) within the region, using tools that the PFMD Sustainable Operations and Climate Change branch is currently developing. The region is ready to conduct analysis on some parks as soon as the modeling system is expanded to provide analysis procedures for noncoastal parks, and the results will influence project selection
- Remove unnecessary, redundant, vulnerable or underused (low OB) infrastructure to follow agency policy to reduce the facility footprint, restore resources and reduce long-term maintenance needs
- Integrate risk assessment and total cost of facility ownership into future planning initiatives and project prioritization criteria

Apostle Islands National Lakeshore

Measuring System Performance

Performance Measure: Condition of Highest and High-Priority Transportation Assets

Definitions of Priority

The Midwest Region defines highest and high-priority transportation assets as follows:

- Paved Roads and Parking: FC 1, 2 and 7
- Bridges: OB 1 and 2
- Other Transportation Assets: OB 1 and 2.

Baseline

The baseline conditions for highest and high-priority MWR transportation assets are as follows:

- Paved Roads and Parking: PCR of 85
- Bridges: BHI of 98.7 percent
- Other Transportation Assets: FCI of 0.15.

Target

In six years the Midwest Region seeks to achieve and maintain the following target conditions for its transportation assets:

- Highest and high priority paved roads and parking: PCR of 82
- All bridges: BHI of 98.7 percent
- Other Transportation Assets: Highest priority FCI of 0.17 and high-priority FCI of 0.27.

FCI figures are adjusted to include programmatic needs, such as life health safety, code compliance and accessibility, in addition to DM.

Performance Measure: Transportation Deferred Maintenance

The Midwest Region seeks to reduce the amount of DM associated with OB 1 and 2 transportation assets.

Baseline

The baseline DM figure for MWR OB 1 and 2 transportation assets is $108 million, as per the FY 2014 OMB 8 Industry Standard Locations Report (January 29, 2015).

Target

Attain a DM backlog of OB 1 and 2 transportation assets of $114 million over the next six years. Continuation of the current investment practices would otherwise result in a regional DM value of $130 million by FY 2021.

Performance Measure: Number of Park Units with a Completed Risk Vulnerability Assessment

Baseline

No MWR park units have completed transportation infrastructure vulnerability assessments.

Target

Complete a minimum of one vulnerability assessment within each MWR cluster annually and make the climate change vulnerability assessment tool available to all parks in the Midwest Region.

Isle Royale National Park

Chapter 3
Transportation Finance

Midwest Region Long Range Transportation Plan

Goal

Maximize the amount, variety and flexibility of transportation fund sources and allocate these funds wisely

Objectives

- Identify and prioritize transportation system investments based on NPS mission, life-cycle costs and anticipated future funding
- Coordinate transportation system investments across all available fund sources
- Grow and leverage transportation system investments through appropriate partnerships and innovative financing approaches
- Establish the institutional capacity within the MWR to meet the goals of the regional and National LRTPs

Introduction

The MWR must allocate capital investment and O&M funding to support the transportation systems in all of its park units. Securing this funding is an ongoing, multiyear effort that incorporates input from every level of the service, as well as the DOI and the US DOT, particularly the FHWA Office of Federal Lands Highway.

The long-term sustainability of the region's transportation system faces a serious financial challenge. Between federal FY 2006 and federal FY 2013, an average of $23.7 million per year was invested in MWR transportation assets. In recent years, funding levels for the most significant transportation funding programs have leveled off or declined or the funding programs have been eliminated altogether. The NPS forecasts that an annual average of only $20.0 million in funding for capital and O&M needs will be available from fund sources inside and outside the NPS for the MWR between FY 2015 and FY 2021.

The financial analysis for the MWR LRTP was completed with projections of funding levels based on MAP-21 federal surface transportation allocations. The recently enacted FAST Act could result in an increase to the projected Title 23 allocation to the Midwest Region, which would reduce the projected regional transportation funding gap.

The total annual need for the region's transportation portfolio is estimated to be $53.9 million, which leaves an annual $33.9 million unmet gap. The largest component of this annual need is capital investment at $31 million. Total annual need for just the highest and high-priority assets (those assigned to OBs 1 and 2) is $31.8 million.

Under the current forecasted funding, the MWR will neither be able to fulfill the ongoing capital and O&M requirements of its existing transportation asset inventory nor will it be able to reduce the $170 million DM backlog for these assets.

Funding for transportation system O&M activities will need to be carefully balanced among asset life-cycle stages in line with total cost of facility ownership principles. The NPS has historically allocated the majority of its maintenance funding to heavy maintenance, rehabilitation and reconstruction projects that improve asset condition and reduce DM. However, the majority of NPS units have not historically had either the staff or financial resources needed to perform the required day-to-day PM on those same assets. Failure to perform these necessary PM activities accelerates asset condition decay; fails to maximize the cost effectiveness of prior investments in heavy maintenance, rehabilitation and reconstruction; and increases DM in the long run because DM accrues at a rate faster than it can be addressed. The result is a shorter asset life cycle and, ultimately, higher major rehabilitation or replacement costs.

The CIS has begun to address these issues and will maximize benefits relative to limited funding projected into the future. By aligning capital and heavy maintenance funding with corresponding funding for operations and PM and by strategically focusing available financial resources on highest and high-priority assets, the MWR should be able to lower the life-cycle costs of its high-priority transportation assets, obtaining the maximum service return per dollar spent. These strategic improvements will enable the MWR to improve the condition of its high-priority transportation assets, albeit at the expense of its lower priority assets, whose conditions are expected to continue to deteriorate over time.

Baseline Conditions and Trends

This regional LRTP presents historical investments, forecasted funding, total transportation portfolio needs and funding gaps according to three main concepts: priority, asset life cycle and asset category. All figures this chapter presents are adjusted to FY 2014 dollars, and all identifiable American Recovery and Reinvestment Act investments have been removed.

Historical Investments

Between FY 2006 and FY 2013, the MWR invested an annual average of $23.7 million in transportation assets, combining NPS funds with those from the FHWA and other sources. The MWR invested 58 percent of all transportation funding in paved assets, including roads, bridges and parking.

Fund Sources

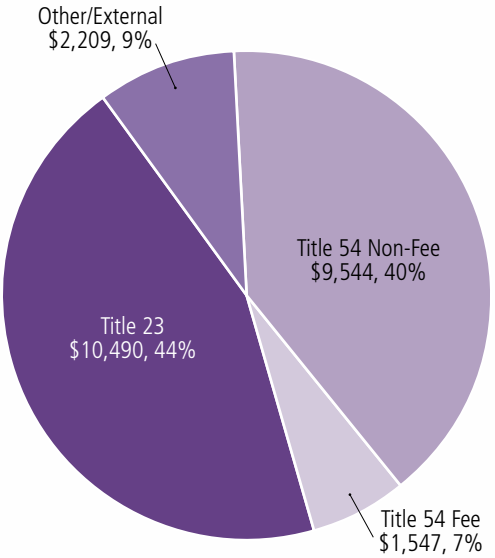
Between FY 2006 and FY 2013, eight out of more than 60 funding programs accounted for nearly 90 percent of transportation funding in the MWR. As shown in Figure 3-1, 44 percent of the funding came from FHWA programs authorized under Title 23 of the United States Code (USC). Forty-seven percent of the funding came from the DOI via programs authorized under USC Title 16, which has recently been replaced by USC Title 54, and is now referred to as Title 54 throughout this document. Other sources made up the remaining 9 percent of transportation funding sources during this period and included donations, Federal Transit Administration (FTA) grants and reimbursable agreements with other entities. In contrast, nearly 60 percent of total national systemwide transportation expenditures are sourced from Title 23 and a correspondingly smaller share from Title 54 sources.

Wilson's Creek National Battlefield

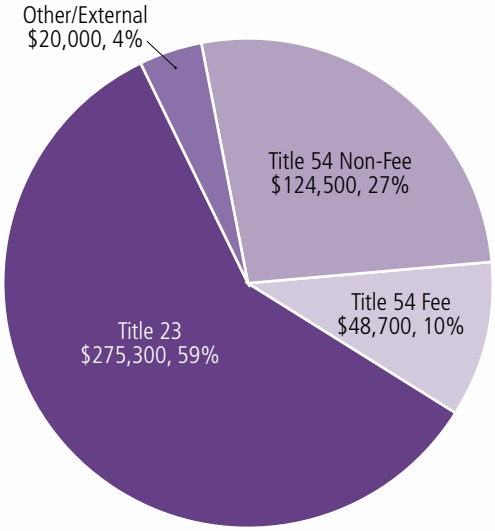
Figure 3-1. MWR and NPS System-wide Transportation Fund Sources, FY 2006–FY 2013 ($ in Thousands)

Source: NPS Administrative Finance System

MWR Obligations by Fund Source



NPS System-wide Obligations by Fund Source



Cuyahoga Valley National Park

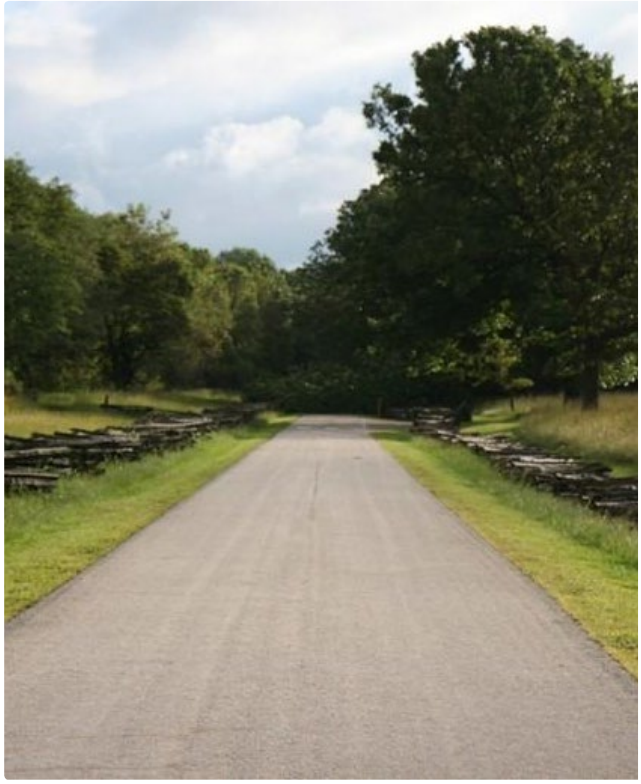
TITLE 23 FUND SOURCES

Between FY 2006 and FY 2013, the Federal Lands Transportation Program (FLTP, formerly known as the Federal Lands Highways Program) constituted 44 percent of overall MWR transportation obligations, or an average of $10.5 million per year (see Table 3-1). This program is the largest contributor to transportation funding for the NPS systemwide at 59 percent of overall transportation obligations, which is a significantly greater share than in the MWR, whose smaller share is reflective of the relatively small amount of paved roads and parking in the region in comparison to the NPS national transportation system inventory. The Title 23 Category 1 program funds capital investments, RM and component renewal of NPS transportation assets. The Title 23 Category 3 program supports the development and operation of ITS, bicycle/pedestrian and transit systems.

NPS allocations of the FLTP, which accounted for 80 percent of total MWR Title 23 funds, were administered jointly by the NPS and the FHWA Office of Federal Lands Highway. It was the most significant and stable transportation fund source dedicated solely to NPS transportation. (Title 54 funds are not dedicated solely to transportation projects, and other Title 23 funding programs have been cut or eliminated in recent years, such as the Paul S. Sarbanes Transit in Parks [TRIP] program. The TRIP program provided an annual average of about $1.0 million to the MWR between FY 2006 and FY 2013.) The NPS allocated FLTP funding first by category and then by priority within a category. Category I funded roads and bridges, Category II funded designated parkways and Category III funded transit, trails and ITS.

Successfully leveraging partnership opportunities can supply additional funds for transportation and help address funding shortfalls.

FHWA discretionary programs made up the remaining 20 percent of total MWR Title 23 funds. Many of these programs, including the National Scenic Byways Program and the Public Lands Highway Discretionary Program, were discontinued in 2012 under MAP-21, the prior surface transportation reauthorization legislation that was the successor bill to the Safe Accountable Flexible Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). Also in MAP-21, and carried forward in the FAST Act, transportation enhancements were consolidated with other programs into the Transportation Alternatives Program, for which the NPS remains eligible. Although the FAST Act-authorized FLAP provides benefit to the NPS, this program is not included in this financial analysis because the NPS is not a directly eligible recipient for the funds awarded under this competitive program, which is designed to support state and local governments.



Pea Ridge National Military Park

TITLE 54 FUND SOURCES

Title 54 funding consists of seven primary and many other smaller fund programs that Congress authorizes for application only to the NPS (see Table 3-1). Each Title 54 fund has its own fund program manager and programming process, but it is important to note that none of these sources except for Transportation Fee are dedicated solely to transportation. Over the period of FY 2006–FY 2013, approximately $11 million (47 percent) of the average annual transportation funding for the MWR originated from Title 54, a share 10 percentage points higher than for the NPS as a whole. As noted in the previous discussion of Title 23, each Title 54 dollar spent on core transportation assets is a dollar that could have been spent on many other important park unit needs.

Table 3-1. Average MWR Annual Title 23 and 54 Expenditures, FY 2006–FY 2013, by Fund Source Program, and Share of Total MWR Transportation Expenditures ($ in Thousands)

Source: NPS Administrative Finance System

Title 23 Fund Source	Expenditure	Percentage Share
Park Roads and Parkways Program (FLTP)	$8,379	35%
Public Lands Highway – Discretionary	$1,121	5%
Scenic Byways	$397	2%
Earmarks	$273	1%
Emergency Relief for Federally Owned Roads	$121	0.5%
Transportation Enhancements	$100	0.4%
Other FHWA Programs	$99	0.4%
Total	**$10,490**	**44%**
Title 54 Fund Source	**Expenditure**	**Percentage Share**
Operational Base	$4,121	17%
Cyclic Maintenance	$2,705	11%
Repair/Rehabilitation	$1,896	8%
Line Item Construction	$364	2%
Recreation Fees	$1,459	6%
Concessions Franchise Fees	$67	0.3%
Transportation Fees	$21	0.1%
Other NPS Programs	$370	2%
Total	**$11,002**	**46%**
Other/External Fund Source	**Expenditure**	**Percentage Share**
Reimbursable Agreements	$1,036	4%
FTA TRIP/Alternative Transportation in Parks and Public Lands	$1,018	4%
Donations	$155	1%
Total	**$2,209**	**9%**
Total MWR Transportation	**$23,700**	**100%**

For this reason, there are opportunities within the region to increase use of Title 23 funds to enhance support for transportation assets in the MWR, as well as to improve strategic coordination among Title 54 fund programs.

Park Operational Base, the largest Title 54 fund source for transportation, accounts for $4.1 million (17 percent) of total annual MWR transportation expenditures. Two-thirds of this total is directed to FO and PM, and one-third to less frequently RM projects, as shown in Figure 3-2. At the park unit level, many needs are funded through park operational base funding, and funds expended on transportation needs come at the expense of other needs in different operational areas.

Other Title 54 nonfee funding programs, including Cyclic Maintenance, Repair/Rehabilitation, Line Item Construction and others, accounted for 23 percent of annual transportation funding. As with Park Operational Base, these programs are not solely dedicated to transportation.
The NPS is authorized by Congress to charge recreation fees, transportation fees and concessions franchise fees to help operate and maintain the assets that visitors use. Three Title 54 fee programs (Recreation Fee, Transportation Fee and Concessions Franchise Fee) account for 7 percent of annual transportation funding for the MWR. MWR transportation expenditures from Title 54 Fee revenue came almost entirely from the Recreation Fee program, at nearly $1.5 million per year, while the Transportation Fee and Concession Franchise Fee programs combined for only $88,000, or less than one percent of average annual transportation expenditures. Systemwide, these three fund sources account for 10 percent of average annual transportation expenditures.

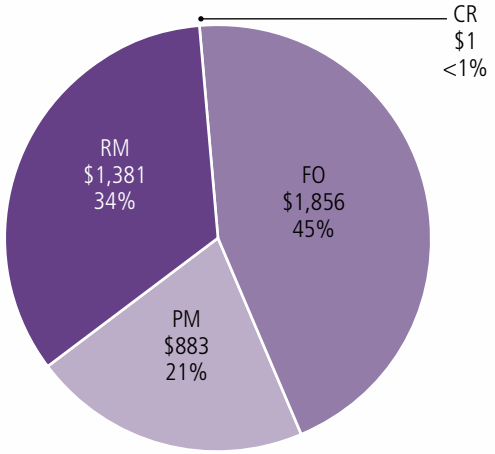
The three percentage point difference in fee expenditure is explained almost entirely by the low level of transportation fee expenditures in the MWR, which account for just one percent of fee expenditures in the MWR versus 28 percent systemwide. Besides the FLTP, transportation fees are the only other fund source solely dedicated to NPS transportation. Not every park unit that has a transit system collects a transportation fee, and approval for these fees can be challenging to obtain. That the MWR does not collect a sizeable amount of transportation fee revenue poses a transportation funding challenge, as transportation needs must compete with other projects within the other Title 54 programs in the region.

The MWR has historically funded O&M predominantly with Title 54 fund programs. The challenges of funding investment and O&M from different sources allocated at varying levels of the organization are described in the section, Obligations by Asset Life-Cycle Stage. While the MWR funded the same share of its O&M expenditures with Title 23 funds as the NPS as a whole, as shown in Table 3-2, a much greater MWR share was funded out of Other/External sources, mostly in the form of donations.

Apostle Islands National Lakeshore

Figure 3-2. Average Annual Allocation of Park Operational Base Funds, FY 2006–FY 2013 ($ in Thousands)

Source: MWR LRTP Financial Analysis



OTHER FUND SOURCES

Approximately $2.2 million each year, or about 9 percent of all transportation funding in the MWR, originated from sources outside of Title 23 and Title 54. The region received $1.0 million from TRIP, now discontinued under MAP-21. These contributions went to four MWR park units: Cuyahoga Valley National Park, Tallgrass Prairie National Preserve, Theodore Roosevelt National Park and Mississippi National River & Recreation Area, with the predominant share dedicated to the support of the Cuyahoga Valley Scenic Railroad. Other federal agencies and nonfederal organizations, such as state DOTs and local governments, contributed an average of $1.0 million in reimbursable agreements each year to help accomplish mutually beneficial projects. Finally, the MWR received $155,000 on average each year from private corporations, nonprofit organizations and individuals to fund transportation investments.

Table 3-2. O&M Expenditure, by Fund Source, FY 2006–FY 2013 ($ in Thousands)

Source: NPS Administrative Finance System

Program	MWR		National	
Fund Source	**Expenditure**	**Percentage Share**	**Expenditure**	**Percentage Share**
Title 54	$8,048	78%	$132,900	86%
Title 23	$1,251	12%	$19,300	12%
Other/External	$1,002	10%	$2,900	2%
Total	**$10,301**	**100%**	**$155,000**	**100%**

Indiana Dunes National Lakeshore

Obligations by Asset Category

The MWR operates and maintains a large and diverse portfolio of transportation assets and services, previously introduced in Chapter 2: Asset Management. Figure 3-3 and Table 3-3 summarize the average annual funding allocation among transportation asset categories between FY 2006 and FY 2013. Paved roads received $9.4 million, or 39 percent of the total transportation funding for the region. Sixty-one percent of this funding for roads came from the FLTP ($5.6 million), with the remaining share funded by other Title 23 and Title 54 sources.

Figure 3-3. MWR Average Annual Historical Obligations, by Asset Category, by Funding Title and Program, FY 2006–FY 2013 ($ in Thousands)

Source: MWR LRTP Financial Analysis

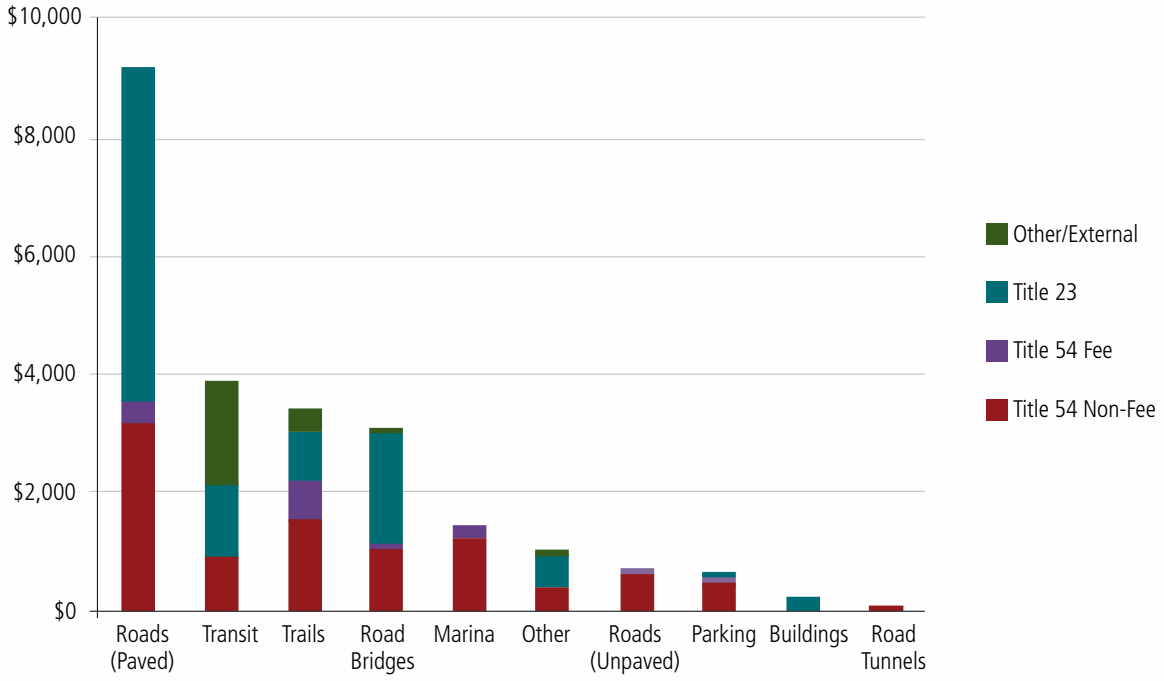


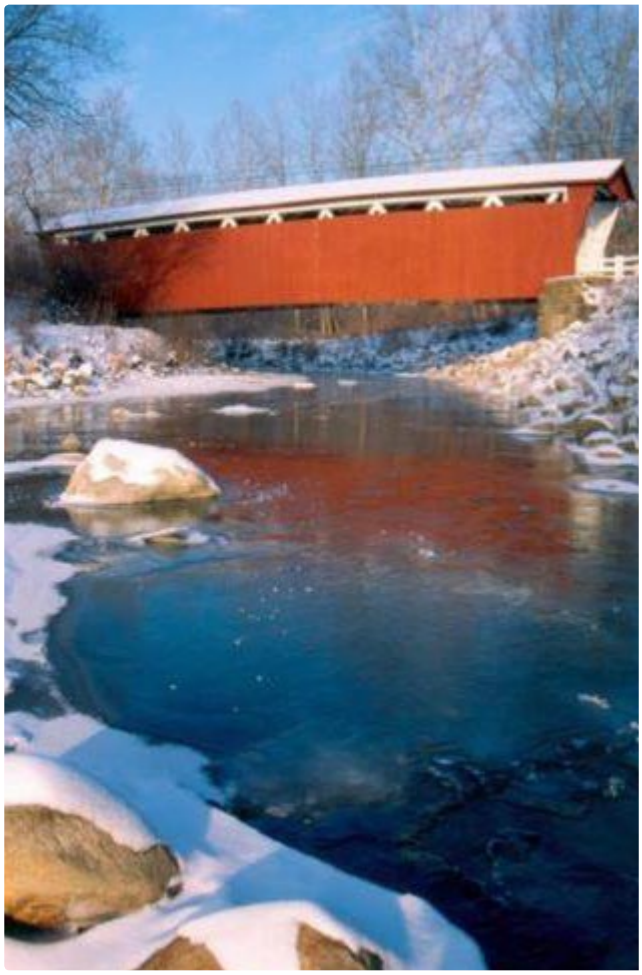
Table 3-3. MWR Average Annual Historical Obligations, by Asset Category, by Funding Title and Program, FY 2006–FY 2013 ($ in Thousands)

Source: MWR LRTP Financial Analysis

Funding Title/ Program	Roads (Paved)	Trails	Transit	Road Bridges	Parking	All Other	Grand Total	%
Title 54 Non-Fee	$3,194	$1,549	$899	$1,059	$470	$2,283	$9,454	39.9%
Title 54 Fee	$370	$651	$28	$59	$89	$349	$1,547	6.5%
Title 23	$5,647	$836	$1,240	$1,910	$89	$769	$10,490	44.3%
Other/External		$412	$1,748	$2	$0	$48	$2,209	9.3%
Grand Total	**$9,211**	**$3,448**	**$3,915**	**$3,030**	**$648**	**$3,449**	**$23,700**	**100.0%**

The allocation of transportation funding differs significantly in the MWR when comparing to the NPS as a whole as a result of the varied composition of the region's asset portfolio. MWR paved roads received a share nearly 20 percentage points smaller than that of the entire service (39 percent versus 58 percent, respectively), while MWR bridges received a share 6 percentage points greater than that of the entire service (13 percent of total expenditures versus 7 percent, respectively).

This discrepancy in the share of Title 23 funds between the MWR and the NPS overall, as shown in Figure 3-1, can be explained in part by the relatively smaller share of paved road and bridge assets in the MWR. However, the more detailed analysis shown in Table 3-4 reveals a significant gap in per-unit expenditure on both road and bridge assets. The MWR spends nearly $5,000 less per route mile than the NPS overall does on paved roads resourced from Title 23 funds, a 10 percentage point difference in the share of total paved road spending. This difference is covered with Title 54 funds, particularly Park Operational Base, Cyclic Maintenance and Repair/Rehabilitation. Interestingly, the average annual MWR expenditure per route mile of paved road of $46,781 is about 99.5 percent of the average annual national expenditure rate per route mile for paved roads.



Cuyahoga Valley National Park

Table 3-4. Share of Title 54 and 23 Funds for Paved Roads and Road Bridges, MWR versus National, FY 2006–FY 2013 ($ in Thousands)

Source: MWR and National LRTP Financial Analysis

Program	Paved Roads		Road Bridges	
Funds	**MWR**	**National**	**MWR**	**National**
Quantity*	197	5,740	85,840	6,571,000
Total Title 23	$5,646,900	$193,900,000	$1,910,200	$26,000,000
Total Title 54	$3,564,300	$76,000,000	$1,118,000	$5,700,000
Title 23 per unit	$28,679	$33,782	$22.25	$3.96
Title 54 per unit	$18,102	$13,241	$13.02	$0.87
Total per unit	$46,781	$47,023	$35.28	$4.82
Percent funded by Title 23	61.3%	71.8%	63.1%	82.0%
Percent funded by Title 54	38.7%	28.2%	36.9%	18.0%

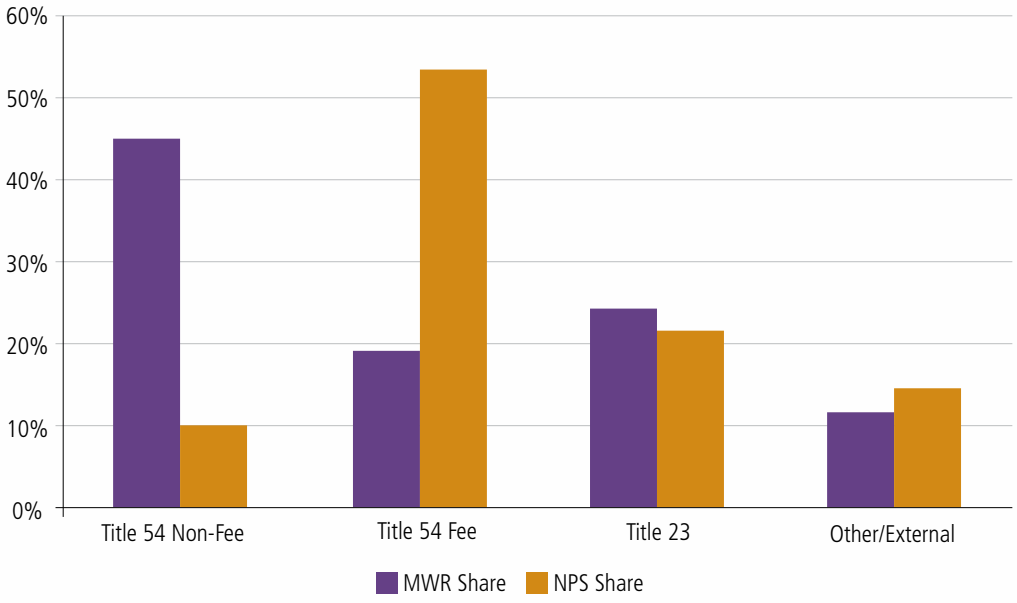
*Quantity is in route miles for paved roads, and square feet for road bridges.

A somewhat different situation exists with road bridges. The MWR funds a relatively smaller share of its bridge expenditures from Title 23 than does the NPS overall, as with paved roads, but the level of spending in the MWR (per square foot of bridge deck) is nearly one order of magnitude higher ($35.28 in the MWR versus $4.82 nationally). This order of magnitude difference may be the result of a small number of large projects in the MWR during the sample period, which may have skewed these per unit figures upward. The expenditure per square foot figure could also be higher in the MWR because of the relatively small size of bridge structures in the region. (Average deck area is 2,400 square feet for MWR bridges but is 4,200 square feet for the NPS overall). Calculating the expenditure per bridge, rather than per square foot, reduces this difference significantly ($48,979 per bridge in the MWR, and $15,081 in the NPS overall), although it is still substantial.

The level and composition of transit funding in the region is also notable, as shown in Figure 3-4. Compared to the entire NPS, which spent 7 percent of total transportation funds on transit systems, the MWR spent more than twice as much (17 percent). Furthermore, while more than half of the transit expenditures in the NPS originate from the Transportation and Recreation Fee programs, less than 1 percent of MWR transit expenditures originate from these sources. A much larger share of MWR transit expenditures originate from the Title 54 Non-Fee and Other/External categories. In particular, an overwhelming majority of the transportation-related revenue collected from reimbursable agreements by the NPS is expended in the MWR for support of its transit operations.

Figure 3-4. Average Annual Transit Expenditure, by Fund Source, FY 2006–FY 2013

Sources: MWR LRTP Financial Analysis



Apostle Islands National Park

Obligations by Asset Life-Cycle Stage

O&M activities include the following work types: FO, PM and RM. Table 3-5 shows that the MWR has funded 78 percent of all O&M activities using Title 54 fund sources, a rate lower than that of the NPS overall. The share of O&M funded by Title 23 is the same for both the MWR and the NPS overall. The MWR leans more heavily on Other/External funds, almost exclusively with reimbursable agreements, which have averaged $985,000 per year.

Table 3-5. Average Annual O&M Expenditures, FY 2006–FY 2013 ($ in Thousands)

Sources: MWR and National LRTP Financial Analysis

Program	MWR		National	
Fund Source	**Expenditure**	**Percentage Share**	**Expenditure**	**Percentage Share**
Title 54	$8,049	78%	$132,900	86%
Title 23	$1,251	12%	$19,300	12%
Other/External	$1,002	10%	$2,900	2%
Total	**$10,302**	**100%**	**$155,000**	**100%**

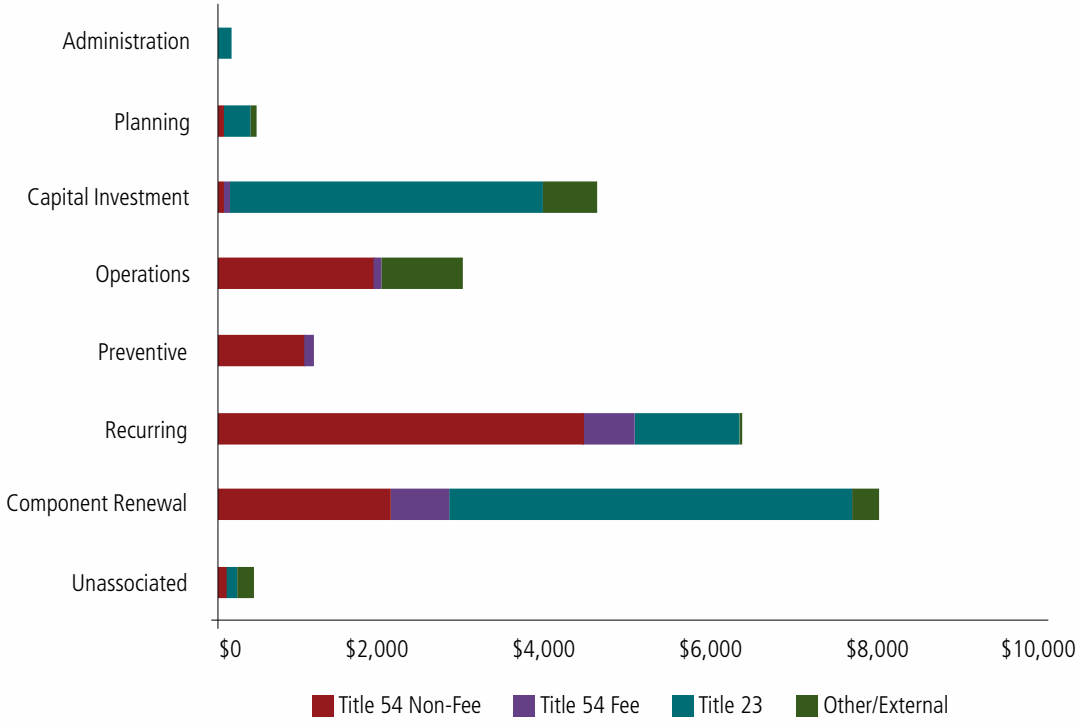
Badlands National Park

Figure 3-5 shows that the MWR leans heavily on Title 23 funds for capital investment and component renewal projects and on Title 54 funds for O&M activities. In this way, MWR follows a pattern nearly identical to that of the NPS overall.

A key component of the CIS is to improve coordination among funding programs and asset life-cycle stages, with the goal of directing sufficient funds to properly maintain new or rehabilitated assets. This policy guidance requires parks to commit to funding minimum levels of PM for the highest and high-priority assets and focuses component renewal and RM funds to these assets. However, park units are challenged to fund even these minimum levels of maintenance, as park unit-level funding is currently insufficient to maintain all their high-priority assets.

Figure 3-5. MWR Average Annual Investments, by Life-Cycle Stage and Fund Source, FY 2006–FY 2013 ($ in Thousands)

Sources: MWR and National LRTP Financial Analysis



Obligations by Priority

The NPS is committed to focusing investments from all fund sources on its highest priority assets and services, a concept at the core of the CIS (see Chapter 2: Asset Management). As of early 2015, the NPS had completed the "re-optimization" process in which all assets were reprioritized. This process was jointly conducted by park staff and the PFMD. However, not all funding programs have formally adopted OBs as the mechanism for identifying priority assets, specifically programs that award Title 23 funds for core transportation assets. At present, FC is still being used for the prioritization of paved roads and parking, although the NPS goal is for OB to be used across all asset categories. Table 3-6 defines investment priorities by asset category for this plan.

Between FY 2006 and FY 2013 in the MWR, an estimated $18.0 million was spent on the highest priority assets, $2.6 million on high-priority assets and $3.1 million on other priority assets.[3]

Herbert Hoover National Historic Site

Table 3-6. MWR LRTP Investment Priorities, by Asset Category

Source: NPS Administrative Finance System and NPS PFMD

Asset Category	Highest Priority	High Priority	Other
Paved Roads and Parking	FC 1,2,7		FC 3, 4, 5, 6, 8
Parking Lots (Paved)	FC 1,2,7		FC 3, 4, 5, 6, 8
Bridges	All	None	None
Transit	All	None	None
All Other	OB 1	OB 2	OB 3, 4, 5

[3] PFMD Five-Year NPS Transportation Spending Summary, Fiscal Years 2007–2011.

Forecasted Funding

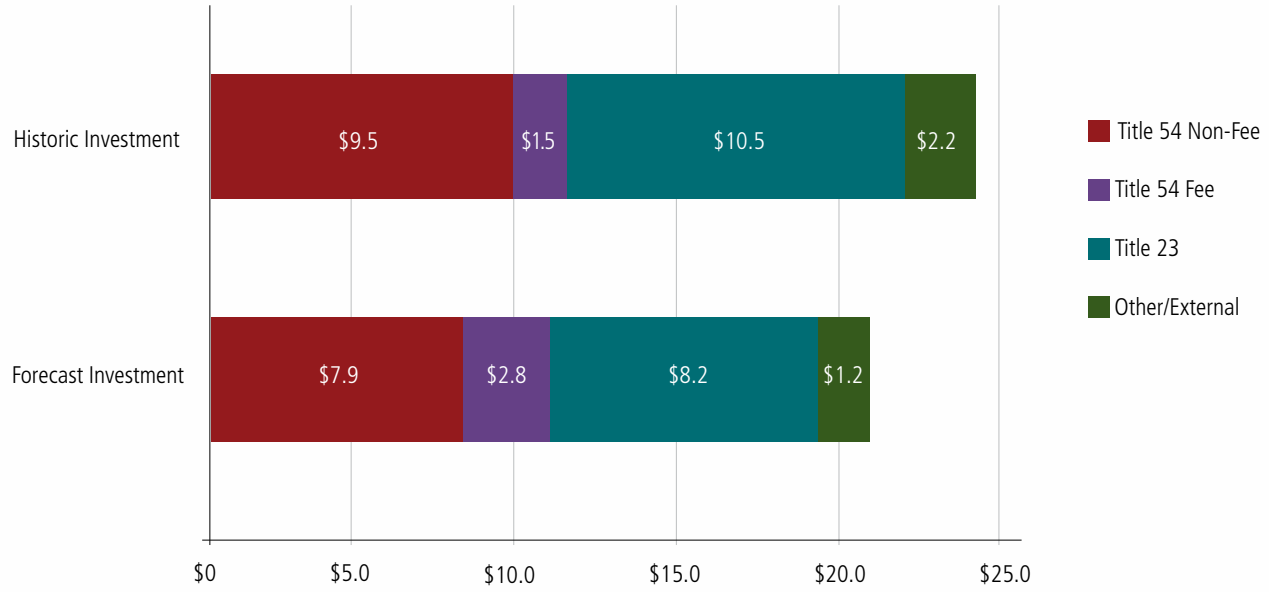
Forecasted transportation funding for the next five years in the MWR is estimated to be $20.0 million per year. This estimate reflects a 16 percent decrease from the historical annual average of $23.7 million and is based on past funding availability, MAP-21 transportation legislation, input from NPS managers and the examination of proposed transportation legislation. Historical and forecasted investment is shown by fund source in Figure 3-6. Table 3-7 shows the approach to developing the forecast for each fund source.

The FAST Act was enacted on December 4, 2015 and replaced the MAP-21 legislation, while this LRTP was under development. While the overall level of transportation funding for the NPS will increase under this new legislation, the allocation of funds among the regions as well as to various mega projects has not yet been determined.

Scotts Bluff National Monument

Figure 3-6. MWR Annual Historic Spending FY 2006–FY 2013 and Annual Forecasted Funding FY 2015–FY 2020 ($ in Millions)

Source: NPS Administrative Finance System and NPS Washington Support Office



Needs and Gaps

The total annual funding need for the MWR transportation portfolio is estimated to be $53.9 million. This total includes modeled needs for roads, bridges and other transportation assets, as well as those needs documented in NPS project and maintenance management systems of record.[4] With annual future funding for transportation over the period FY 2015—FY 2020 forecasted to be approximately $20.0 million for the MWR, and a resulting funding gap of $33.9 million, the MWR will face declines in asset condition over both the near and longer terms.

The gap between the MWR funding need and forecasted funding can be disaggregated by asset category and asset life-cycle stage. In each case, the funding gap is sizeable and pervasive, typically with less than half of each subset of need being met. The need by asset category and by asset life-cycle stage is shown in Figure 3-7 and Figure 3-8, respectively. For the funding bars in each graph, the shaded areas depict forecast funding, while the unshaded areas are included to show the currently anticipated annual funding gaps.

MWR total annual transportation need is $53.9 million, comprised of $10.7 million RM, $24.8 million CR and $18.4 million of other needs.

Table 3-7. Average Annual Forecasted Funding, FY 2015–FY 2020 ($ in Millions)

Fund Source	Historical	Forecasted	Difference	Rationale
Title 54 Non-Fee	$9.5	$7.9	–$1.6	A combined 3% single-year reduction expected by the NPS budget office for the Park Operational Base fund source plus other specific planned program expenditures for several construction and maintenance fund sources
Title 54 Fee	$1.5	$2.8	$1.2	Visitation, policies, authorizations expected to remain constant
Title 23	$10.5	$8.2	–$2.3	FLTP expected to remain flat; many discretionary programs eliminated
Other/External	$2.2	$1.2	–$1.0	TRIP program eliminated
Total	**$23.7**	**$20.0**	**–$3.7**	

[4] For a more detailed description of the needs estimation methodology, see the National Long Range Transportation Plan, particularly the technical appendices. The needs shown here are a subset of those developed for the National LRTP. For more information on these systems of record, please refer to Chapter 2: Asset Management.

Figure 3-7. MWR Transportation Annual Forecasted Funding and Needs, by Asset Category, 2015–2021 ($ in Millions)

Source: MWR LRTP Needs Analysis (Note: sum of individual lines may not equal total due to rounding.)

Asset Category	Total Needs	Met Needs	Unmet Needs	% of Needs Met
Roads (Paved)	$12.6	$7.7	$4.9	61%
Parking	$12.1	$3.1	$9.0	25%
Transit	$7.9	$1.5	$6.4	20%
Trails	$7.1	$3.3	$3.8	46%
Other	$5.5	$3.0	$2.6	54%
Buildings	$4.1	$0.1	$4.1	1%
Roads (Unpaved)	$2.4	$0.1	$2.3	3%
Marina	$2.1	$1.4	$0.8	65%
Total	**$53.9**	**$20.0**	**$33.9**	**37%**

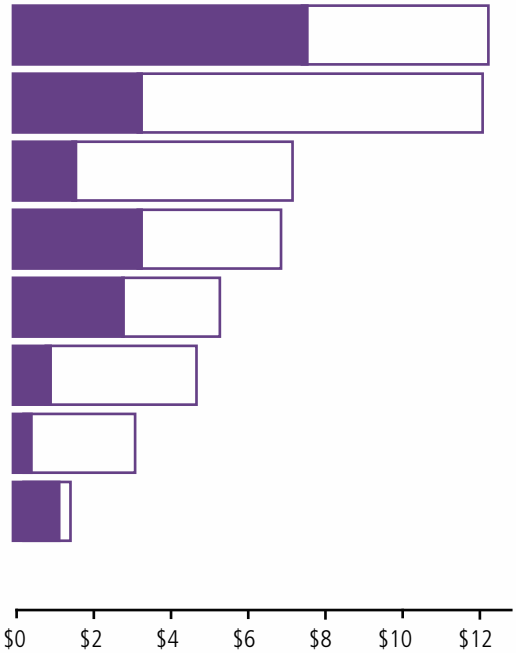
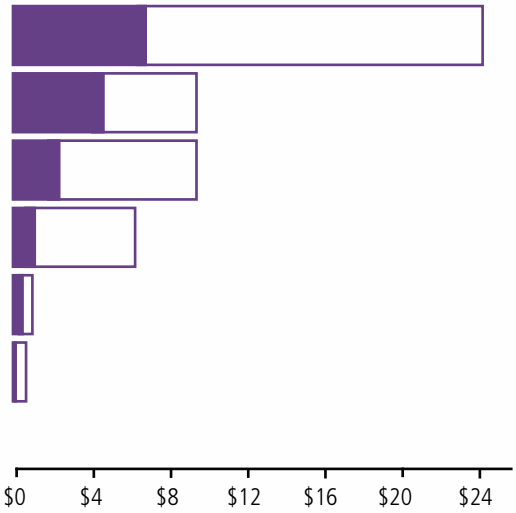


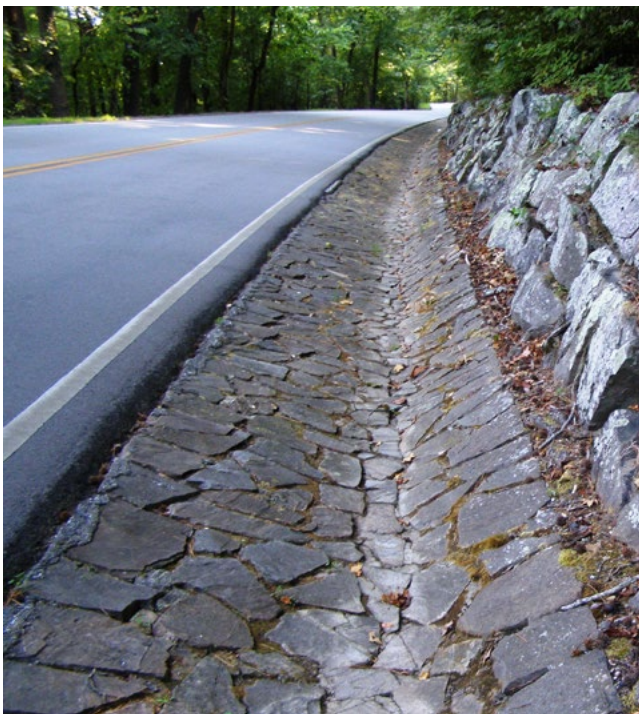
Figure 3-8. MWR Transportation Annual Forecasted Funding and Needs, by Asset Life-Cycle Stage, 2015–2021 ($ in Millions)

Source: MWR LRTP Needs Analysis (Note: sum of individual lines may not equal total due to rounding.)

Life-Cycle Stage	Total Needs	Met Needs	Unmet Needs	% of Needs Met
CR	$24.8	$7.5	$17.4	30%
RM	$10.7	$4.8	$5.9	45%
FO	$9.5	$3.4	$6.1	36%
CI	$6.2	$2.5	$3.8	39%
PM	$2.3	$0.9	$1.4	40%
Other	$0.3	$0.4	-	>100%
Total	**$53.9**	**$20.0**	**$33.9**	**37%**



While Figure 3-8 reveals that all stages of the asset life cycle will likely be underfunded by a significant amount in the future, of particular concern are the shortfalls in operations and preventive (routine) maintenance. These activities are both key to maintaining asset condition and extending the asset life cycle to the greatest extent possible. Underfunding of these activities will shorten the life cycle and require more frequent and costly capital expenditures for replacement, and will tend to increase the total amount of DM over time. Properly operating and maintaining the transportation assets in the MWR would require an additional annual investment of $6.7 million for operations and $1.2 million for PM beyond the levels currently forecast.



Hot Springs National Park

The National Park Service Invests Less per Lane Mile on Roads O&M than Do State DOTs

The National Park Service invests less per lane mile on road O&M, both in actual dollars and as a percentage of requirements, than its state counterparts.

In the near future, part facility managers plan to spend $3,000 to $4,500 per lane mile, roughly 50 to 75 percent of the $6,000 per lane mile that is required to maintain park paved roads in good condition (NPS 2013f). Reasons for under investment in the O&M of roads include limited budgets relative to needs and competition for limited funding with non transportation needs.

In comparison, the FHWA estimates that state DOTs invest between $5,000 and $10,000 per lane mile (excluding surface overlays, chip seal or deep base repairs that would normally be covered during major surface rehabilitation projects). And state DOT investments only meet an estimated 90 percent of actual needs (US DOT Volpe Center 2012). Increased focus on the operations and PM of NPS roads should minimize condition decline and slow the accrual of DM.

Large-Scale Projects

The MWR has several large-scale project needs currently defined. The largest is the replacement of the MV-Ranger III ship at Isle Royale National Park (as illustrated in the image below). The estimated replacement cost of this single passenger vessel is $25 million to $35 million. This cost alone is more than three times the amount of the entire forecast annual FLTP allocation for the MWR, and greater than the entire annual expenditure for all MWR transportation across all fund sources. Acquiring the vessel within the current funding constraints the MWR faces would cause severe disruption to park unit O&M and investment activities across the region. Alternative financial strategies will likely be needed to make this ship replacement a reality. Conversely, the failure to replace what is the sole means of access linkage from the mainland to Isle Royale National Park would have the potential to dramatically reduce visitation to this MWR park unit.

Two other projects could also severely strain current regional funding allocations. The first is the need for rehabilitation of 11 miles of the South Unit Loop Road in Theodore Roosevelt National Park. The total estimated cost of this single major roadway project is approximately $21 million, which is also in excess of the forecast funding for MWR transportation across all fund sources.

The second is the expansion of the Fitzwater Maintenance Facility, which supports the Cuyahoga Valley Scenic Railroad at Cuyahoga Valley National Park. This expansion is required to meet park unit operational needs, and although the cost is not yet determined, the combined CRV of the building assets currently at this site is nearly $7 million.

Isle Royale National Park

Deferred Maintenance and Programmatic Needs

The DM backlog for core and multimodal transportation assets in the MWR is a combined $170 million. If all regional RM needs ($10.7 million per year) and component renewal needs ($24.8 million per year) could be met, DM on the transportation asset inventory would cease to grow. Expenditures above and beyond this level would be required to reduce the DM backlog across the entire inventory, which is highly unlikely given current and forecast future funding levels. Under the forecasted most likely future annual funding scenario, DM will increase overall, although the backlog among the highest priority transportation assets is anticipated to stabilize or decline with implementation of the CIS.

In addition to the DM backlog, the backlog of programmatic needs totals about $17.3 million. This backlog consists primarily of FMSS work orders identified under the "Legal Mandate" sub-work type, which includes Accessibility, Code Compliance, Life Safety and Structural Fire. As with the DM backlog, the programmatic backlog is also projected to grow over time under forecasted funding levels.

Under forecasted funding levels, the MWR will unlikely be able to reduce its overall backlog of DM and programmatic needs. However, strategic project selection may enable the region to shift some of this backlog away from its highest priority transportation assets.

The total annual need to meet all RM, CR and other (CI, FO, PM and Planning) needs for all MWR transportation assets, which will meet legal requirements and freeze DM at its current level, is $53.9 million. Over the 20-year period of this LRTP, this annual need sums to a cumulative need of $1.1 billion. While the MWR will likely be unable to reduce the overall DM and programmatic backlogs under the forecasted funding level, strategic project selection may be able to shift some of this backlog away from the highest priority transportation assets.

Scotts Bluff National Monument

Regional Issues and Opportunities

Asset Prioritization and Funding

With a gap of nearly $34 million per year between the total estimated MWR transportation system needs and forecasted funding levels, the region needs to ensure that whatever level of funding is available is directed to support its core transportation functions.

The region needs to ensure that available transportation funding supports core transportation functions.

Recommended Strategies

- Maximize assistance from the WASO, DSC-Transportation and the FHWA to support project planning and implementation and to track implementation of the MWR LRTP
- Create shovel-ready, scalable projects in the event new or unexpected funding becomes available
- Develop and grow the professional staff capacity at the regional level to effectively plan, execute and monitor the overall transportation program
- Coordinate projects among fund source managers and park units to obtain economies of scale (both geographically and by project type)

Fort Union Trading Post National Historic Site

Mega Projects

Some high-priority regional transportation projects are of such a large scale that they could consume the MWR's total available transportation funds for an entire year or more. In the MWR, there are currently three such identified "mega projects" in line for funding:

- Replace the Ranger III vessel at Isle Royale National Park, with an estimated cost of $25 million to $30 million
- Rehabilitate segments of the South Unit Loop Road in Theodore Roosevelt National Park, with an estimated cost of $21 million
- Expand the Fitzwater Maintenance Facility, which supports the Cuyahoga Valley Scenic Railroad, at Cuyahoga Valley National Park. (Cost is not yet determined, but the CRV of the building assets at this location is nearly $7 million.)

Recommended Strategies

- Ensure that regional and national program managers are aware of all identified MWR mega projects and how funding implementation may affect other regional priorities. Complete all planning, design and compliance work for these projects to ensure that they are shovel ready, enabling the MWR to react quickly to any funding increase or new funding source
- Use "seed" money provided under the FAST Act to stimulate partnership arrangements to fund large-scale projects

Cuyahoga Valley National Park

Fund Source Diversification and Coordination

Several of the NPS and FHWA funding programs used for transportation projects in past years have been reduced in size or eliminated. The loss of the TRIP program was especially notable, as it had provided an annual average of approximately $1 million in alternative transportation funds to the MWR. Compounding the challenge of increasingly scarce transportation funding is the difficulty in timing and sequencing the delivery of funds from multiple regional programs and fund sources to fully fund a project. This coordination issue can result in project phases being delayed or funded in a suboptimal order.

George Washington Carver National Monument

Recommended Strategies

- Create shovel-ready, scalable projects in the event new or unexpected funding becomes available
- Build relationships with state DOTs and local partners to coordinate projects and financial resources
- Ensure that regional and national program managers are aware of mega projects and how funding implementation may affect other regional priorities. Complete all planning, design and compliance work for these projects to ensure that they are shovel ready, enabling the MWR to react quickly to any funding increase or new funding source
- Coordinate with partner groups to address park needs through FLAP projects or other means
- Develop a standardized regional approach for funding and prioritizing partnership projects
- Provide funding flexibility to capitalize on "sudden" or unexpected partnership funding opportunities
- Coordinate funding and project requests across program managers and partners and clearly communicate to park units what funding options are available and appropriate

Regional Capacity to Implement the LRTP

Many park units in the MWR have small staffs and lack the breadth or depth of experience and expertise to implement transportation projects using just their own internal resources. Many park units have lost contracting officer representative capabilities, and 30 MWR park units currently lack a dedicated facility manager. The large DM backlog in MWR park units directly stems from the shortage of maintenance staff across the region. Monitoring the implementation of the LRTP will also challenge available resources at the regional office level.

Recommended Strategies

- Maximize assistance from the WASO, DSC-Transportation and the FHWA to support project planning and implementation and to track implementation of the MWR LRTP
- Remove unnecessary, redundant or underused infrastructure assets to restore more important resources, reduce long-term maintenance needs and track the quantity of infrastructure removed over time
- Consider creating or identifying a shared pool of maintenance staff at MWR park units to maximize use of facility staff across the region when opportunities arise
- Develop relationships with partners and contractors to fill maintenance gaps
- Consider developing a MWR Traveling Condition Assessment Team to provide condition assessment and monitoring services, project development and implementation assistance to MWR park units
- Enhance regional support for FMSS work order management—from development to closeout

Badlands National Park

Measuring System Performance

Performance Measure: Reduction of the Midwest Region Transportation Funding Gap

The MWR seeks to reduce the funding gap between its transportation system annual needs and available annual funding. This gap reduction will be achieved through the disposition of low-priority assets and improved use of traditional and non-traditional funding sources.

Baseline

The annual funding gap totals $33.9 million, given an estimated average annual need of $53.9 million versus the forecast of annual available funding of $20.0 million.

Target

The region aims to reduce the annual funding gap to $30 million in six years.

Performance Measure: Percentage of Transportation Funds Obligated to Highest and High-Priority Transportation Assets

The region aims to increase the percentage of regional transportation funds obligated to its highest and high priority transportation assets, i.e., OB 1 and 2 transportation assets.

Baseline

The baseline is 87 percent of funding obligated to highest and high-priority assets, as observed over the period FY 2006 to FY 2013.

Target

The region aims to obligate 90 percent of transportation funds to highest and high-priority assets by FY 2020.

Performance Measure: Allocation of Funds Across the Asset Life Cycle

As summarized from all of the MWR park asset management plans, the region currently allocates the following percentage of required PM funding to its transportation assets:

Baseline

- OB 1: 42 percent
- OB 2: 38 percent
- OB 3: 31 percent.

Target

The MWR aims for the following PM allocation levels by FY 2020:

- OB 1: 55 percent
- OB 2: 50 percent
- OB 3: 25 percent.

Badlands National Park

Performance Measure: Develop a Process to Identify Transportation Assets in the Region Which Are Candidates for Disposition

By identifying transportation assets that are disposition candidates, the MWR can reduce planned O&M expenditures for these assets and more effectively use its transportation funds.

Baseline

This baseline is still to be determined.

Target

This target is still to be determined.

Performance Measure: Transportation Fund Sources

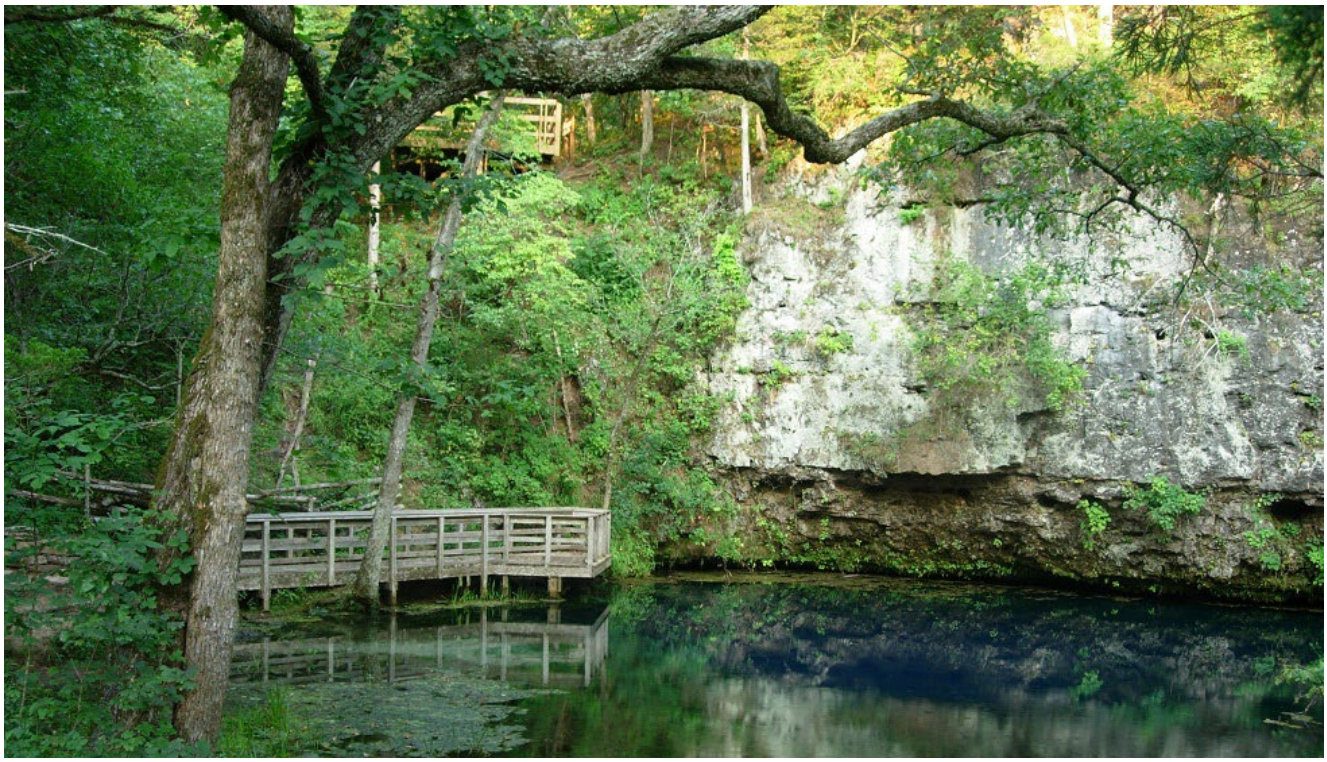
The MWR wants to identify NPS fund sources previously unused for transportation projects. The region also wants to identify new ways to better use fund sources that are not being used to the fullest possible extent for all aspects of MWR transportation (for example, using FLTP funds for PM activities).

Baseline

Fourteen (14) transportation fund sources are regularly used by the region, not counting past programs that have been eliminated or any prior partner or donor agreements.

Target

The MWR is seeking two additional fund sources to support its transportation investment needs.



Ozark National Scenic Riverways

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Hopewell Culture National Historic Park

Chapter 4
Resource Protection

Midwest Region Long Range Transportation Plan

Goal

Design and administer the transportation system in a way that protects and preserves natural and cultural resources

Objectives

Avoid, minimize or mitigate transportation system impacts to park unit resources by using best management practices along with scientific research and emerging technologies

Protect environmental resources at an ecosystem scale through collaborative partnerships to ensure that transportation impacts are understood and mitigated across both physical and jurisdictional borders

Minimize and mitigate the greenhouse gas emissions of the NPS transportation system

Provide sustainable transportation options that promote energy conservation and resource protection

Introduction

The NPS is a global leader in environmental stewardship and historic preservation, and in this role, it protects unparalleled natural and cultural resources of great importance to the nation and, increasingly, the international community. Within many park units, national park roads and parkways were originally designed to "lie lightly on the land" to preserve scenic, aesthetic, historical and environmental resources. In some cases, parts of the transportation system itself are nationally recognized for remarkable engineering feats, technological advances or landscape architecture designs that impinge as little as possible on their spectacular settings.

While the NPS uses science, technology and design to provide visitors access to resources with a minimal footprint, much of its transportation infrastructure was built prior to the modern environmental conservation and historic preservation era. Consequently, resource impacts may not have been fully considered or analyzed when the infrastructure was first built. In some cases, park roads were built directly on top of or immediately adjacent to significant resources to provide visitor access. The maintenance and operation of these legacy transportation systems can perpetuate impacts on mission-critical natural and cultural resources. An additional challenge is that a large part of the NPS transportation portfolio is itself historic and requires management considerations beyond that of typical transportation infrastructure.

NPS transportation policy is grounded in an agency commitment to environmental excellence and historic preservation. This policy promotes timeless design of historic transportation resources to contribute to a unique sense of place at individual park units. The NPS uses best management practices to address negative impacts on natural and cultural resources and to reduce contributions to climate change from GHG emissions, as caused by its transportation systems and users.

This chapter identifies some of the primary areas in which transportation infrastructure impacts the quality and integrity of the natural and cultural resources in the MWR, as well as strategies to mitigate these impacts. The chapter also addresses the role that the regional transportation system plays in the agency's GHG emissions. The strategies in this chapter not only serve to address key regional resource issues, but also several larger goals and actions identified as servicewide priorities in *A Call to Action* (excerpted below):

- "**Revisit Leopold.** Create a new basis for NPS resource management to inform policy, planning, and management decisions and establish the NPS as a leader in addressing the impacts of climate change on protected areas around the world.
- **Go Green.** Further reduce the NPS carbon footprint over 2009 levels, and widely showcase the value of renewable energy.
- **What's Old is New.** Modernize historic preservation methods and technologies, show how historic structures can be made sustainable, and support efforts to rebuild the economic vitality of rural and urban communities.
- **Crystal Clear.** Protect the health of our watersheds by improving water quality, aquatic habitat, and ensuring adequate flows for public enjoyment.
- **Enjoy the View.** Protect clean, clear air and spectacular scenery now and for future generations."

Sleeping Bear Dunes National Lakeshore

Regional Issues and Opportunities

Transportation Facility Location

Transportation networks, if sited inappropriately, can have wide-ranging impacts on natural resources, including habitat fragmentation, erosion, introduction of invasive species, river sedimentation and siltation, modification of surficial hydrology and increased incidences of wildlife-vehicle collisions along wildlife movement corridors. The NPS philosophy on transportation has changed over the years, and what may have been considered appropriate in the past is now known to have unforeseen consequences for natural resources. Accordingly, while the situation has greatly improved over the years, facility siting is still an important consideration when conducting capital improvement, O&M and repair and rehabilitation of transportation assets.

Recommended Strategies

- Ensure compliance with NPS policy on resource protection in developing transportation infrastructure
- Evaluate, disseminate and adhere to best management practices for areas with resource sensitivity and update these best management practices as needed based on post-project evaluations
- Ensure Interdisciplinary Team participation and the use of geographic information systems early in the planning, design and implementation of transportation projects to identify areas of potential resource impacts

Indiana Dunes National Lakeshore

Air Quality

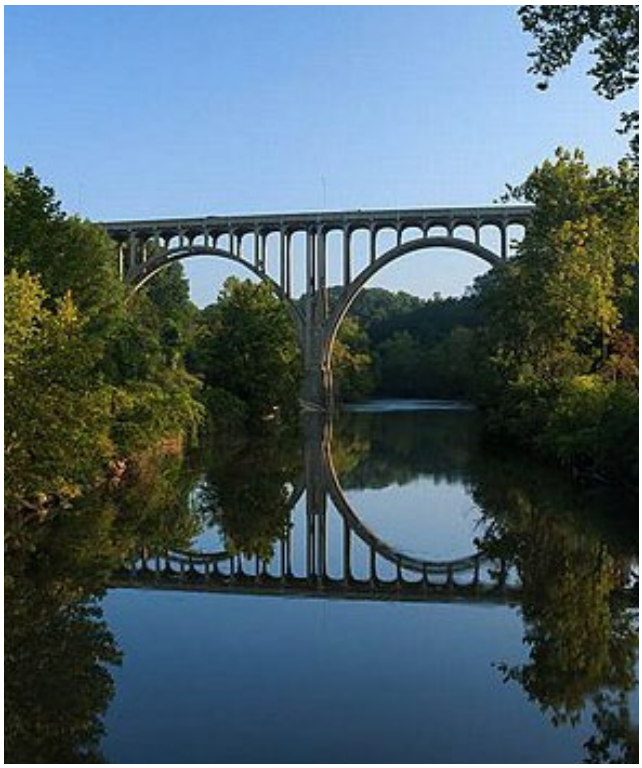
Air pollution, even in relatively low levels, can affect ecological health, visibility, scenic views, visitor experience and human health. Motorized transportation use, on both paved and unpaved roads, and visitation are directly linked to air quality in parks. Highway vehicles, off-highway vehicles, marine engines, aircraft engines and other motorized vehicles all contribute to air pollution in gaseous and particulate form. The US Environmental Protection Agency (EPA) has established national ambient air quality standards (NAAQSs) for ground-level ozone and other air pollutants. Areas that fail to achieve these standards are classified as nonattainment areas.

As of 2015, 11 NPS park units in the MWR lie within ozone and particulate matter nonattainment areas, as defined by the EPA. As shown in Figure 4-1, a majority of the sites are located near or downwind from urban or industrial areas. Consequently, this issue is most relevant for parks in the Urban Units cluster, but it also affects Indiana Dunes National Lakeshore, which is part of the Great Lakes cluster.

A conformity process is required for each nonattainment area to ensure that transportation-related emissions are within the bounds needed to ensure compliance with national air pollution standards. For MPOs, that process includes the evaluation/analysis of LRTPs and transportation improvement programs for conformity with state air quality implementation plans. When NPS park units fall within an EPA-designated ozone or particulate matter nonattainment or air quality maintenance area, all proposed transportation and road construction projects must undergo an evaluation to assess whether the activity would contribute to air quality violations or potentially delay attainment of air quality standards. Table 4-1 identifies MPOs within the MWR that lie within EPA-designated nonattainment areas, their evaluation/analysis document and associated NPS sites.

Recommended Strategies

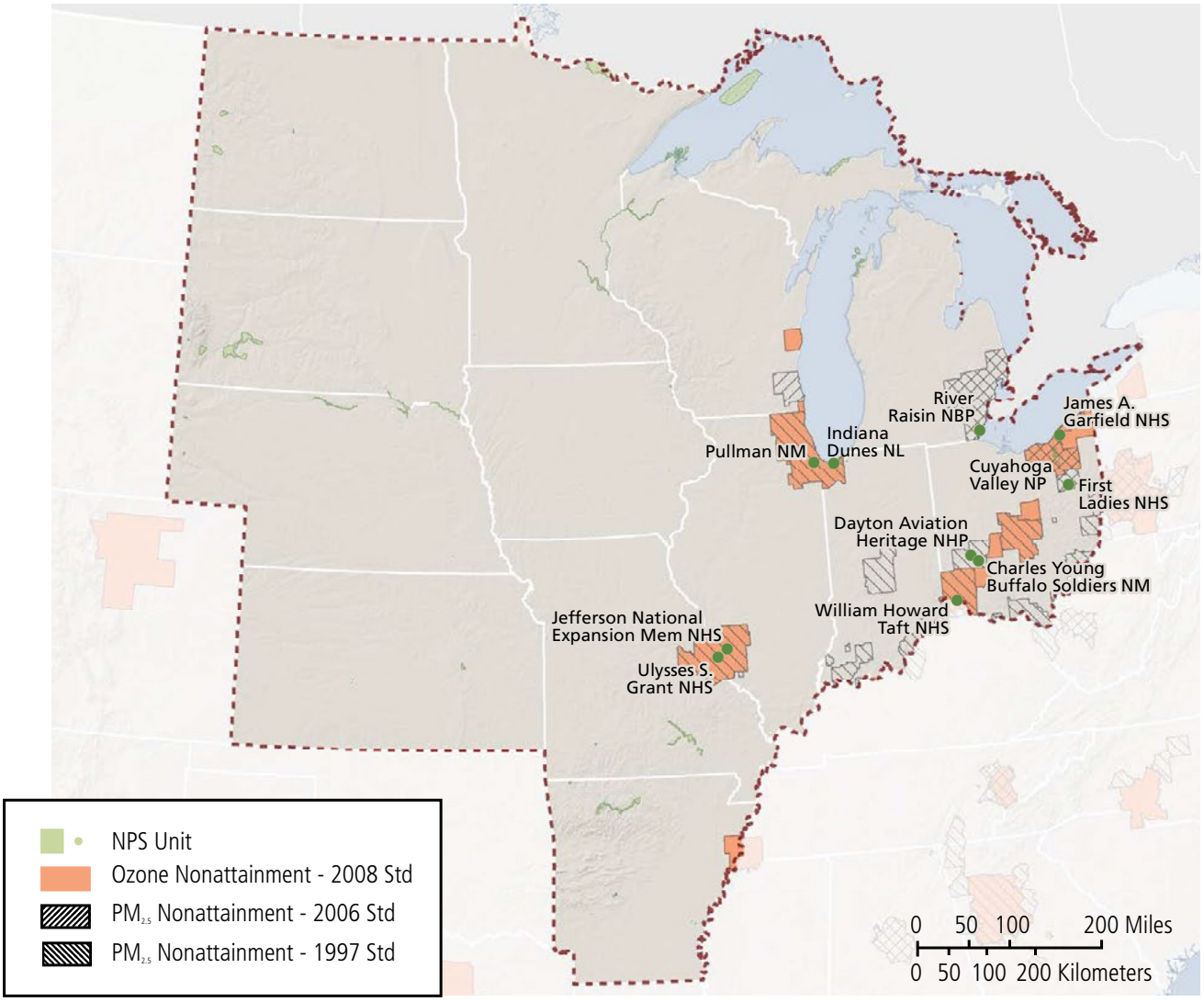
- Ensure compliance with Clean Air Act, MPO and state air quality standards early in the planning stages of transportation projects for parks that lie within defined ozone or particulate matter nonattainment or air quality maintenance areas
- Gather and communicate successful actions that NPS park units or regions undertake to reduce NPS transportation system emissions



Cuyahoga Valley National Park

Figure 4-1. MWR NPS Sites within Ozone and Particulate Matter Nonattainment Areas

Source: NPS Natural Resource Stewardship and Science, Air Resources Division



On October 1, 2015, the EPA established a new, stricter ozone standard. The EPA will finalize the designation of areas as attainment or nonattainment based on this new standard by October 2017. Any resulting changes that affect which MWR park units lie within ozone nonattainment areas will be reflected in subsequent updates to this plan.

Table 4-1. MPOs in MWR Nonattainment Areas and Associated Analysis

Major City	Metropolitan Planning Organization	Conformity Evaluation/ Analysis	NPS Sites
Akron, OH	Akron Metropolitan Area Transportation Study	Ozone and PM2.5 Conformity Analyses for Transportation Plans, Programs, and Projects in the Cleveland-Akron-Lorain, Ohio Metropolitan Area	• Cuyahoga Valley National Park*
Canton, OH	Stark County Area Transportation Study	Air Quality Conformity Analysis	• First Ladies National Historic Site
Chicago, IL	Chicago Metropolitan Agency for Planning	Transportation Conformity Analysis for the PM2.5 and 8-Hour Ozone National Ambient Air Quality Standards	• Indiana Dunes National Lakeshore • Pullman National Monument
Cincinnati, OH	Ohio-Kentucky-Indiana (OKI) Regional Council of Governments	Air Quality Conformity Determination of OKI FY 2016-2019 Transportation Improvement Program and OKI 2040 Regional Transportation Plan in the Cincinnati-Hamilton OH-KY-IN, Area for NAAQS	• William Howard Taft National Historic Site
Cleveland, OH	Northeast Ohio Areawide Coordinating Agency	Ozone and PM2.5 Conformity Analyses for Transportation Plans, Programs, and Projects in the Cleveland-Akron-Lorain, Ohio Metropolitan Area	• James A. Garfield National Historic Site • Cuyahoga Valley National Park*
Dayton, OH	Miami Valley Regional Planning Commission	DRAFT Miami Valley Regional Planning Commission Transportation Improvement Program (FY2016-2019)	• Charles Young Buffalo Soldiers National Monument • Dayton Aviation Heritage National Historical Park
Detroit, MI	Southeast Michigan Council of Governments	Ozone, Carbon Monoxide (CO), and Fine Particulate Matter (PM2.5) Conformity Analysis	• River Raisin National Battlefield Park
St. Louis, MO	East-West Gateway Council of Governments	Air Quality Conformity Determination and Documentation 8-Hour Ozone & PM2.5	• Jefferson National Expansion Memorial National Historic Site • Ulysses S. Grant National Historic Site

* Note: Cuyahoga Valley National Park falls within the neighboring jurisdictions of the MPOs for both the Cleveland, Ohio and Akron, Ohio, urbanized areas.

Culturally Significant Transportation Assets

The NPS is in the unique position of providing access for visitors and at the same time protecting the natural and cultural resources that visitors seek to experience. This mission can be complicated by the fact that many NPS transportation assets are themselves cultural resources, including assets that are designated as National Historic Landmarks (NHLs), National Register Listed (NRL), National Register Eligible and Contributing to an NHL or NRL. Such assets include historic roadways, bridges and parking areas. The NPS has a mission to preserve the qualities that make such cultural transportation assets significant, while in many cases still maintaining and accommodating their enduring transportation function. Conservation is paramount when there is a conflict between resource conservation and visitor enjoyment, which is well documented in NPS and DOI policies and standards.

Modern transportation standards sometimes require updates to both historic and nonhistoric transportation infrastructure. For historic transportation infrastructure, a robust design review is required by applicable state historic preservation offices, but this same level of review is not required for nonhistoric infrastructure, which sometimes leads to issues of overdevelopment and overdesign. Additionally, management policies and state historic preservation office design review do not always ensure that designs are sensitive to their given natural or cultural setting. While adequate infrastructure is critical to any transportation network, NPS transportation infrastructure must also be designed and developed to fit contextually within its surrounding environment. Inappropriate infrastructure design can detract from the unique character and experiences offered at NPS sites in the MWR.

To better understand the relationship between cultural resources and transportation assets, the service has begun to better identify cultural resources in the Financial and Business Management System[5], which is the system of record for real property in the service. By improving the identification of these resources, the service may be able to better understand which cultural resources are at risk when constructing or updating infrastructure. The Financial and Business Management System tracks asset inventory and historic status and works in conjunction with the FMSS to track asset condition and DM. Through these databases, the NPS has identified 375 culturally significant transportation assets in the MWR, which represents approximately 17 percent of the region's transportation assets (see Table 4-2).

The FCI of the highest priority historic assets[6] in the region is 0.077, which is a calculation of DM costs (the estimated value of necessary work on infrastructure, such as roads and bridges, visitor centers, trails and campgrounds that has been put off for more than a year) divided by the asset's current replacement value. An FCI of 0.08 or lower is equivalent to the transportation industry-standard definition of "good" condition. With an FCI of 0.077 (equivalent to a rating of "good"), the culturally significant transportation assets in the MWR are generally in better condition than those nationally, which have a collective FCI of 0.24 (a general condition rating of "poor").

[5]See the Cultural Resource Stewardship section of the National LRTP for more information on identification of cultural resources in the Financial and Business Management System and the FMSS.

[6]Highest priority for cultural resources is defined as historic federal real property assets that are also assigned to OB 1 and 2, used in park asset management plans to prioritize assets for O&M funding. These criteria are relaxed in comparison to the definition of highest priority for the entire transportation asset portfolio (band 1 only) to capture those assets that rate highly in terms of cultural significance, but which may score lower in other areas.

Table 4-2. Historic Transportation Assets in the Midwest Region, by Asset Category

Source: FY 2014 Location-level data for OMB 8 and Federal Accounting Standards Advisory Board reports

Asset Category	Federal Real Property Historic Status[7]	Total MWR Inventory	Percentage of MWR Inventory (%)
Roads	126	594	21
Parking Area	112	681	16
Road Bridge	8	38	21
Road Tunnel	6	6	100
Trails	69	537	13
Trail Bridge	10	49	20
Trail Tunnel	2	6	33
Maintained Landscapes	4	38	11
Dock/Marina	11	241	5
Railroad System	21	36	58
Conveyances	2	3	67
Total	**375**	**2,229**	**17**

Pullman National Monument

[7]These FMSS data are reported by Federal Real Property historic status, which includes four resource tiers: (1) NHL, (2) NRL, (3) National Register Eligible and (4) Contributing to an NHL or NRL asset.

Recommended Strategies

- Develop, disseminate and adhere to best management practices for preserving culturally significant transportation assets. This guidance should include special contract requirements and compatible design solutions for the treatment of culturally significant transportation assets. These best management practices should be updated as needed based on post-project evaluations.
- Support servicewide cultural resource data collection and data management efforts to ensure proper identification of historic transportation assets
- Ensure compliance with NPS policy on resource protection in developing transportation infrastructure
- Ensure Interdisciplinary Team participation and the use of geographic information systems early in the planning, design and implementation of transportation projects to identify areas of potential resource impacts

Homestead National Monument of America

Climate Change

GHG emissions, most notably carbon dioxide, contribute to the warming of the Earth's atmosphere. A warming atmosphere significantly contributes to global climate change, with implications both for the resources the NPS seeks to protect and for its transportation systems that support visitation and other important park functions.

The service has undertaken both national and regional efforts to reduce those emissions that contribute to climate change. Most notably, the *Green Parks Plan* (NPS 2012c) was released in 2012, which defines a national collective vision and long-term strategic plan for sustainable management of NPS operations. The document identifies national goals for climate change, as well as targets for the reduction of emissions. The MWR has a supplemental *Climate Change and Green Parks Strategy* (NPS 2012b), which presents a three-year strategy to begin to address and lessen the effects of climate change in the region through specific actions.

The NPS estimates and reports GHG emissions to comply with national standards and as part of required reporting under Executive Order 13693[8]. Emissions are reported in three categories, called scopes, which describe the degree of control the service has over the emissions source. The baseline year for GHG emissions tracking and targets is 2008.

Categories of GHG Emissions

Scope 1
Emissions from sources owned or directly controlled by the NPS. For transportation, Scope 1 consists of NPS fleet vehicles and equipment.

Scope 2
Indirect emissions from purchased electricity and heating, cooling and steam generation. For transportation, Scope 2 deals only with energy use in buildings that primarily serve a transportation system function.

Scope 3
Emissions from sources not directly controlled or owned by the NPS, but that are attributable to agency activities. For transportation, Scope 3 includes employee travel (business travel and employee commuting).

Theodore Roosevelt National Park

[8]Executive Order 13693: Planning for Federal Sustainability in the Next Decade seeks to reduce the federal government's GHG emissions and increase the share of electricity the federal government consumes from renewable sources.

The *Green Parks Plan* (NPS 2012c) describes NPS emissions from each of these categories and establishes targets for the year 2020. Its transportation emissions reduction targets are as follows:

- Reduce Scope 1 and 2 emissions by 35 percent by 2020 from the 2008 baseline
- Reduce Scope 3 emissions by 10 percent by 2020 from the 2008 baseline.

These same targets are used in the NPS National LRTP.

GHG emission estimates for Scope 1 and Scope 2 sources have been downscaled from the national to the regional level and are included for the MWR by emission category in Table 4-3. While estimates for Scope 3 emissions are available at the national level, the nature of these emission sources - such as business air and ground travel - do not enable the agency to downscale emissions to the regional level with any certainty. Employee commuting surveys, which could aid in this calculation, are currently only prepared at the national level. The NPS has assessed each Scope 3 emission source and identified which sources could potentially be broken down regionally, but there has not yet been a formal effort to do so.

Several parks in the MWR have taken further steps to improve their individual emissions as part of the Climate Friendly Parks Program. This national program aims to provide park units with comprehensive support, management tools and resources to address sustainability and climate change aspects within park boundaries and in

Table 4-3. Midwest Region Energy- and Fleet-related Scope 1 and 2 GHG Emissions (in Metric Tons of CO_2 equivalents [MTCO2E][9,10])

Emission	2008	2009	2010	2011	2012	2013	2014
Scope 1	**9,900**	**8,678**	**8,725**	**9,649**	**8,603**	**8,229**	**8,476**
Stationary Combustion	3,609	3,351	4,008	3,985	3,114	3,835	3,875
Mobile Combustion (V+E)[11]	2,373	2,227	1,286	2,329	2,008	1,544	1,501
Mobile Combustion (FAST)[12]	3,918	3,099	3,431	3,334	3,480	2,850	3,100
Scope 2	**14,977**	**16,170**	**17,245**	**16,447**	**15,805**	**14,998**	**14,103**
Purchased Electricity	14,146	15,329	16,360	15,562	15,041	13,945	14,334
Purchased Steam	831	841	885	886	765	1,054	1,769
Total	**24,878**	**24,848**	**25,971**	**26,096**	**24,408**	**23,228**	**24,579**
% change from 2008	—	0.12%	4.39%	4.9%	–1.89%	–6.63%	–1.2%

[9]The GHG estimates are prepared using data reported to the Energy Management Data Reporting System and the Federal Automotive Statistical Tool.

[10]Net Scope 1 and 2 GHG emissions that include GHG emission benefits associated with renewable energy purchases are not included because of data limitations.

[11]V+E: vehicles and equipment

[12]FAST: Federal Automotive Statistical Tool

partnership with surrounding communities. This program helps these park units measure their park-based GHG emissions; educates park staff and the public about climate change and demonstrates ways to address the issue; and assists in development of strategies and specific actions to address sustainability challenges, reduce GHG emissions, and anticipate the impacts of climate change on park resources. The following MWR park units participate in this program:

- Agate Fossil Beds National Monument (NE)
- Apostle Islands National Lakeshore* (WI)
- Badlands National Park (SD)
- Cuyahoga Valley National Park* (OH)
- Fort Smith National Historic Site* (AR, OK)
- Homestead National Monument of America* (NE)
- Indiana Dunes National Lakeshore* (IN)
- Jewel Cave National Monument* (SD)
- Lewis and Clark National Historic Trail (ID, IL, IA, KS, MO, MT, NE, ND, OR, SD, WA)
- Minuteman Missile National Historic Site (SD)
- Mississippi National River and Recreation Area (MN)
- Mount Rushmore National Monument* (SD)
- Nicodemus National Historic Site* (KS)
- Pea Ridge National Military Park* (AK)
- Pictured Rocks National Lakeshore* (MI)
- Scotts Bluff National Monument (NE)
- Sleeping Bear Dunes National Lakeshore (MI)
- Voyageurs National Park (MN)
- Wind Cave National Park (SD).

Recommended Strategies

- Gather and communicate successful actions NPS park units or regions have undertaken to reduce NPS transportation system emissions
- Set reduction targets for visitor vehicle emissions and pursue solutions to achieve those targets
- Seek implementation of innovative products and technologies to reduce GHG emissions, such as fueling stations or solar paving

Apostle Islands National Lakeshore

*Note: Parks denoted with an asterisk have completed the four milestones associated with the program to become an official "member park" of the Climate Friendly Parks Program.

Measuring System Performance

Performance Measure: Aggregate FCI Rating of Highest Priority Historic Federal Real Property Assets

Preserving cultural resources and values for the enjoyment, education, and inspiration of this and future generations is at the core of the NPS mission. Tracking the condition of the highest priority culturally significant transportation assets in the region over time will allow the NPS to gauge its performance in preserving these resources.

Baseline

The aggregate FCI of the highest priority federal real property transportation assets is 0.077.

Target

The target is an aggregate FCI of 0.08, which is the industry standard of "good" condition.

Keweenaw National Historic Site

Performance Measure: Percentage Decrease in NPS Midwest Region Transportation System Emissions

As part of the NPS commitment to being a climate leader and in support of Executive Order 13693, the NPS is taking steps to reduce its GHG emissions. The service is actively measuring, inventorying and reporting aggregate statistics for the MWR from Scope 1 and 2 sources.

Baseline

This performance measure uses a 2008 baseline, which is consistent with required federal agency reporting. The 2008 baseline for the MWR is as follows:

- **Scope 1:** 9.900 MTCO2E
- **Scope 2:** 14,977 MTCO2E.

Target

The region aims to meet or exceed *Green Parks Plan* targets for Scope 1 and 2 regional GHG emissions (consistent with the GHG goals established in the National LRTP).

This amounts to a reduction in both Scope 1 and 2 emissions of 35 percent by 2020.

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Badlands National Park

Chapter 5
Visitor Experience

Midwest Region Long Range Transportation Plan

Goal

Improve the ease of access to, within and through park units for all people to maintain and enhance the quality of transportation-related visitor experiences

Objectives

Meet the physical, programmatic and technological needs of increasingly diverse visitors and those with disabilities

Provide state-of-the-art traveler information, wayfinding, information for linking related park units and—where appropriate—interpretation and education opportunities that complement transportation opportunities

Manage congestion

Minimize the impacts of traffic and congestion where it interferes with the visitor experience

Introduction

The LRTP goal for visitor experience is mission driven and responds to the "for the enjoyment, education, and inspiration of this and future generations" part of the NPS mission. Visitor experience is the perceptions, feelings and reactions a person has before, during and after a visit to a park unit (see Figure 5-1). Everything about a park's transportation system, including its location, type and design, strongly influences the quality of a visitor's experience. Visitor experience also includes how a visitor views available opportunities and the quality of services provided at a park site. Visitor experience is an essential, albeit intangible, resource to manage, maintain and enhance within every National Park System unit.

Different user types, including local and nonlocal visitors and recreational and nonrecreational visitors, have varying transportation needs. Although NPS transportation networks primarily serve park units and visitors to those units, their reach extends beyond park unit boundaries. Populations residing in gateway communities are uniquely tied to their neighboring park units and are directly affected by their day-to-day operations, including the transportation system. Transportation can play a critical role in enhancing the economic and social well-being of gateway communities. By creating and maintaining a safe, reliable, integrated and accessible transportation network, it can enhance choices for transportation users, provide easy

Types of Parks Visitors

Local Visitors
Visitors who live in the local area

Nonlocal Visitors
Visitors who travel from out of the area to visit a park

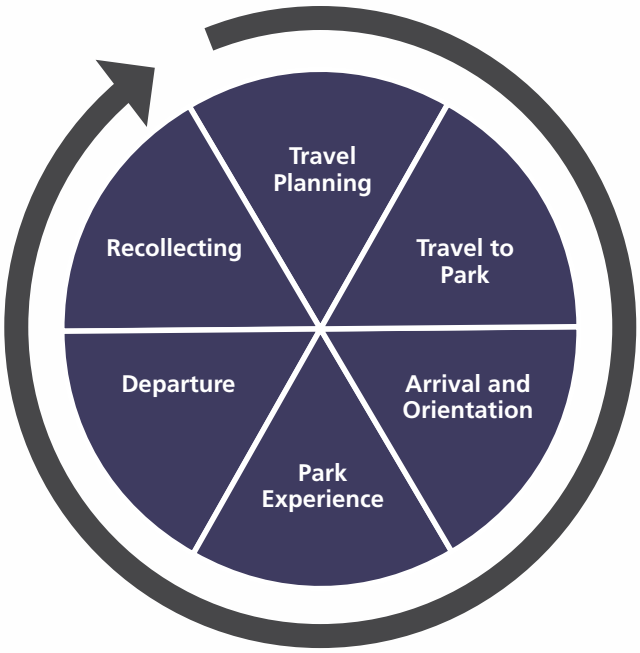
Recreational Visitors
Visitors who are in a park unit for a recreational purpose (e.g., vacationing)

Nonrecreational Visitors
Visitors who are in or traveling through a park unit for a nonrecreational purpose (e.g., commuters)

access to employment opportunities and other destinations and have positive effects on the surrounding community.

The NPS is committed to developing and maintaining transportation facilities and services that improve access to park units for all users and maximize the enjoyment of park resources and values. *A Call to Action* has challenged the agency to better connect parks to people and to provide opportunities for healthy and meaningful visitor experiences (NPS 2014). This chapter summarizes visitation and visitors to MWR park units with an emphasis on transportation. Additionally, it provides additional analysis and supporting information on specific issues relevant to the MWR.

Figure 5-1. The Visitor Experience Cycle



Visitation and Visitor Use in the Midwest Region

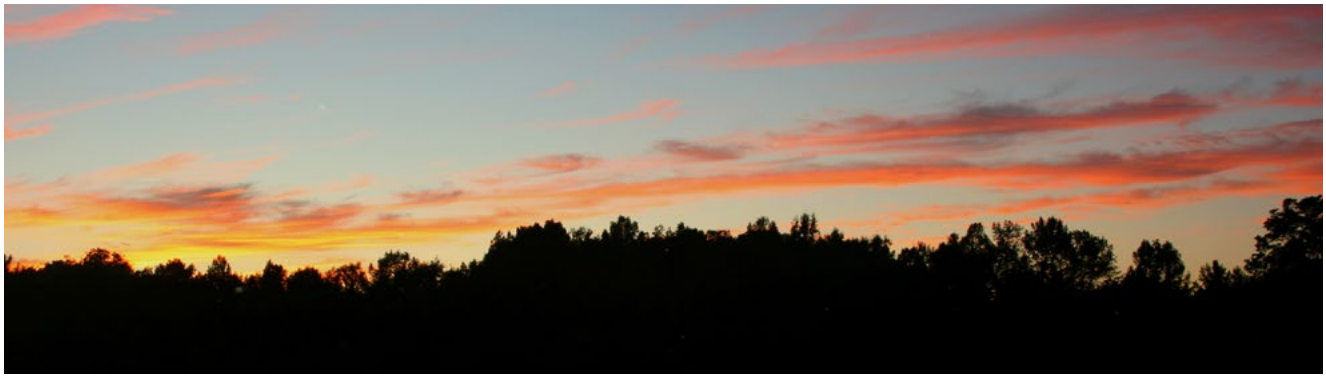
Characteristics of visitor use, which include the amount, type, timing and distribution of visitor activities and behaviors, when applied to transportation help in understanding traveler trends, user transportation needs and influences on the visitor experience. The NPS collects a great deal of information related to visitor use characteristics and visitation levels.

VISITATION TO MWR PARK UNITS

Visitation data can be useful in determining the kinds, amounts and patterns of use in a region, cluster or park unit. However, visitation data collection methodologies vary by park unit and tend to change over time. Collection methods within the region include both direct visitor counts and proxies, such as vehicle counts. The Visitor Use Statistics Office uses 132 traffic counters at 27 MWR park units. While there are known inaccuracies with some traffic counters, the agency is currently developing guidance on how to improve traffic data collection. In addition, data on visitor origins, the timing of visits, visitor patterns of use and distribution throughout park units and the information sources they use to plan their visits is not consistent across all park units. These elements are important bases for the investment decisions transportation planners traditionally make. Having more detailed and accurate information about visitors and how they use park units will help the MWR ensure that its transportation investment decisions are closely aligned with visitors' needs and desires.

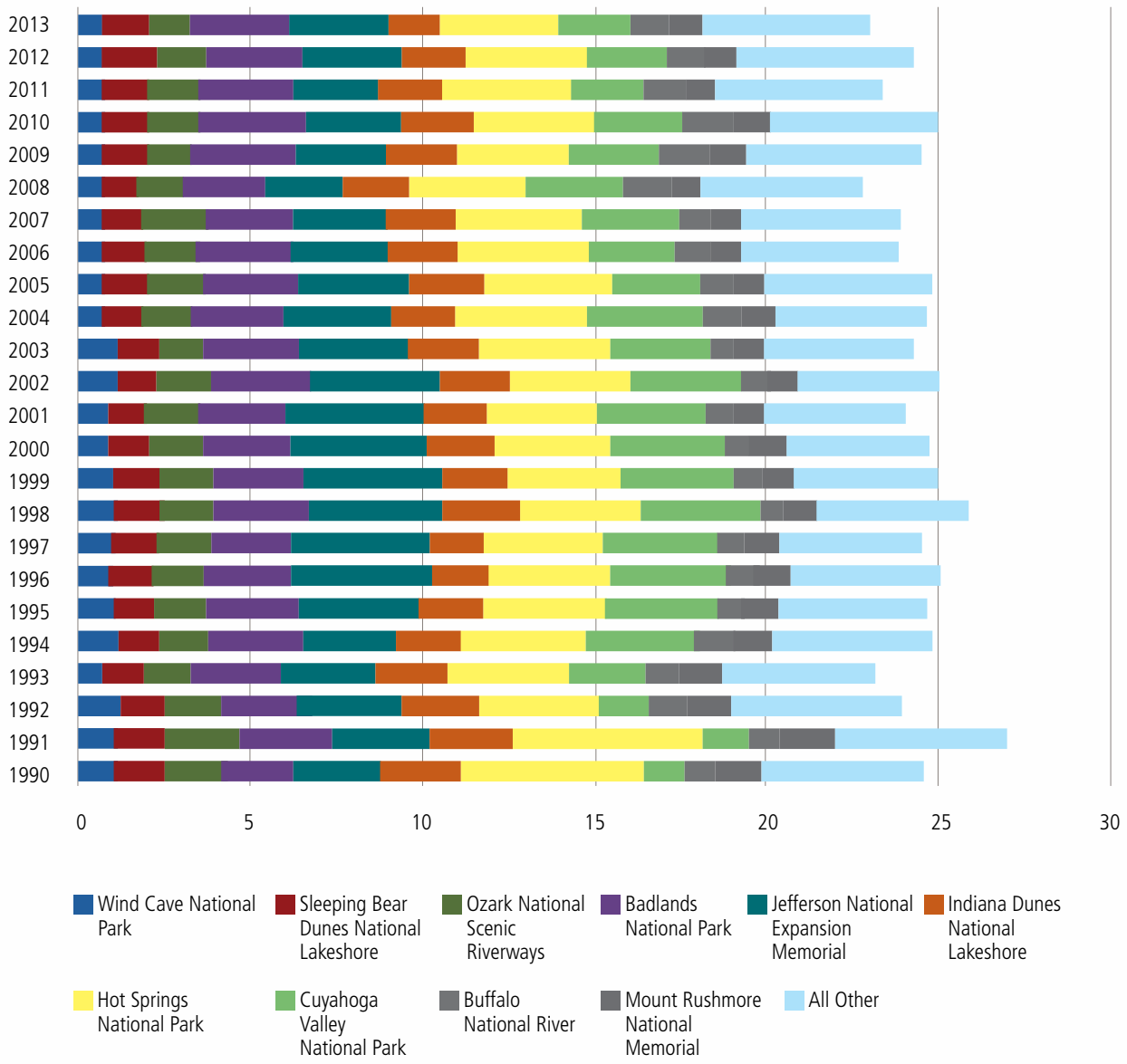
Total visitation to MWR park units ranges between 22.7 million and 27.0 million visits annually, with an average of 24.4 million visits (see Figure 5-2). The following 10 busiest park units account for roughly 80 percent of this total visitation (listed by average annual visitation beginning with the most visited):

- Hot Springs National Park (4,220,620)
- Jefferson National Expansion Memorial (2,886,707)
- Mount Rushmore National Memorial (2,456,423)
- Cuyahoga Valley National Park (2,126,208)
- Indiana Dunes National Lakeshore (1,946,392)
- Ozark National Scenic Riverways (1,592,280)
- Sleeping Bear Dunes National Lakeshore (1,108,382)
- Badlands National Park (1,042,387)
- Wind Cave National Park (984,687)
- Buffalo National River (920,947).



Arkansas Post National Memorial

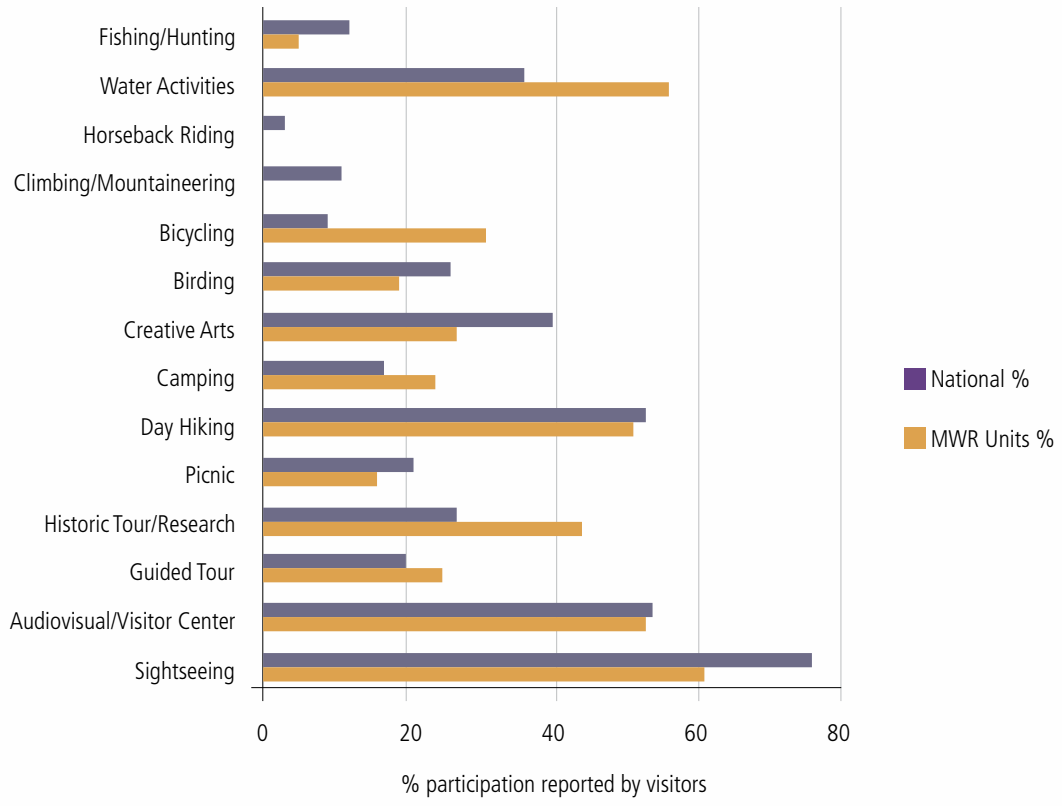
Figure 5-2. MWR Visitation, by Major Park Contributor (in Millions)



VISITOR ACTIVITIES

Visitors to MWR park units participate in a variety of activities. The most popular activities in the region are sightseeing[13] (61 percent), water-based activities (56 percent), visiting a visitor center (53 percent) and day hiking (51 percent) (Vaske and Lyon 2014). Figure 5-3 summarizes participation in visitor activities for the MWR park units and nationally.

Figure 5-3. Participation in Park Activities at MWR Park Units and Nationally



[13]Includes scenic driving and viewing scenery.

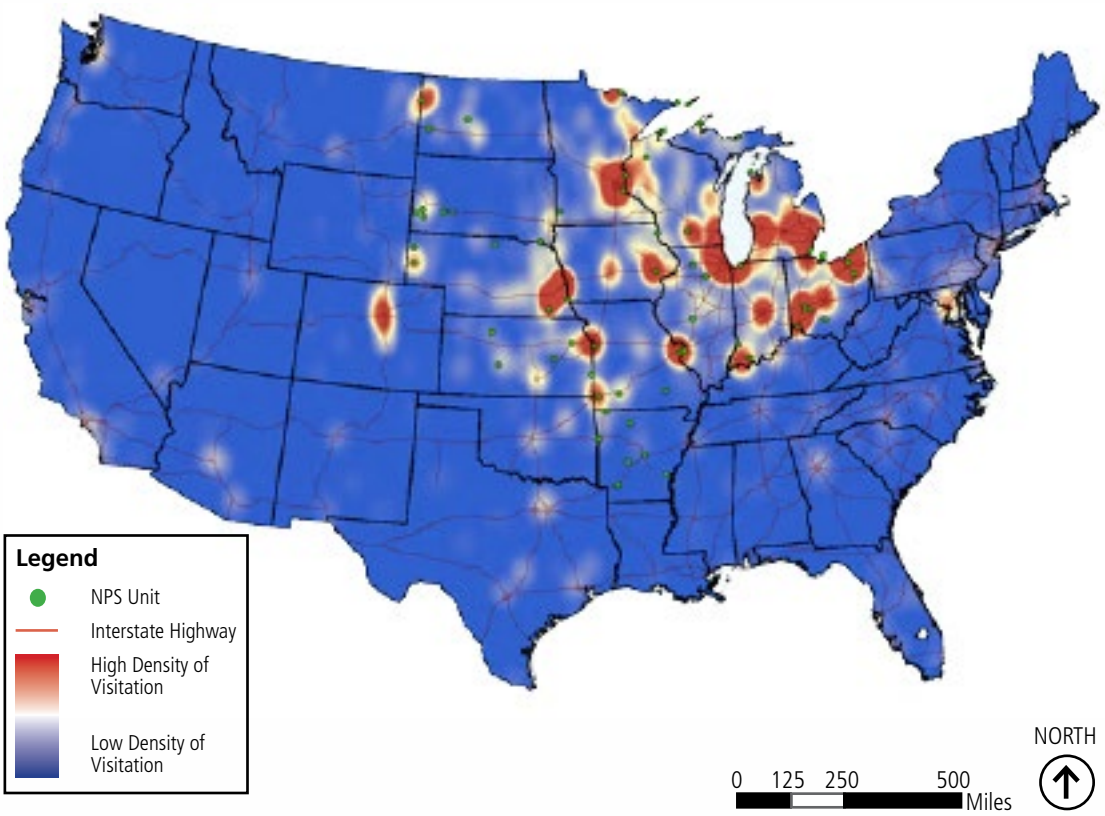
VISITOR DEMOGRAPHICS

The majority of visitors to the region's park units identify as White/Caucasian (97 percent). Two percent of visitors identify as American Indian/Alaska Native, 1 percent as Asian and 0 percent identify as Black/African American or Native Hawaiian. Hispanic visitors represent only 1 percent of all visits to MWR park units compared to 7 percent of Hispanic US Census respondents in the region. Nationally, 7 percent of visitors to NPS park units report being of Hispanic descent compared to 16 percent in the 2010 US Census (Vaske and Lyon 2014).

The majority of US visitors to MWR park units are from states within the region (75 percent of all visitation). Eight percent of visitors are from Intermountain Region states (predominately Colorado and Texas), 6 percent from the Northeast Region (predominately Pennsylvania and New York), 5 percent from the Southeast Region (predominately Florida and Kentucky), and 4 percent from the Pacific West Region (predominately California). As a part of the Visitor Survey Project, visitors are asked to report the ZIP code of their primary residence. Figure 5-4 graphically represents this data, for park units in the MWR.

Figure 5-4. Visitors to MWR Park Units, by ZIP Code of Residence

Source: Densities based on visitors' ZIP codes reported in Visitor Services Project survey results from 31 MWR park units



Transportation System Usage

The NPS Public Use Statistics program regularly tracks visitation in several capacities, including the type of visitation. The quality of a user's experience specific to transportation depends on the needs of that individual or group using the transportation system or facility; for this reason, different visitor types may have varying transportation needs. For example, recreation visitors may value access to specific resources, such as trailheads and day-use areas, and may need more traveler information and wayfinding guidance than nonrecreation visitors. Nonrecreation visitors may appreciate the scenic vistas, but they primarily require efficient access through NPS lands. The different needs of these two user groups can, at times, create conflict, particularly on parkways that are also commuting routes.

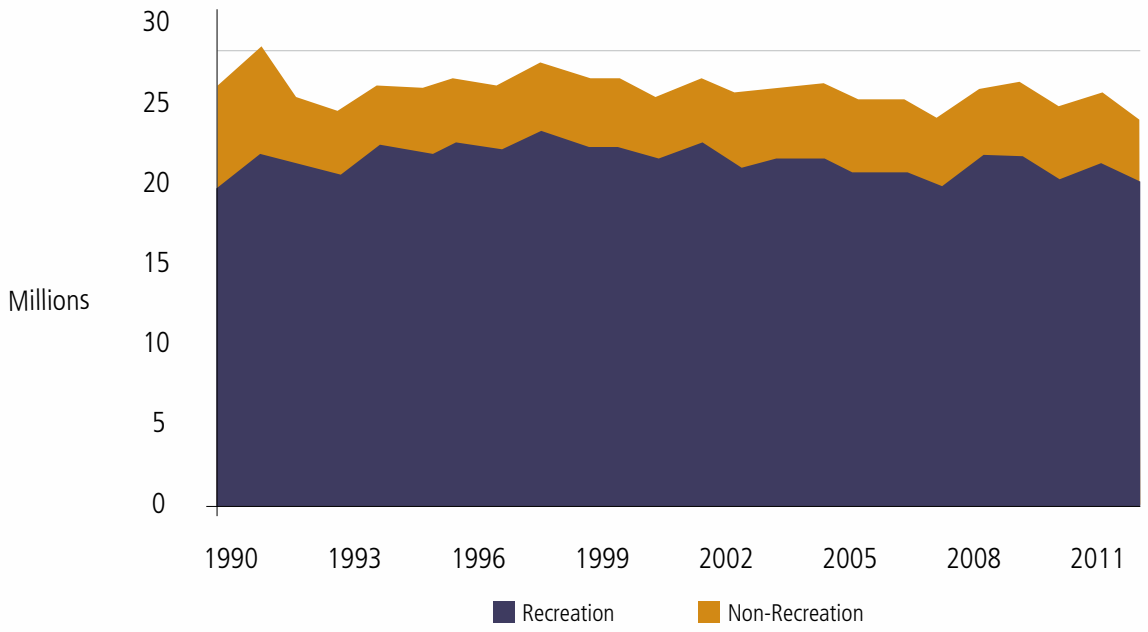
Recreation visits are defined as the entry of a person onto lands or waters the NPS administers for recreational purposes, excluding nonrecreation visits and residents within park boundaries. **Nonrecreation visits** include through traffic (commuters), persons getting to and from inholdings, tradespeople with business in a park and government personnel (other than NPS employees) with business in a park unit. Since 1990[14], the MWR has had an average visitation of 24.4 million visitors annually.[15] This trend has been mostly stable over the last 20 years. Figure 5-5 summarizes total visitation (with a breakdown between recreation and nonrecreation visitation) for the MWR since 1990. Not surprisingly, the majority of the visitors to MWR park units are classified as recreational visitors. However, in an average year, 16 percent of the visits to MWR park units are from nonrecreation visitors. The majority of nonrecreation visitation in the MWR occurs in Hot Springs National Park, where roughly two-thirds of the visitation is attributed to nonrecreation visitation. Other park units with notable nonrecreation visitation include Wind Cave National Park (approximately 50 percent nonrecreation visitation) and Mount Rushmore National Memorial (approximately 25 percent nonrecreation visitation).

Of the recreational visitors who stay more than one day in MWR park units, the average length of stay is 3.5 days.[16] For visitors who stay in the park for less than one day, the average length of stay is 3.5 hours.[17]

Though bicycling within park units is a popular activity, a review of survey research in MWR park units finds that rarely do visitors enter park units via bicycle; in the instances where it does occur, this mode of transportation to access park units makes up only 1 to 3 percent of all access.[18]

[14]All visitor-related analysis was conducted using data from 1990 to present day according to recommendations from the LRTP program. Such analysis provides a comprehensive snapshot of what can reasonably be considered "current conditions."
[15]Visitation numbers do not include Charles Young Buffalo Soldiers National Monument, Ice Age National Scenic Trail, Keweenaw National Historic Park, Lewis and Clark National Trail and North Country National Scenic Trail because the NPS Statistics Office does not collect data on visitation to these units.
[16]Results based on Visitor Survey Project survey results with 32 MWR park units reporting. Standard deviation on this variable is 5.5 days.
[17]Results based on Visitor Survey Project survey results with 12 MWR park units reporting. Standard deviation on this variable is 3.1 hours.
[18]Results based on Visitor Survey Project survey results with 10 MWR park units reporting.

Figure 5-5. Recreation and Non-Recreation Visitation to MWR Park Units Between 1990 and 2013



Pictured Rocks National Lakeshore

Regional Issues and Opportunities

Multimodal Access

In many of the MWR park units, traveling along the roads via vehicle, bus or bicycle is one of the primary attractions for visitors. In certain areas of these park units, this demand for road access results during peak-use times in the need to accommodate multiple visitor transportation modes along the same stretch of road. Balancing the needs of cyclists, cars and motorcycles presents significant challenges to park managers from both safety and visitor experience perspectives. Additionally, there is an increasing demand and opportunity for nonmotorized access to park units and alternative transportation. Helping parks and communities make transportation connections easier and more available will be critical to this region.

In 2013, MWR park units logged roughly 352,000 passenger boardings on transit systems (NPS 2013a). A survey of park unit websites revealed that 72 percent of the region's park units provide information for visitors on the availability of public transit services on their websites, which is an above average proportion of websites for the NPS system. (Nationally, 64 percent of park units report public transit information on their websites). However, there is room for improvement: only 38 percent of park unit websites in the MWR provide information on bike and pedestrian access to park units.

In MWR park units, only one park unit identified that it has planning and data needs directly associated with improving multimodal access connections (Mississippi National River & Recreation Area Alternative Transportation Plan, 2010). An additional five park units are requesting the development of transportation or visitor use management plans that will likely include strategies to connect visitors to units via multimodal modes.

In a survey of MWR park unit superintendents undertaken during the initial phase of this LRTP development effort, the issue of multimodal access was considered a moderate issue; however, the MWR park units in the Urban Park Units, Black Hills and Great Lakes clusters consider multimodal access to be a bigger issue than other park units in the region.

Recommended Strategies

- Coordinate with gateway communities and partners to identify existing transportation gaps and to provide multimodal options (where appropriate) to improve connectivity to park units
- Coordinate with local governments, MPOs and states to develop five-year transportation improvement programs at park units where appropriate
- Support the region and its park units in pursuing discretionary funding opportunities to address gaps in nonmotorized connections and between modes
- Develop and disseminate best practices of methods to safely turn walking and/or biking into viable and implementable transportation options, such as installing share the road signs or bicycle racks at key locations
- Develop programmatic best practices for park units to coordinate with partners, streamline planning/compliance and identify fund sources (e.g., healthy communities funding) to further develop multimodal connections

Dayton Aviation Heritage National Historic Park

Accessibility

A complete inventory and evaluation of the accessibility of core park experiences and the related transportation systems within the region has yet to be completed. While some park units have completed self-assessments and transition plans, they are in the minority for the region. Because widespread accessibility evaluation has not yet occurred, it is likely that accessibility needs to be improved for many transportation system elements. Additionally, many of the trails in the region are classified as natural trails (classes 1–3) and do not readily accommodate use by people of all abilities or provide reasonable alternatives for those visitors who experience some degree of mobility limitation.

According to a 2010 survey for the National Organization on Disability, people with disabilities are more likely than those without disabilities to consider inadequate transportation a problem in daily life (34 percent versus 16 percent, respectively) (Harris Interactive 2010). That statistic is inclusive of all forms of disabilities, including not only mobility impairments but also seeing, hearing and speech impairments; emotional or mental disabilities; and learning disabilities.

Findings from the second NPS Comprehensive Survey of the American Public (Taylor, Grandjean and Anatchkova 2011) indicate that the accessibility of a park unit acts as a physical barrier to visitation. Sixteen percent of people surveyed either "strongly agree" or "somewhat agree" that NPS park units are not accessible to persons with physical disabilities, and 13.9 percent neither agreed nor disagreed. Similar results are observed for those residents of the MWR, who responded that 14.5 percent "strongly agree" or "somewhat agree" that park units are not accessible and 13 percent neither agree nor disagree (Taylor, Grandjean and Harnisch 2013).

In a survey of MWR park unit websites, 58 percent of park units provided information on the accessibility of their transportation systems. While other non-NPS accessibility information is available for park units, it is not well organized or standardized (see http://www.wheelchairtraveling.com/badlands-national-park-in-south-dakoda/ or http://www.tdtcompanion.com/NPS/).

Additionally, the findings of the regional LRTP survey of MWR park unit superintendents indicates that accessibility is by far the greatest transportation-related visitor experience issue facing their park units. More than two-thirds of the superintendents surveyed reported that accessibility was either a "major" or "moderate" issue facing their park unit, and half of those park units were within the Urban Park Units cluster.

Cuyahoga Valley National Park

Recommended Strategies

- Continue to build awareness about accessible design standards within transportation systems and the resources available to support accessible projects
- Ensure that transportation design and planning teams incorporate universal design principles and accessibility expertise (which may include the National Accessibility branch, the National Center on Accessibility and the involvement of people with disabilities)
- Review MWR self-evaluation and transition plans as they are completed to identify and help prioritize transportation-related improvements
- Continue to incorporate accessibility information into trip planning resources
- Develop regional processes to ensure that accessibility is considered early in the planning or project scoping phase of transportation projects

In the Great Lakes cluster, all the visitors to island park units have to use ferries that are often concession operated. Some of the ferries and tour boats are not accessible to all users. Additionally, it is often unclear where the responsibility lies to make the appropriate infrastructure updates to the ferries and tour boats to provide accessible features. Addressing accessibility is being written into all present and future concessions contracts.

Many of the launch sites provided along park units' river corridors in the Great Rivers and Trails cluster are not currently accessible, which limits the ability of some visitors to participate in this core park experience.

Within the MWR, 58 trails are Architectural Barriers Act (ABA) compliant, and roughly half of the parking areas and one-third of the buildings are ABA accessible. Table 5-1 lists the ABA-compliant assets in the MWR transportation inventory.

Wind Cave National Park has completed a pilot self-evaluation and transition plan to address accessibility issues within its boundaries. This plan is the first plan of its kind in the region. An additional four park units are requesting the development of accessibility plans or accessibility studies in their foundation documents. It is anticipated that others will follow in the coming years.

Table 5-1. ABA-Compliant Visitor Use Assets in MWR Transportation Inventory

Asset Category	Number Accessible	Percentage Accessible	Grand Total
Parking	337	49%	681
Trails	58	11%	537
Buildings	72	32%	222
Railroads	0*	0%*	36
Other Conveyances	1	33%	3

*Three of the cars on the CUVA railroad are accessible. However, these cars are not included here because they are not NPS assets.

Changes in Visitor Use Patterns from Climate Change

Changes in climate may alter the kinds and amounts of visitor use that any particular park unit or cluster of units is experiencing. These changes may place additional pressure on the park unit resources for maintaining transportation infrastructure to support use. Currently, this issue is most salient in the north of the region where colder winters and longer summer seasons are stressing transportation systems. Park units may need to anticipate needed changes to transportation assets resulting from changes in climate.

In a survey of park superintendents, no park unit identified changes in visitor use patterns from climate change as a "major issue"; however, it was the visitor experience issue that received the most "minor issue" responses. This level of response may indicate that climate change (and its impacts on visitor use patterns) is an upcoming issue that park units are carefully observing and think may be an emerging issue.

A 2015 report from the NPS Climate Change Response program indicates that climate change will significantly impact park visitation patterns. More specifically, increasing temperatures are expected to result in increasing visitation to park units nationwide in all seasons and will contribute to an expansion of the high-visitation season (Fisichelli et al. 2015). While this study is not a precise forecast of what the future will look like, it does provide reasonable projections of how visitation may change based on its historical relationship with temperature at specific park units and how temperature is expected to change in the future. This study evaluated the historical monthly average air temperature and visitation data (1979-2013) and modeled potential future visitations (2041–2060) based on two warming-climate scenarios (low emission and high emissions) and two visitation-growth scenarios. See Fisichelli et al. (2015) for a full description of the methodologies.

Of the 324 park units included in this study, 49 are in the MWR, and their potential visitation futures are summarized below. Table 5-2 summarizes the range of potential changes to total annual visitation, the range of changes to visitation in the peak season and the low season. While some park units may see decreases in visitation resulting from increasing temperatures in low emission scenarios, most will see increases in visitation regardless of the emission scenario, and all MWR units examined in this study are expected to experience increases in visitation in all seasons under the high-emission scenario. On average, these models predict between 13 percent and 36 percent growth in annual visitation to MWR park units, and some of the biggest increases are predicted to be at units within the Great Lakes cluster. Given these results, MWR park units should consider how these increasing visitation numbers could impact their transportation systems and how visitors access these sites.

Apostle Islands National Lakeshore

Table 5-2. Range of Potential Visitation Changes (2041–2060) Resulting from Increasing Temperatures

Park Unit Name	Increase in Annual Visitation	Increase in Peak Season Visitation*	Increase in Low Season Visitation**
Agate Fossil Beds National Monument	15–40%	9–28%	5–98%
Apostle Islands National Lakeshore	22–65%	19–51%	88–117%
Badlands National Park	16–43%	7–30%	1–7%
Cuyahoga Valley National Park	2–4%	1–3%	–3–4%
Dayton Aviation Heritage National Historical Park	10–25%	–1–9%	3–64%
Effigy Mounds National Monuments	9–22%	–5%–3%	29–101%
Fort Larned National Historic Site	9–20%	2–9%	0–37%
Fort Scott National Historic Site	9–23%	2–10%	–5%–35%
Fort Smith National Historic Site	5–16%	–2–7%	19–41%
Fort Union Trading Post National Historic Site	19–47%	10–31%	59–90%
George Washington Carver National Monument	8–20%	1–10%	31–65%
Grand Portage National Monument	26–70%	24–59%	82–108%
Harry S Truman National Historic Site	8–22%	5–20%	9–32%
Herbert Hoover National Historic Site	6–17%	7–22%	12–15%
Homestead National Monument of America	7–18%	–4–3%	–3–26%
Hopewell Culture National Historic Park	12–28%	5–15%	30–99%
Hot Springs National Park	4–14%	3–11%	12–26%
Indiana Dunes National Lakeshore	15–39%	13–38%	20–45%
Isle Royale National Park	30–85%	18–54%	181–238%
James A Garfield National Historic Site	9–24%	8–23%	9–20%
Jefferson National Expansion Memorial	17–73%	24–93%	36–94%
Jewel Cave National Monument	25–62%	16–44%	84–119%
Knife River Indian Villages National Historic Site	13–38%	11–31%	29–48%
Lincoln Boyhood National Memorial	11–35%	7–32%	8–33%
Lincoln Home National Historic Site	9–23%	1–12%	28–88%
Little Rock Central High School National Historic Site	3–16%	–1 – 22%	11–37%
Minuteman Missile National Historic Site	19–46%	12–34%	50–99%
Mississippi National River and Recreation Area	7–25%	5–22%	8–45%
Mount Rushmore National Memorial	21–51%	14–39%	5–20%
Nicodemus National Historic Site	9–24%	9–27%	5–8%
Niobrara National Scenic River	24–64%	17–48%	73–97%
Ozark National Scenic Riverways	15–46%	12–40%	33–74%
Pea Ridge National Military Park	5–13%	1–2%	29–74%

Park Unit Name	Increase in Annual Visitation	Increase in Peak Season Visitation*	Increase in Low Season Visitation**
Perry's Victory and International Peace	26–65%	21–47%	349–437%
Pictured Rocks National Lakeshore	16–48%	17–47%	13–19%
Pipestone National Monument	22–54%	21–49%	53–130%
Saint Croix National Scenic Riverway	14–47%	11–36%	29–70%
Scotts Bluff National Monument	11–30%	8–24%	7–37%
Sleeping Bear Dunes National Lakeshore	30–76%	23–58%	224–261%
Tallgrass Prairie National Preserve	1–6%	15–19%	2–22%
Theodore Roosevelt National Park	16–45%	12–34%	74–194%
Ulysses S Grant National Historic Site	6–25%	4–24%	8–35%
Voyageurs National Park	9–34%	7–28%	–33%–5%
William Howard Taft National Historic Site	3–7%	2–6%	5–9%
Wilson's Creek National Battlefield	6–17%	7–17%	18–40%
Wind Cave National Park	15–41%	10–33%	5–20%

*Defined as the three busiest contiguous months
**Defined as the three contiguous months with the least visitation

Apostle Islands National Lakeshore

Table 5-3 summarizes the range of potential visitation changes for the shoulder seasons in both volume of visitors and length of that season. Most park units analyzed in this study, under all future climate scenarios, should expect to see increased visitation in the shoulder seasons, as well as a growth of the overall length of the shoulder season.[19] On average, these models predict between 25 percent and 60 percent increases in visitation during the shoulder seasons at MWR park units and a 12- to 29-day expansion to the visitation season. Given these results, park units should consider how additional visitors and a longer visitor season could impact the demands on transportation systems during these shoulder seasons.

Table 5-3. Range of Potential Visitation Changes to Shoulder Seasons (2041–2060) Resulting from Increasing Temperatures

Park Unit Name	Increase in Shoulder Season Visitation*	Expansion of the Visitation Season**
Agate Fossil Beds National Monument	29–56%	20–45 days
Apostle Islands National Lakeshore	26–109%	18–46 days
Badlands National Park	42–82%	19–36 days
Cuyahoga Valley National Park	7–15%	3–1 days
Dayton Aviation Heritage NHP	31–45%	23–45 days
Effigy Mounds National Monuments	50–64%	7–32 days
Fort Larned National Historic Site	14–24%	12–31 days
Fort Scott National Historic Site	41–57%	24–41 days
Fort Smith National Historic Site	19–30%	9–22 days
Fort Union Trading Post National Historic Site	54–98%	22–42 days
George Washington Carver National Monument	19–30%	18–34 days
Grand Portage National Monument	32–108%	22–47 days
Harry S Truman National Historic Site	11–25%	6–19 days
Herbert Hoover National Historic Site	9–20%	5–9 days
Homestead National Monument of America	31–41%	12–30 days
Hopewell Culture National Historic Park	11–25%	21–41 days
Hot Springs National Park	6–15%	7–16 days
Indiana Dunes National Lakeshore	16–43%	15–31 days
Isle Royale National Park	84–266%	30–56 days
James A Garfield National Historic Site	8–25%	4–15 days
Jefferson National Expansion Memorial	–1–50%	22–47 days

[19] Two units (Voyageurs National Park and Pictured Rocks National Lakeshore) in the MWR region in this study reported that based on the models used in this study, the visitation in the shoulder seasons may be reduced and the length of the visitation season may be contracted.

Park Unit Name	Increase in Shoulder Season Visitation*	Expansion of the Visitation Season**
Jewel Cave National Monument	68–142%	21–40 days
Knife River Indian Villages National Historic Site	16–45%	16–35 days
Lincoln Boyhood National Memorial	13–37%	10–24 days
Lincoln Home National Historic Site	18–30%	14–34 days
Little Rock Central High School National Historic Site	3–5%	6–20 days
Minuteman Missile National Historic Site	50–92%	16–32 days
Mississippi National River and Recreation Area	11–26%	8–27 days
Mount Rushmore National Memorial	44–90%	19–39 days
Nicodemus National Historic Site	23–42%	5–7 days
Niobrara National Scenic River	52–161%	18–39 days
Ozark National Scenic Riverways	20–61%	13–29 days
Pea Ridge National Military Park	8–14%	10–27 days
Perry's Victory & International Peace Memorial	40–115%	17–35 days
Pictured Rocks National Lakeshore	28–84%	(9– 13 days)**
Pipestone National Monument	18–58%	11–31 days
Saint Croix National Scenic Riverway	18–65%	12–34 days
Scotts Bluff National Monument	21–39%	9–30 days
Sleeping Bear Dunes National Lakeshore	36–127%	24–44 days
Tallgrass Prairie National Preserve	18–38%	5–18 days
Theodore Roosevelt National Park	21–55%	16–40 days
Ulysses S Grant National Historic Site	9–27%	3–17 days
Voyageurs National Park	36–90%	(35 days)**
William Howard Taft National Historic Site	3–7%	6–9 days
Wilson's Creek National Battlefield	0–8%	16–28 days
Wind Cave National Park	32–65%	17–35 days

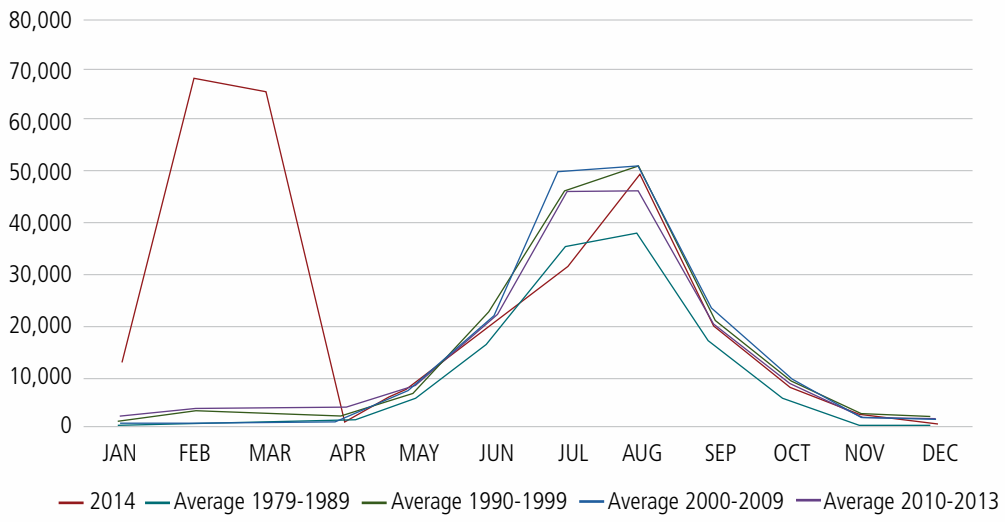
*Defined as the two months prior and the two months after peak season
**Units are predicted to show contractions in their peak seasons as opposed to expansions

Climate change may also increase the instances of extreme weather events that have effects on park visitation and operations. As an example, in winter 2014, the sea caves at Apostle Islands National Lakeshore were accessible by foot travel for the first time in nearly six years[20]. This rare access made national news, and visitors flocked to the site in record numbers that significantly exceeded even the peak summer visitation levels recorded between 1979 and 2013. To accommodate an unusually high number of visitors, the park unit had to adjust its management of this area. These adjustments included additional communication and wayfinding, increased supporting infrastructure (e.g., restrooms), shuttle buses and additional messaging and ranger patrols to ensure visitor safety along roads and trails. Figure 5-6 summarizes monthly visitation over multiple time periods and compares this historical visitation pattern to that experienced during 2014 at Apostle Islands.

Recommended Strategy

- Look for ways to adapt visitor services and transportation system components in the face of changing visitor use patterns resulting from changing climates that are consistent with park unit purpose and static financial resources

Figure 5-6. Monthly Visitation at Apostle Islands National Seashore



[20] An interesting note: The last time the ice caves were open was in 2009. At that time, Facebook had approximately 13 percent of its current users, and Instagram was still more than a year away from being launched.

Congestion

The Black Hills and Great Lakes clusters can experience heavy traffic and congestion along their roadways and at attraction sites during the busy summer season. This congestion sometimes results in conflicts between road users and pedestrians at high-volume intersections and on-road pedestrian crossings. The units in these clusters often need to employ situational flexibility and advanced planning to mitigate congestion related to both anticipated and unanticipated special events that may cause the types and amounts of use that exceed a park unit's transportation system capacity.

Traffic congestion in some park units can be a serious operational and safety concern, particularly during peak hours or during peak tourist season. Congestion is generally defined as a situation where the travel demand for a facility or service exceeds the capacity of that facility/service to handle the demand at performance levels considered acceptable to the facility/service users (Institute of Transportation Engineers 1997). Congestion can negatively impact the visitor experience and visitor safety and can impede visitor access to park resources.

In most cases, congestion is currently managed individually by the region's park units. This approach of managing congestion often does not look broadly at the service as a whole, regionally or subregionally, which may lead to a less-than-optimal allocation of resources across the NPS. To address this issue, the NPS is developing a systemwide congestion management system (CMS) that will enable NPS managers at all levels to allocate resources more effectively to address congestion-related problems. The NPS is developing this CMS in phases. Phase I laid the foundation for the CMS, with technical memoranda documenting available data, users and needs and results from a 2010 servicewide park congestion survey.

Phase I data from the National Congestion Management study (NPS 2011) indicates that roughly 31 percent of MWR park units experience congestion issues within or around their unit, 13 percent of these park units are actively managing this congestion and an additional 6 percent have managed congestion from time to time. This traffic management is usually performed by park rangers, but is occasionally managed through changes to traffic circulation and other strategies.

Those park units reporting congestion state that it mostly affects visitor safety and visitor experience. The negative impacts to visitor experience related to congestion are most often observed in mixed and remote population centers. These safety issues stemming from congestion mostly involve pedestrian or bicycle conflicts with vehicles. Congestion also affects park resources, park operations and facilities, most frequently in urban and suburban population centers and less likely in remote areas.

Construction work zones, commercial traffic operations and roadway capacity bottlenecks are thought to be the causes of congestion with the biggest impacts. However, the region's park units note many other causes of congestion, indicating a range and variability in the sources of congestion across park units in the region. Across all population centers, the most common source of congestion is people congregating at attraction sites. In MWR park units, congestion most often occurs in parking areas and secondarily on roadways providing access to the park unit and in pedestrian lodging areas (NPS 2011). Table 5-4 summarizes the causes of congestion in MWR park units and nationally.

A review of the unit foundation documents completed to date indicates that only one park unit thus far (Cuyahoga Valley National Park) is requesting a transportation plan be developed to mitigate congestion issues. In 2010, a study was done at Indiana Dunes National Lakeshore (Visitor Circulation, Parking Assessment & Transportation Improvement) to look at congestion and relieving some of the parking and traffic issues.

At this point, the majority of park units in the region do not have a perceived need for a plan to mitigate congestion issues. There were other major projects planned to relieve congestion issues; or there was a vacancy in park management and it was not a good time to undertake a study or planning effort.

The increasing urbanization of the US population may affect future congestion levels at park units. In recent years, the rate at which formerly rural or natural lands are becoming more urbanized has increased faster than the US population. This trend is expected to continue; by 2030, 87 percent of the US population is expected to live in urban areas (Vassigh and vom Hove 2012). Increasing urbanization near park units will likely contribute to increased nonrecreational use of NPS transportation facilities (e.g., through traffic) and will exacerbate congestion issues in some areas.

In a 2015 survey of MWR park unit superintendents, congestion ranked as the second highest visitor experience transportation issue of all issues presented. Park units in the Great Lakes, Great Rivers and Trails and Black Hills clusters ranked this issue higher than did other clusters in the region.

Table 5-4. Average Rank Scores for Causes of Congestion

Cause	MWR Average Score*	National Average Score
Construction work zones	14.0	11.4
Bottlenecks	13.3	12.7
Commercial traffic	13.3	12.0
People congregating at one attraction	13.2	13.3
Commuter traffic	12.5	12.4
Weather	12.5	11.5
Bicyclists	12.0	11.2
Normal fluctuations in traffic	11.8	12.0
Pedestrian crossings	11.7	11.3
Traffic control devices	11.5	11.6
Transit schedule/transit traffic	11.3	11.5
Special events	10.8	11.9
Traffic incidents	10.5	10.6
Wildlife viewing	10.0	11.0

*A point value of 14 was assigned to a survey rank of 1, with points decreasing by 1 for each lower ranking.

Recommended Strategies

- Coordinate with partner agencies/ organizations to mitigate or reduce congestion (from built systems, construction and commercial use)
- Ensure that transportation system improvements or new development is designed to mitigate congestion
- Explore potential congestion indicators, thresholds and performance measures and methodologies to assess congestion in lieu of servicewide quantitative congestion data
- Develop technical assistance resources to assist park units in diagnosing congestion problems and identifying appropriate solutions
- Develop a regional congestion management strategy using information from the Congestion Management Program

High Visitor Use Areas

Many of the access points in park units in the Great Rivers and Trails cluster are heavily used by school buses, liveries and other users. Because these park units are by their nature long and linear, there is limited opportunity to disperse users. High use in primitive parking areas and access points often overwhelm the area and lead to visitor-created site expansion through erosion and vegetative loss at the perimeters of paved or other hardened sites. Many of these launch sites and access points need to be improved and/or need operational strategies to better manage the level of use that they receive.

Many park units in this region contain boat launch sites, which often see high visitor use during peak visitation periods. Such concentrated use has led to resource degradation, including trampling of vegetation, which can lead to runoff, erosion and other associated impacts to the sensitive riparian habitats often within or immediately adjacent to launch sites. High visitor use is an especially relevant issue at park units within the Great Rivers and Trails cluster, which have many boat launch sites, but it can be an issue at any unit in the region with public boat launch locations (i.e., units in the Great Lakes cluster).

This issue, however, is not limited to boat launch locations. Parking areas can become full in any high visitor use location. When this occurs, visitors sometimes park in nearby areas that are not designed to accommodate vehicles (e.g., along roadsides, on road shoulders). Inappropriate parking can lead to roadside impacts, such as to vegetation, wildlife and habitats.

While high visitor use is a concern at many park units in the region, no regional data is currently available to help quantify impacts. To better understand this issue, the region could gather information related to capacities and usage at high-use locations and work toward a comprehensive approach to identification and quantification of transportation-related resource impacts.

An LRTP focused survey of MWR park unit superintendents revealed that high levels of visitor use at specific park areas is the second largest issue facing park units with respect to visitor use and visitor experience of transportation. This issue also tends to be a highly ranked issue in the Great Lakes, Great Rivers and Trails and Black Hills clusters. The results of this survey indicate that high levels of visitor use is a “moderate issue” in many of the park units.

Currently, the incident management team in the MWR helps to plan for and respond to special events expected to attract high levels of visitor use (such as the 75th anniversary of the Sturgis Motorcycle Rally). To date, using incident management teams has been a successful strategy in helping to mitigate the potential congestion associated with these popular special events.

A review of the unit foundation documents for the region indicates that eight park units have issues relating to high visitor use and are requesting visitor use management plans or studies to mitigate these issues. These units include Cuyahoga Valley National Park, River Raisin National Battlefield Park, George Rogers Clark National Historical Park, Isle Royale National Park, James A Garfield National Historic Site, Mississippi National River & Recreation Area, Theodore Roosevelt National Park and William Howard Taft National Historic Site.

Recommended Strategy

- Ensure that the region takes a multidisciplinary approach to providing park units with high-use area/related technical assistance for planning and project development

Trip Planning

While some park units have robust trip planning resources on their websites, most units' websites do not provide thorough, comprehensive information on trip planning to park visitors. While information about alerts (e.g., construction, road closures) are usually easy to find and well placed on park unit websites, information about accommodations availability at or near park units can be more challenging for visitors to locate on park unit websites. Additionally, while some units provide information about accessibility on their park websites, others do not, and only some of the park unit websites are Section 508 compliant—all of which can make planning a trip challenging for some visitors. Trip experiences could also be improved by increasing the information and branding at park units that alerts and reminds visitors that they are in a national park unit. Park units in the Urban Park Units cluster are often accessed by regional transit services operated by the municipality within which the park unit is located. Providing links to trip planning tools hosted by these partners is one way these park units could improve the provision of information on visitor access to their sites.

Traveler information, wayfinding and signage are key transportation features that facilitate visitor travel to and within a park unit. Providing improved traveler information to potential visitors in advance of their trips can help to increase the public's awareness of NPS park units and the ease in accessing these units. Effective traveler information and wayfinding signage improves visitor experiences by helping visitors navigate a park unit with ease. In addition, providing information on traffic and parking on websites, or through variable message signs or other methods, may help visitors avoid crowded locations and in turn help to mitigate congestion. Visitor traveler information needs may differ based on the context of a park unit's location, environmental or geographic setting and the types of visitors it serves (e.g., visitors with disabilities, non-English speaking visitors, repeat visitors, visitors who primarily arrive by public transportation). Regardless of these differences, traveler information needs to reach a wide range of visitors. NPS partners, including gateway communities and tourism partners, play a critical role in providing traveler information to visitors.

The NPS National LRTP includes a performance measure to have all park units include complete traveler information on the "Directions and Transportation" sections of their NPS.gov web pages. The NPS Web Council reviewed the recommendations for what to include on this page, and they are available to all NPS web managers (as of June 2015). These recommendations define "essential traveler information" as the following:

- A description of the transportation experience
- Driving directions
- Alternative transportation options
- Parking
- Congestion
- Travel distances and travel times to sites within the park unit
- Accessibility of transportation systems
- Alternative fueling stations.

Wind Cave National Park

A preliminary analysis[21] of park unit websites for the MWR revealed that almost all park units currently offer detailed driving directions for visitors to reach their sites and include the recommended address or latitude/longitude coordinates for a global positioning system-enabled device. However, only a small number of park units provide accessibility information or congestion information on their park unit websites. Table 5-5 summarizes the available trip planning information on MWR park unit websites.

Mississippi National River & Recreation Area has developed a trip planning website on local transit options for visitors to access the park unit. This website includes route information and arrival times for nine different areas of the river. (For a full discussion and description of this resource at Mississippi National River, please see Chapter 7: Partnerships.)

Table 5-5. Available Trip Planning information on MWR Park Unit Websites

Trip Planning Information	Percent Complete (%)
Description of the Transportation Experience	50
Driving Directions	97
Alternative Transportation*	34
Bike and Pedestrian Information	38
Parking**	8
Congestion Information	13
Travel Distances and Times to and within the Park Unit	41
Accessibility of Transportation Systems	54
Alternative Fueling Stations***	3

*While 68% of parks provide information on public transit access to the park, only 34% also provide information about bike/pedestrian access.
**While 53% of units provide information on the parking lot locations, only 9% of parks provide information on peak use/availability of parking. This item records when parks provide both of these elements for parking.
***Alternative fuels information is only available on the websites for Mississippi National River & Recreation Area and Wilson's Creek National Battlefield.

[21] The following criteria were used in assessing the information provided on park unit websites:

- A description of the transportation experience should briefly cover what a visitor should expect to experience when using the park unit's transportation system.
- The driving directions section should provide detailed driving directions to get to a site and should include the recommended address or latitude/longitude coordinates to enter into a global positioning system-enabled device.
- Alternative transportation should provide information on how to access the park unit via motorized and nonmotorized alternative transportation, as well as alternative transportation modes that are available for travel within the park unit. If the site is not accessible via alternative transportation, then the website should specify that.
- Parking should provide information on parking lot locations and accommodations (e.g., accessible spaces, RV spaces), as well as information on parking lot peak use/availability.
- Congestion should include information on the typical presence or lack of congestion at specific locations or at times of the year/week/day. Travel distances should include times to sites within the park unit.
- The accessibility of transportation systems should provide information on whether the transportation system (including both motorized and nonmotorized portions of the system) is accessible to individuals with disabilities.
- Alternative fueling stations should provide a link to the Department of Energy Alternative Fueling Station Locator. Park unit web managers can access this information on the NPS Digital Community website.

Roughly half (46 percent) of visitors to MWR park units used previous visits as their source of information for their visits (Vaske and Lyon 2014), which may indicate the frequency of return visitors to MWR park units. Other sources of information included word of mouth (39 percent), NPS brochures (32 percent), travel guides (24 percent) and NPS websites (24 percent). Visitors to MWR park units were also more likely than visitors to other regions to use visitor centers as a source of trip information (13 percent and 8 percent, respectively).

Recommended Strategies

- Provide trip planning resources on park unit websites to make visitors aware of where and when congestion and crowding occurs within park units and share best practices and successes across the region (relates to multiple issues)
- Better use park unit websites and social media to provide up-to-date trip planning resources (e.g., what's available and how to navigate)
- Participate in servicewide standardized approach to disseminate traveler information on mobile devices
- Improve wayfinding and other transportation information that is being distributed via non-NPS media (e.g., Trip Advisor, partner apps, booking agent/reservation systems, 511)
- Conduct a region-wide, all-unit visitor survey of trip planning information using the collaborative visitor transportation survey to identify needed improvements to park unit websites and transportation systems

Indiana Dunes National Lakeshore

Measuring System Performance

Performance Measure: Percentage of Park Unit Websites That Provide Essential Travel Information

Visitor satisfaction is increased when visitors' expectations are met. Providing detailed information about a park unit's transportation system and a description of the transportation experiences at a park unit can help establish accurate expectations. A review of the "Plan Your Visit" portion of the 60 MWR park unit websites indicates that park units do not currently provide the level of comprehensive traveler information that the National LRTP and the NPS web editorial board recommend. Ensuring that all MWR park units provide essential traveler information as a key milestone in achieving the objective of providing state-of-the-art traveler information.

Grand Portage National Monument

Baseline

Park unit Plan Your Visit webpages that provide the following essential travel information as of April 2015:

- A description of the transportation experience
  Current status: 50 percent of MWR park units
- Driving directions
  Current status: 97 percent of MWR park units
- Alternative transportation information
  Current status: 34 percent of MWR park units
- Bike and pedestrian information
  Current status: 38 percent of MWR park units
- Parking information
  Current status: 8 percent of MWR park units
- Congestion information
  Current status: 13 percent of MWR park units
- Travel distances and times to and within the park unit
  Current status: 38 percent of MWR park units
- Accessibility of transportation systems
  Current status: 38 percent of MWR park units
- Alternative fueling systems
  Current status: 3 percent of MWR park units.

Target

100 percent of MWR park units provide essential traveler information for all nine of the listed topical areas on the Plan Your Visit webpage by 2019.

Performance Measure: Percentage of Areas With Accessible Facilities and Parking Spaces

The NPS is committed to making all practice efforts to make NPS transportation facilities and services accessible and usable by all people. Ensuring that parking lots and associated facilities are improved or made accessible is key to this overall goal.

Baseline

49 percent of MWR park unit parking areas have accessible spaces and/or facilities.

Target

60 percent of MWR park unit parking areas have accessible spaces and/or facilities by 2019.

Performance Measure: Number of Park Units Reporting Congestion Issues In Parking Areas, Park Unit Entrances and Pedestrian Loading Areas

Results of the 2010 National CMS survey reveal that the most congested areas of MWR park units are the parking areas, roadways that provide access to the park units and pedestrian loading areas. Focusing on reducing congestion issues at these critical visitor access points will help improve the visitor experience by ensuring that visitors have stress-free access to park unit resources.

Baseline

This baseline measurement is not yet available as of the date of this report.

Target

Develop a survey or other reporting mechanism to gather and track information about the number of park units reporting congestion and severity of congestion at those park units. Implement this instrument at the five-year update and use during subsequent five-year updates.

Mount Rushmore National Memorial

Performance Measure: Number of Park Units Reporting Crowding Issues

Crowding at any given destination throughout a park unit can negatively impact a visitor's experience of that place. This over-use of a destination or area can also lead to resource through visitor use-related expansion of parking areas, trails and other well-used areas. Often times, these crowded locations and events are linked to transportation systems. Ensuring that crowding issues are addressed will help the NPS to meet its goal of improving transportation-related visitor experiences within park units.

Baseline

This baseline measurement is not yet available as of the date of this report.

Target

Develop a survey or other reporting mechanism to gather and track information about the number of park units reporting congestion and severity of congestion at those park units. Implement this instrument at the five-year update and use during subsequent five-year updates.

Cuyahoga Valley National Park

Isle Royale National Park

Chapter 6
Safety

Goal

Provide a safe transportation system for all users

Objectives

- Maximize transportation safety across all modes while preserving scenic, cultural and natural resources and values
- Support the implementation of the NPS Transportation Safety Program
- Reduce transportation-related incidents and prepare for emergencies and special events
- Develop a better understanding of the current transportation safety hazards within the region
- Promote the "Four E's" (engineering, enforcement, education and emergency services) of transportation safety

Introduction

Safety is paramount to the design and operation of NPS transportation systems, yet motor vehicle crashes remain a significant safety risk throughout the service. Between 2008 and 2013, motor vehicle crashes were the second leading cause of visitor deaths in park units nationwide and a major source of employee injury. In the MWR, single-vehicle crashes account for 88 percent of severe (fatal and injury) crashes and 59 percent of the total crashes reported during the 2008–2013 time period. This proportion is the highest of all NPS regions. In addition to motor vehicle crashes, the MWR identified three other major safety issues that it faces: road design standards and features, safe operations and work zones and special events and emergency preparedness. The MWR is committed to understanding its transportation safety needs and mitigating risks.

Mount Rushmore National Memorial

Regional Issues and Opportunities

Crash Data in the Midwest Region

Crash data is collected by park units and transmitted to a national database. The most complete servicewide crash data set includes crash records from 1990 to 2005. This data was compiled in the legacy Servicewide Traffic Accident Reporting System database and serves as the baseline for this plan. The current and relatively new DOI system of record for crash information is the IMARS. Efforts are underway to extract salient crash data from the IMARS database for subsequent analysis in an NPS safety management system. Improving the quality and consistency of crash data collected would significantly improve program managers' ability to identify transportation safety risks and programmatically approach improvements. Further park unit or corridor-level safety studies in high-risk areas (in lieu of regionwide crash data) would help identify actions to focus limited funds toward projects with the highest likelihood of preventing future crashes.

Pictured Rocks National Lakeshore

Motor Vehicle Crashes in the Midwest Region

Park units in the MWR have relatively low overall crash densities (crashes per mile) when compared to the other NPS regions, but motor vehicle crashes are still a top contributor to visitor and workforce injuries.

With only 2 percent of the total reported crashes in the NPS, the MWR has the second lowest number of total crashes (after the Alaska Region), as well as the second lowest number of severe crashes (defined as fatal or injury crashes).

The most complete crash data set for the region spans from 1990 to 2005. During this time period, 1,709 crashes occurred in the region, of which 235, or approximately 14 percent, resulted in injury and 9 (less than 1 percent) resulted in fatality. The remaining 1,465 crashes resulted in property damage. Table 6-1 shows average annual crash statistics for the region between 1990 and 2005.

Crashes are not evenly distributed across park units or clusters in the region. Not surprisingly, more than 90 percent of all reported serious and total crashes during the 1990–2005 period occurred in the region's 10 most visited park units (see Table 6-2). As the site of one-third of all serious crashes in the region, Hot Springs National Park had the highest number of total crashes and the highest number of severe crashes in the region. After Hot Springs National Park, the MWR park units that experienced the greatest number of severe crashes across the region were Ozark National Scenic River and Buffalo National River, each with 9 percent of the regional total, and Mount Rushmore National Memorial and Badlands National Park, each with 8 percent of the regional total, In addition, one-third of all recorded fatal crashes (3 crashes) occurred at Buffalo National River.

Table 6-1. Average Annual Motor Vehicle Crashes, 1990-2005, by Crash Type

Crash Type	MWR Average	NPS National Average
Property Damage Only	98	5,550
Injury	16	1,300
Fatal	1	50
Total	**115**	**6,900**

Following Hot Springs National Park's 15 percent, Mount Rushmore National Memorial had the second highest number of total crashes over the 15-year period, experiencing 14 percent of all reported crashes across the region. The next largest clusters of total crashes were reported at Indiana Dunes National Lakeshore and Cuyahoga Valley National Park, both at 13 percent, followed by Jefferson National Expansion Memorial at 10 percent.

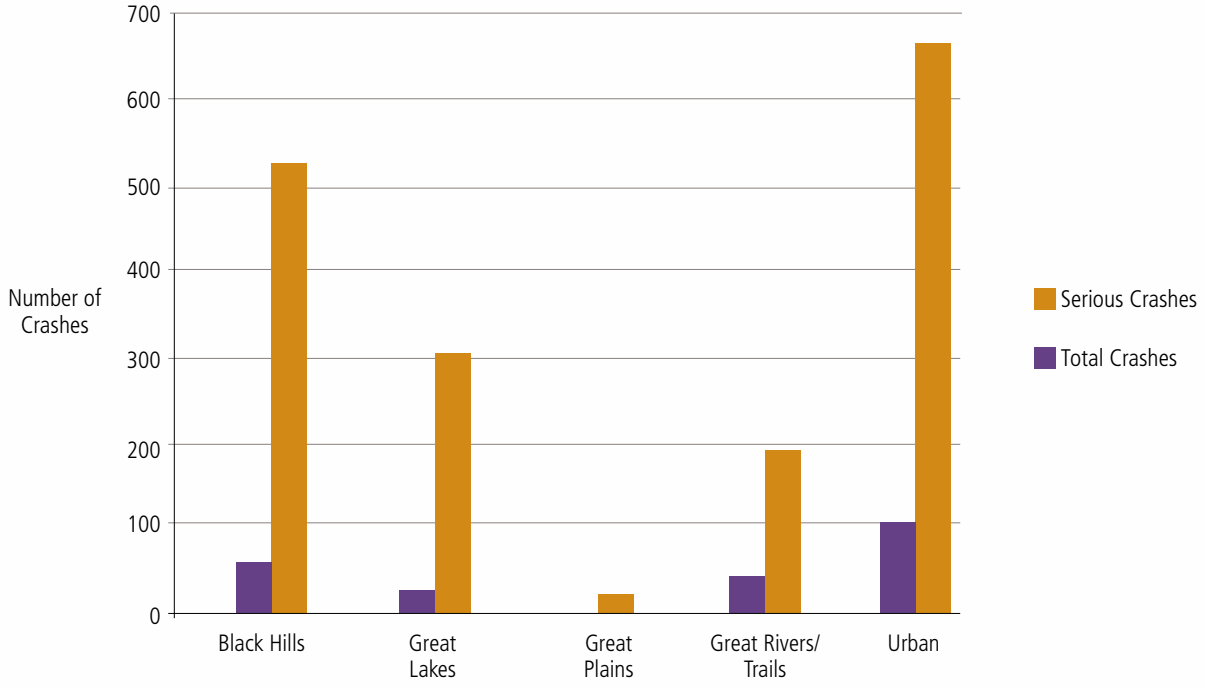
When examining the data by the five regional park unit clusters, the Urban and Black Hills clusters experienced higher crash percentages than the region overall (see Figure 6-1). Crashes in Hot Springs National Park heavily contribute to the overall Urban Park Units cluster total. Additionally, commuters using park transportation assets contribute to higher traffic volumes in the region's urban areas, which may explain the higher crash percentages observed in the Urban Park Units cluster units. During this same time period, the Black Hills park cluster, which accounts for only 10 percent of the total number of park units in the region, was the scene of 25 percent of the reported serious crashes and 31 percent of all crashes.

Table 6-2. Crashes in the Midwest Region, 1990-2005

Park Unit Name	Cluster	Percentage of Regional Severe Crashes (%)	Percentage of Regional Total Crashes (%)
Hot Springs National Park	Urban Park Units	33	15
Ozark National Scenic River	Great Rivers	9	6
Buffalo National River	Great Rivers	9	5
Mount Rushmore National Memorial	Black Hills	8	14
Badlands National Park	Black Hills	8	7
Indiana Dunes National Lakeshore	Great Lakes	7	13
Cuyahoga Valley National Park	Urban Park Units	6	13
Wind Cave National Park	Black Hills	6	8
Jefferson National Expansion Memorial	Urban Park Units	4	10
Theodore Roosevelt National Park	Black Hills	3	2
Wilson's Creek National Battlefield	Urban Park Units	2	1
Sleeping Bear Dunes National Lakeshore	Great Lakes	1	3
Total	**—**	**96***	**97***

*Twenty park units contributing 1 percent or less to the regional crash totals were omitted from this table.

Figure 6-1. Crashes in the Midwest Region, 1990-2005, by Cluster

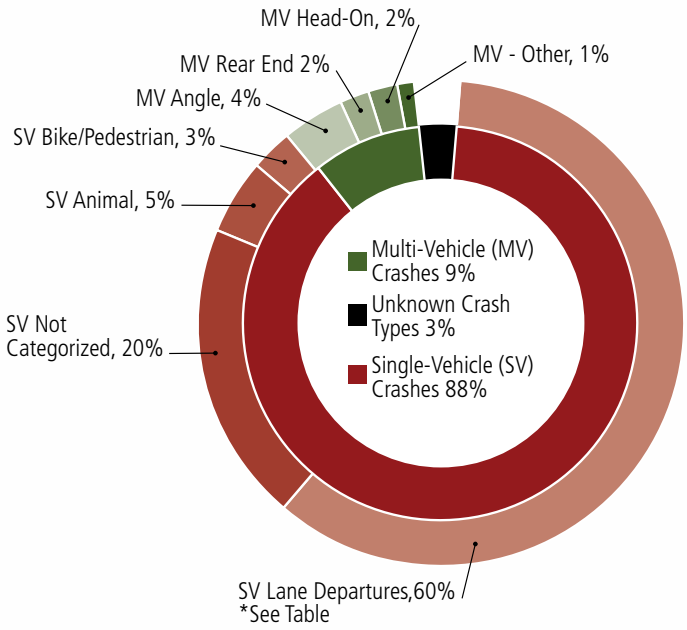


SEVERE CRASHES BY COLLISION TYPE

In the MWR, single-vehicle crashes account for 88 percent of severe (fatal or injury) crashes over the 1990-2005 time period, of which 60 percent were lane departures (see Figure 6-2). This proportion is the highest of all NPS regions, which is remarkable given that the region has the second lowest total crash total of all seven NPS regions. In the broader context, lane departure crashes consistently account for more than half of the highway fatalities in the United States (NPS 2009). Severe crashes resulting from lane departures commonly occur in rural areas, along undivided roadways, where posted speed limits are higher than 50 mph, and along curves.

Twenty percent of severe crashes were Single Vehicle – Not Categorized. Although little information is provided on the Not Categorized crash types, they appear to be primarily single-vehicle crashes involving an overturned vehicle and/or other nonobject-related crashes that are not defined by crash report codes. Five percent of severe crashes in the MWR involved a vehicle collision with an animal.

Figure 6-2. Type of Collision for Severe Crashes in the Midwest Region, 1990-2005



Types of SV Lane Departures	Percentage
Tree/Shrub	25%
Guardrail/Barrier	5%
Other Object	5%
Rock/Stone Wall	5%
Ditch	4%
Other Fixed Object	4%
Backslope	4%
Barricade	2%
Boulder	2%
Pole	2%
Bridge Structure	1%
Drainage Structure	1%
Sign	<1%
Total SV Lane Departures	**60%**

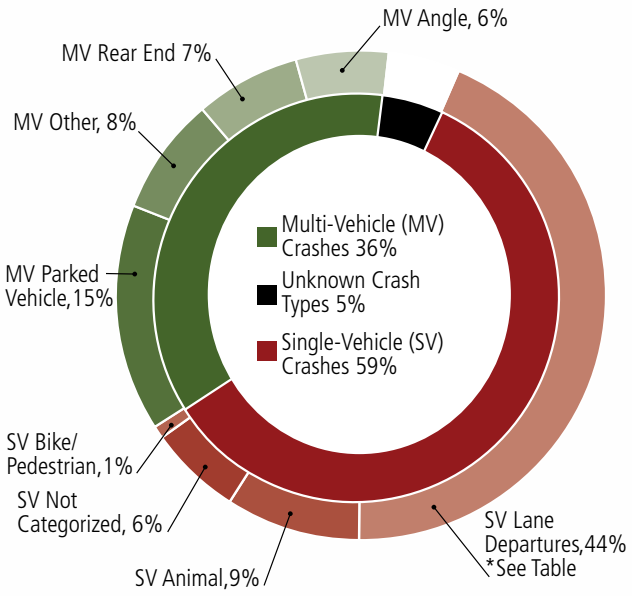
MIDWEST REGION TOTAL CRASHES

Fifty-nine percent of all reported crashes in the region during the 1990-2005 time period were single-vehicle crashes, of which 44 percent were lane departures (see Figure 6-3). Multiple vehicle crashes accounted for 36 percent of all crashes. The most common multivehicle crash type was parked vehicle collisions, which makes up 15 percent of all crashes. It is the most common type of collision overall. Collisions with animals represent 9 percent of all collisions.

Recommended Strategies

- Identify and implement unit-level, site-specific safety improvements (focusing first on high-crash park units) that include specific recommendations related to engineering, enforcement, education and emergency response
- Conduct unit-level safety studies cyclically in park units that represent the majority of crashes and vehicle miles traveled, focusing first on high-crash park units
- Implement strategies identified in unit-level safety studies in park units that represent the majority of crashes and vehicle-miles traveled
- Coordinate with other FLMAs, as well as state and local jurisdictions, for shared services/ response/and crash data collection
- Ensure that park unit crash data is reported in the DOI IMARS
- Develop an aggressive crash collection protocol and procedures across the region (e.g., agreements with local law enforcement to report all crashes, which they then investigate using NPS standard forms)

Figure 6-3. Type of Collision for All Crashes in the Midwest Region, Including Parking, 1990-2005



Types of SV Lane Departures	Percentage
Tree/Shrub	10%
Other Fixed Object	10%
Guardrail/Barrier	5%
Barricade	3%
Pole	3%
Other Object	3%
Ditch	2%
Rock/Stone Wall	2%
Backslope	1%
Boulder	1%
Bridge Structure	<1%
Drainage Structure	<1%
Culvert End Wall	<1%
Total SV Lane Departures	**44%**

Road Design Standards

Road design standards were identified as a major issue among superintendents from the Black Hills cluster, a grouping of park units characterized by rural roads designed to follow natural contours of the landscape and provide scenic driving experiences. Park units in this cluster experience high volumes of traffic from a mixture of vehicles large and small. Designed features, such as surface material or sharpness of turns, must accommodate the needs of all vehicles traveling on the roads or must be mitigated through operations.

When it comes to designed features, park roads are subject to NPS park road standards. These standards are generally consistent with FHWA and state DOT design standards and guidelines, but are adaptable to a park unit's unique character and resource limitations. In some cases, management decisions about road design elements, such as road geometry, lighting, road width or guardrail number, placement and type, may deviate from generally accepted industry standards and practices to ensure the protection and integrity of a park resource. Visitor expectations of standard roadside design features, combined with a lack of knowledge of the local area, can increase safety risks. The MWR uses the FHWA exception process when designs requests vary from the industry standard. When design exceptions are made for context, park units can use nonengineered features, such as lower speed limits, night-time driving restrictions, increased law enforcement or operational leadership training to mitigate some safety risks.

Signage and lighting were also identified as areas of concern by park managers across the region. Individual responses from park managers about why signage and lighting were a top issue ranged from wayfinding needs to the poor condition of existing signs to lighting issues in parking areas. The quality of lighting and signage is highly variable in park units across the region and is confounded by complex jurisdictions. To protect the night sky, many park units in the region use lower levels of lighting than standard design practices, which visitors may not be accustomed to. Visitor perceptions of safety, such as navigating a dim parking lot, can be negative, even when lighting conditions are not contributing to safety incidents. The MWR has expressed some concern over internal and external pressure to update signs and lighting to more closely match the safety standards outlined in the FHWA Manual on Uniform Traffic Control Devices, such as signage colors, signage text fonts, retro reflectivity and brighter traffic lights, without taking away from NPS identity. While consistent and compliant signage is critical to visitor safety and the visitor experience, sign replacement projects typically receive lower priority than competing projects among eligible funding programs. As a result, sign replacement is typically funded from limited park base funds and can be many years overdue.

Recommended Strategies

- Employ best management practices, such as context-sensitive solutions and engaging with safety and law enforcement disciplines during project development
- Implement replacement program for signs to meet reflectivity, accessibility and NPS design standards

Niobrara National Scenic River

Safe Operations and Work Zones

To maintain and operate the regional transportation network, park facility management staff must operate a variety of specialized heavy duty equipment. NPS employees and volunteers work on a variety of projects, often near roadways. Heavy traffic volumes and high vehicle speeds combined with roadside work activities can increase risk for employees. Work zone best management practices, such as worker training, high-visibility apparel, speed control and separation of traffic, should be assessed for each project to reduce the risk of injury or fatality. Additionally, state DOTs and the FHWA can assist the NPS in developing and implementing safe work zones. Transportation projects should build training into projects where specific skill sets are needed to reduce the safety risks to NPS employees and visitors. A job hazard analysis should also be created for all NPS roadway activities.

Recommended Strategies

- Build in safety considerations, training and best management practices into all transportation and roadside projects using existing job hazard analysis form to ensure safe work zones
- Empower employees to make daily risk management decisions

Badlands National Park

Special Events and Emergency Preparedness

Many parks in the region host annual events that draw in large numbers of visitors and high traffic volumes, dominating local and regional transportation facility capacity. These events also often require additional law enforcement to mitigate risks, such as vehicle and pedestrian conflicts or impaired driving. South Dakota is home to a rally of national renown: the Black Hills Motor Classic (also known as the Sturgis Motorcycle Rally), which has been held every year, usually in August, since 1940. Although this event started as a rally for a few hundred motorcyclists, it has grown into a two-week event that sees anywhere from 357,000 to more than 605,000 vehicles, mainly motorcycles. Sturgis, a city with a year-round population of 6,600, is flooded with event goers entering and leaving town from this event.

Working with state and local DOTs, park managers can deploy education, enforcement, engineering and emergency services best management practices to reduce transportation safety risks. To mitigate safety risks during the Sturgis Motorcycle Rally in particular, the South Dakota DOT uses temporary traffic control devices, as well as variable dynamic messaging signs to alert drivers of upcoming risks, such as steep downgrades or sharp curves. The Black Hills Motor Classic is just one example of the many special events that park units in the region host regularly that impact park unit transportation systems.

Timely and proper treatment of emergency incidents is essential for potentially reducing the severity of injuries and preventing fatalities. Each year NPS staff and local partners carry out hundreds of search and rescue missions, emergency medical responses and fire responses. Transportation plays an essential role in providing access for emergency response vehicles and providing a means to evacuate visitors and employees in an emergency situation.

Recommended Strategies

- Develop a regional congestion management strategy using information from the Congestion Management Program
- Employ best management practices (e.g., develop regional guidance for event safety management), including those for incident command (mock strategies) and traffic control protocols
- Identify and develop law enforcement agreements to mitigate the risks associated with special events
- Undertake regular and consistent coordination between NPS staff and state and local government transportation, law enforcement and emergency response personnel
- Identify and develop law enforcement agreements to mitigate the risks associated with special events

Cuyahoga Valley National Park

Measuring System Performance

Performance Measure: Crash Reporting Statistics

Crash statistics are a result of the crash data that park units report into the IMARS.

Baseline

The baseline has yet to be determined as of the date of this report.

Target

100 percent of park units report crash data into the IMARS.

Performance Measure: Completion of Unit-Level Safety Guides

Baseline

One park unit has completed a road safety audit. Hot Springs National Park completed its audit in 2010.

Target

Complete unit-level safety studies for the 12 most crash-prone park units within five years. These park units include:

- Hot Springs National Park
- Ozark National Scenic River
- Buffalo National River
- Mount Rushmore National Memorial
- Badlands National Park
- Indiana Dunes National Lakeshore
- Cuyahoga Valley National Park
- Wind Cave National Park
- Jefferson National Expansion Memorial
- Theodore Roosevelt National Park
- Wilson's Creek National Battlefield.

Performance Measure: Reduction in Crashes

Measuring crash reduction will be based on the best available data.

Baseline

In the 32 park units with crash data for the 1990 to 2005 study period, 1,709 total crashes were reported. The crashes were classified as follows:

- Fatal - 9 crashes (10 people killed)
- Injury - 235 crashes (315 people injured)
- Property Damage Only - 1,465 crashes.

Target

Achieve consistent annual reduction in the number and severity of reported crashes across the region.

Apostle Islands National Lakeshore

Mississippi National River and Recreation Area

Chapter 7
Partnerships

Goal

Support expanded partner relationships and community engagement to maintain and improve the transportation system

Objectives

Use the NPS transportation planning process to strengthen partner and community relationships, support collaborative community goals and ensure enhanced opportunities for public engagement

Broaden partnerships and cooperative planning to improve the visitor experience, public access and resource protection and safety at the community, regional, state, tribal and federal levels

Develop cooperative relationships to leverage funding and provide transportation facilities and services with mutual benefits for NPS, other federal land management agencies and tribes and gateway communities

Introduction

Partner organizations are a valuable resource to the NPS and to parks within the MWR. Partnerships can benefit parks in direct ways, such as in program cost sharing, and in indirect ways, such as by the provision of improved air quality, visitor experiences and connections to local communities derived from a more robust transit system.

Many park units in the region, including Mississippi National River and Recreation Area, Cuyahoga Valley National Park, Jefferson National Expansion Memorial and Indiana Dunes National Lakeshore, as well as many parks in the Urban Park Units cluster are already well connected or have the potential to be well connected to alternative transportation systems that local public transit agencies operate. Collaborating with these partners to provide both local and nonlocal visitors with transportation connections to park units presents both a continuing challenge and a major opportunity for the park units in this region.

Arkansas Post National Memorial

Regional Issues and Opportunities

Coordination and Communication with Partners

Partnership funding opportunities for transportation improvements in park units and gateway communities are complex and continually evolving. Some park units within the region, such as Mississippi National River & Recreation Area, have been able to capitalize on these funding opportunities to significantly improve their transportation systems. Other park units in the region lack the capacity or expertise to fully engage with their partners and may be missing out on significant opportunities to leverage transportation funding.

Park units that lack the capacity or expertise to fully engage with their partners may miss significant opportunities to leverage transportation funding.

Recommended Strategies

- Share successes. Host an annual webinar or training session with other park units in the region on best practices for engaging partners and leveraging transportation funding
- Communicate NPS project priorities to the FHWA during the FLAP project selection process for each state
- Reach out to diverse groups of partners to identify and capitalize on shared transportation improvement goals

Apostle Islands National Lakeshore

Funding and Mission Support

Many partnership funding opportunities for transportation improvements require partners or federal land management agencies to provide matching funds toward a project. Prioritizing these partnership projects and planning for their funding is critical to fully leveraging matching fund sources. However, current staffing levels within the regional office limits the region's capacity to assist park units in building the relationships necessary to take full advantage of these opportunities.

To fully capitalize on these opportunities, it is critical for park units and the regional office to maintain open lines of communication with local and regional transportation managers to better understand where agency missions overlap. This communication also leads to the identification of opportunities to achieve economies of scale where related or potentially related transportation improvement projects align. These lines of communication are enhanced with a thorough understanding of how local and regional transportation networks can enhance and support visitor access to national park units.

A significant example of partnership funding in the region is the ongoing CityArchRiver 2015 initiative at Jefferson Expansion National Memorial. This $380 million dollar investment in the grounds, riverfront, buildings and pedestrian plaza surrounding the Gateway Arch is funded through private donations from individuals, corporations and foundations; a local sales tax bond; and federal state and local funds.

One of the primary partnership funding mechanisms currently available to park units is the FLAP, which was reauthorized in the FAST Act. The FLAP "was established in 23 USC 204 to improve transportation facilities that provide access to, are adjacent to, or are located within Federal lands." The FLAP fosters both connections to communities and promotes partnership funding opportunities. This program supplements state and local resources for public roads, transit systems and other transportation facilities, with an emphasis on high-use recreation sites and economic generators (FHWA FLAP Implementation Guidance 2016).

In 2014, the FLAP provided more than $15 million to states in the MWR for projects that improve transportation connections between local communities and federal lands. Many of these FLAP-funded projects improve non-NPS assets that local, state or county partners own or maintain, but they directly benefit visitors to national park units.

Recommended Strategies

- For park units where significant partnership funding opportunities may exist, coordinate with local governments, MPOs, state DOTs and tribes to develop five-year, park-level transportation improvement programs
- Develop stronger relationships with state DOTs, MPOs, tribes and local governments at both the individual park unit and regional levels
- Aggressively seek out and pursue opportunities to leverage partnership funding
- Develop and grow the professional staff capacity in the region to assist park units with leveraging partnership dollars for transportation improvements that benefit those park units
- Provide for some flexibility within the regional transportation program to take advantage of unforeseen funding opportunities

Connecting People to Parks

Many park units in the MWR, including Mississippi National River & Recreation Area, Cuyahoga Valley National Park, Jefferson National Expansion Memorial and Indiana Dunes National Lakeshore, as well as many parks in the Urban Park Units cluster are currently well connected to alternative transportation systems that local transit agencies operate. Providing and promoting connections through alternative transportation systems offers a means of access for urban residents to experience and recreate in national parks. Identifying and promoting these connections is also critical to achieving several of the goals of *A Call to Action*, including "In My Back Yard" and "Parks for People" (NPS 2014.)

Related *A Call to Action* Goals

In My Back Yard

Improve urban residents' awareness of and access to outdoor and cultural experiences close to home by promoting national parks in urban areas and ensuring safe and enjoyable physical connections from parks to a variety of sustainable transportation options aligned with urban populations' needs

Parks for People

Enhance the connection of densely populated, diverse communities to parks, greenways, trails, and waterways to improve close-to-home recreation and natural resources conservation. We will achieve this by proactive Rivers, Trails, and Conservation Assistance Programs and collaborative park-based programs that develop a deeper understanding of communities' needs and connect citizens to the outdoors in the 50 largest urban areas and those with the least access to parks

Collaborating with these partners to provide both local and nonlocal visitors with transportation connections to park units presents both a continuing challenge and an opportunity for MWR park units. Where connections exist, park units may be able to work with their local transit agencies to promote greater ridership and provide visitor trip planning information on park unit websites. In all, 38 park units in the region include at least some information on trip planning on their websites. Parks with the most robust information tend to be located within urban areas, where public transit options are more readily available. Examples of park unit websites that highlight these public transportation connections include the Mississippi National River & Recreation Area and Indiana Dunes National Lakeshore.

The Mississippi National River & Recreation Area produces the *Mississippi River Companion* as a resource for visitors to assist in finding rental bikes and mass transit options, biking and walking trails, boat landings and other recreational opportunities. The *Companion* helps visitors connect to key points along the river using bus routes, commuter rail and light rail services operated by Metro Transit, the local public transportation agency, as well as pedestrian and bike paths paralleling the river. The *Companion* includes a series of maps (see Figure 7-1 and Figure 7-2) to aid visitors in identifying bus and rail stops, Nice Ride (bike share) stations and HOURCAR (short-term vehicle rental) stations. Key destinations along the river particularly well served by alternative transportation are specifically identified on the maps as an "alternative transportation node."

Indiana Dunes National Lakeshore's website also includes a page specifically dedicated to identifying public transportation. This page identifies park facilities located within two miles of commuter train stations served by the Chicago South Shore and South Bend Railroad, as well as bus stops served by the Gary Public Transportation Corporation. It also provides walking directions from these stops to park facilities, along with hyperlinks to transportation agency websites for additional trip planning information.

Figure 7-1. *Mississippi River Companion* Map Legend

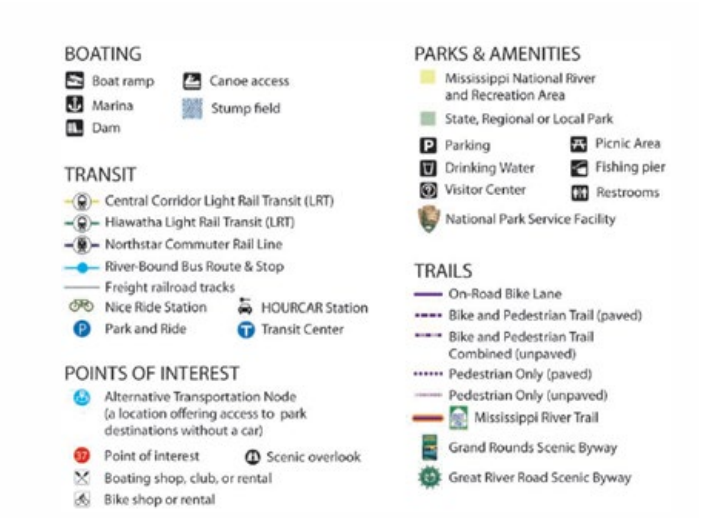


Figure 7-2. Example of a *Mississippi River Companion* Map

Recommended Strategy

- Encourage park units to work with their local transit agencies to develop and promote efficient and accessible public transportation connections to park units to drive greater ridership and to provide visitors with improved trip planning information on park unit websites

Mississippi National River and Recreation Area

Measuring System Performance

Performance Measure: Total Partnership Dollars Leveraged

Approximately $15.0 million in FLAP projects are currently programmed for 2015 to 2018. These projects were leveraged using approximately $8.4 million in FLTP dollars. That is a return of about $1.00 for every $0.56 in NPS FLTP investment.

Baseline

No tracking mechanisms currently exist to track partnership funding from sources other than the FLAP.

Target

Develop a system over the next three to five years in association with other FLMA partners and the FHWA to better track partnership dollars leveraged.

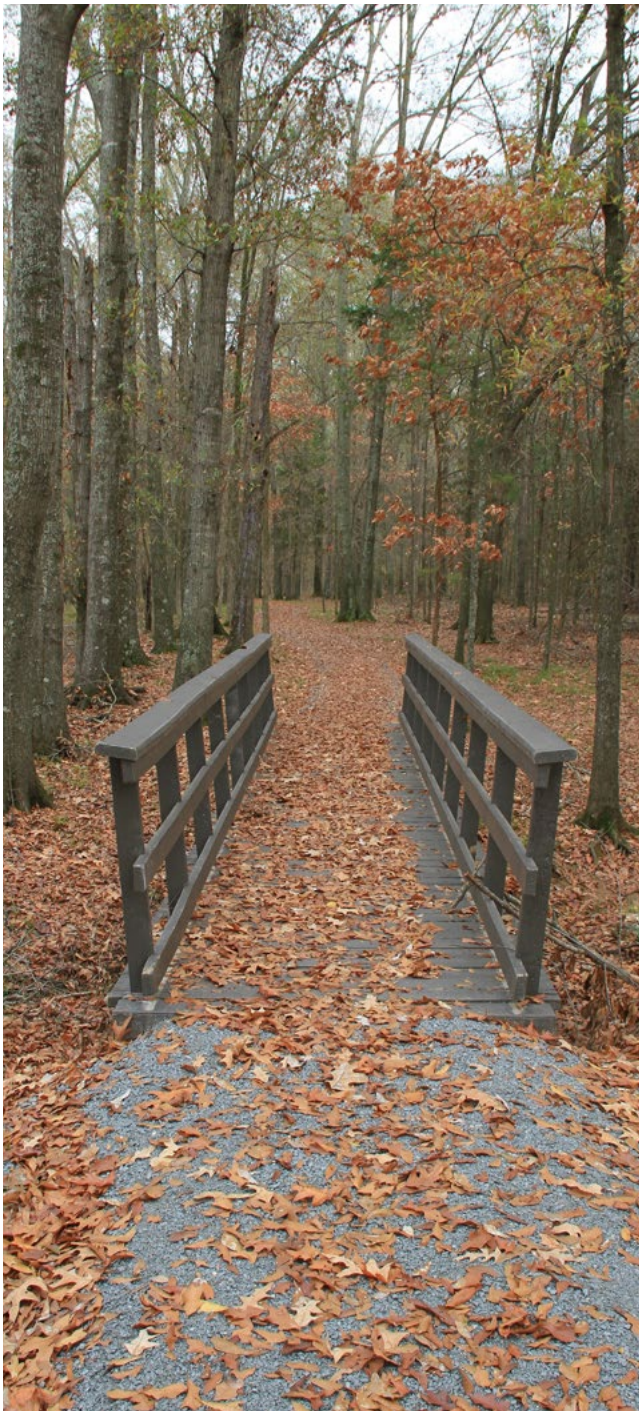
Performance Measure: Number of Park Units Actively Engaged in or Seeking Partnership Funding Opportunities

Baseline

No data is available at this time to measure park unit partnership engagement or funding opportunities.

Target

Develop a protocol to simultaneously survey park units on their partnering activities and provide additional resources for park units to further develop their outreach and partnering capacity. Once this protocol is in place, the region aims to have at least 80 percent of park units actively seeking partnership funding opportunities by 2023.



Arkansas Post National Memorial

Theodore Roosevelt National Park

Conclusion

Midwest Region Long Range Transportation Plan

Moving Forward

With this first Midwest Region LRTP, the National Park Service provides a framework for moving the regional transportation system forward into the service's second century. Designed to shape regional transportation investments over the next 20 years, the Midwest Region LRTP better aligns transportation planning with all aspects of the NPS mission and recommits the service to both protecting and providing access to the most important, unique and special places in the region. The Midwest Region LRTP sets goals and objectives that address both traditional transportation topics, such as asset management, financial sustainability and safety, as well as additional NPS mission-focused topics, such as visitor experience, climate change, partnerships and natural and cultural resource protection.

Transportation planning in the Midwest Region does not stop with the release of this document. The region is committed to continuing the broad coordination and collaboration between the regional office and the parks it serves, as well as with the FHWA and with state, local and agency partners that contributed to the Midwest Region LRTP. The region will use this momentum to go forward and take decisive action to achieve the plan's goals and performance targets.

The region will work with its parks and its partners, and with the national and other regional LRTP planning teams to put Midwest Region LRTP strategies into practice and establish performance monitoring protocols. Teams throughout the region will work through existing programs to advance the goals of the plan. The future of transportation in Midwest Region park units depends on everyone's commitment, creativity and enthusiasm for realizing the vision of a sustainable transportation system that is safe and seamless, enables high-quality access to essential park unit experiences and is effectively managed to accommodate changing environmental, social and financial conditions.

In the second century of the National Park Service, Midwest Region transportation systems will increasingly connect people to the outdoors in diverse and engaging ways, supported by modern management systems and programs. Every two years, the region will monitor performance by preparing a report card indicating any change in the performance metrics identified in this plan. The report cards will aid in updating the plan.

The first update to the Midwest Region LRTP is scheduled for 2021, when the region will comprehensively evaluate progress towards meeting plan's goals and objectives. This update to the LRTP will consider new opportunities and changes brought on by the passage of the FAST Act and subsequent federal surface transportation legislation. In addition, the update to the LRTP will incorporate any changes in national transportation policy or guidance. The Midwest Region invites all stakeholders to join it on this journey into a new century of stewardship, engagement and enjoyment of its national parks.

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Acknowledgments

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Appendix A. Midwest Region Long Range Transportation Plan Superintendents' Survey Report

During the first workshop conducted as part of the Midwest Region (MWR) long range transportation plan (LRTP) effort, the interdisciplinary advisory committee identified a preliminary list of transportation-related issues facing the park units in the MWR. These issues formed the basis for a survey of MWR park unit superintendents.

PURPOSE

This survey was intended to give park unit superintendents an opportunity to provide input on these issues. In the survey, superintendents evaluated a list of issues. A description of each issue was included in a linked reference document to clarify any issues that might be confusing to the responder.

Superintendents at MWR parks ranked issues into one of the following four categories:

- Major Issue: Major Issues are those issues that consume much of the staff's time, energy, and other park resources. These issues occur often, and solutions to resolve these issues require additional planning and development.
- Moderate Issue: Moderate issues are those issues that occur regularly, but they are predictable and manageable. These issues may require additional funding to support the implementation of known solutions.
- Minor Issue: Minor issues occur infrequently and can be dealt with in regular routine maintenance.
- Not an Issue: not currently an issue or not relevant to your unit.

Additionally, superintendents were also asked to identify their first and second highest priority issues across all LRTP goal areas and any suggestions or considerations for project ranking criteria. The responses to these questions are contained at the end of this appendix.

Overall responses were collected from superintendents at 36 park units. At least 50 percent of park units at each cluster are represented in the results (see Table C-1).

Table C-1. Response to MWR LRTP Superintendents' Survey by Cluster

Cluster Name	Number of Units Responding	Response Rate (%)
Great Lakes	6	75
Great Rivers and Trails	7	88
Great Plains	9	53
Urban Park Units	10	50
Black Hills	4	67
Total	**36**	**54**

ANALYSIS METHOD

For comparability and analysis, responses were assigned a numerical ranking. This numerical ranking offers a relative "weighting" of responses. Major issues were scored as "3," moderate issues as "2," minor issues as "1" and not an issue as "0."

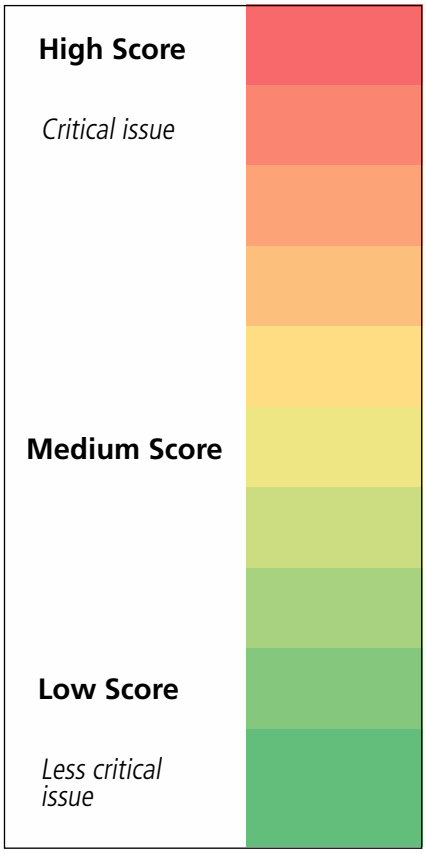
Two primary analyses were conducted on the data from this survey. The first analysis is an overall weighted ranking of all issues within a goal area. This analysis identifies which issues are more critical or more prevalent throughout the region as a whole. The second analysis is a weighted ranking by cluster. The second analysis enables us to look at where issues may be more or less critical to a specific grouping of park units.

RESULTS

Results of this survey are organized by goal area and provide results from the two analyses conducted. Most results are provided in tabular format; however, the overall weighted ranking results are also provided in graphical form so that readers can see the relative contributions of each score category (major, moderate, minor) to the overall total score.

Colors are used in to indicate high, medium and low scoring issues. Cells colored in red/orange hues indicate many major and moderate responses while green hue cells indicate many nonissue or minor issue responses.

Interpretation and discussion of these results is contained in each goal area chapter in the context of the larger discussion on that topic. This appendix is a supplement to the discussions in the chapters and provides the methods and numerical results of these data. For discussion and interpretation of these results, please see the discussion of the issue in each respective chapter.

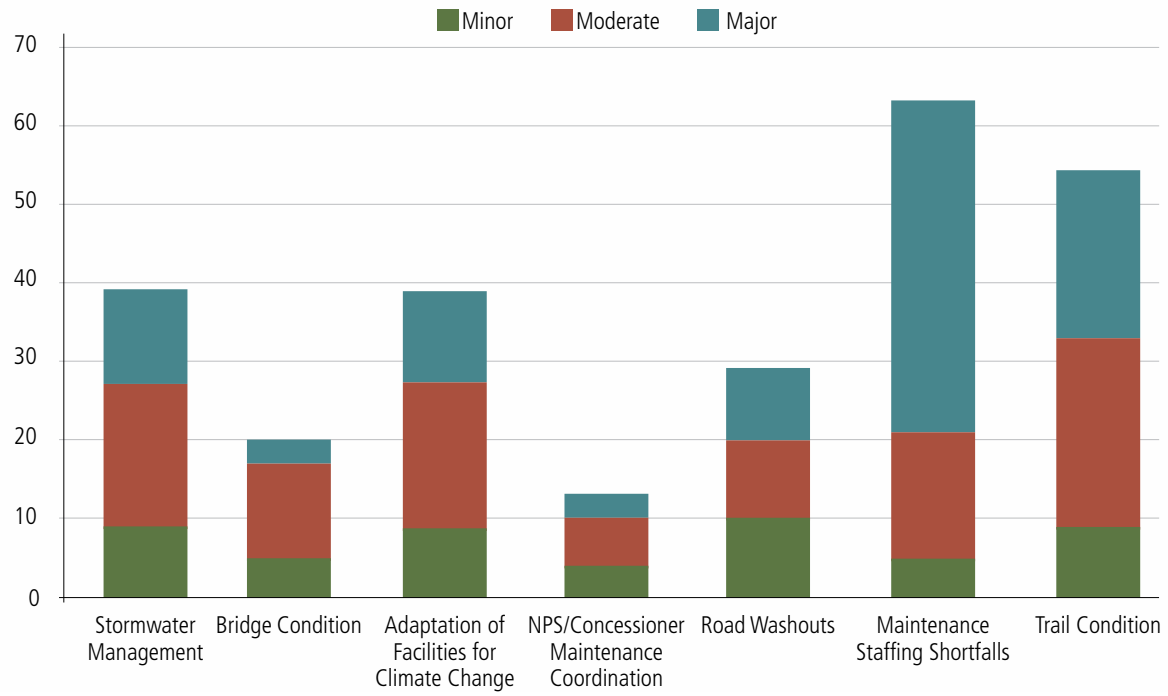


GOAL AREA: TRANSPORTATION FACILITY MANAGEMENT

The results show the overall weighted ranking of transportation facility management issues and a weighted ranking by cluster

Overall Weighted Ranking of Transportation Facility Management Issues

Stormwater Management	Bridge Condition	Adaptation of Facilities for Climate Change	NPS/Concessioner Maintenance Coordination	Road Washouts	Maintenance Staffing Shortfalls	Trail Condition
39	20	39	13	29	63	54



Weighted Ranking by Cluster

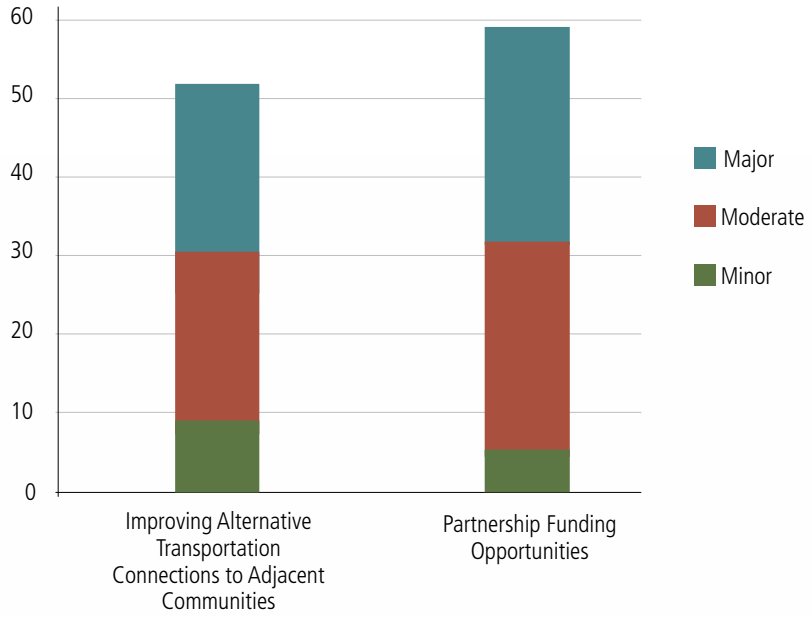
Cluster	Stormwater Management	Bridge Condition	Adaptation of Facilities for Climate Change	Maintenance Coordination (NPS/ Concessioner)	Road Washouts	Maintenance Staffing Shortfalls	Trail Condition
Great Lakes	1.50	1.17	1.33	0.67	1.00	2.00	2.00
Great Plains	1.00	0.00	0.89	0.00	0.56	1.11	1.00
Great Rivers and Trails	0.75	0.63	0.50	0.25	1.00	1.75	1.75
Black Hills	1.50	0.75	1.75	1.00	1.75	2.75	2.25
Urban Park Units	1.00	0.56	1.33	0.33	0.33	1.78	1.11

GOAL AREA: TRANSPORTATION PARTNERSHIPS

The results show the overall weighted ranking of transportation partnership issues and a weighted ranking by cluster.

Overall Weighted Ranking of Transportation Partnerships Issues

Improving Alternative Transportation Connections to adjacent communities	Partnership Funding Opportunities
52	59



Weighted Ranking by Cluster

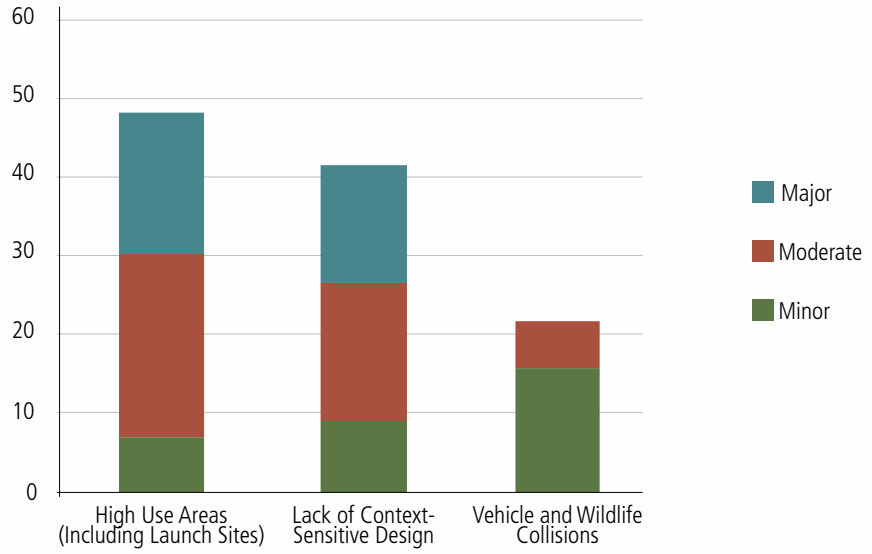
Cluster	Improving Alternative Transportation Connections to Adjacent Communities	Partnership Funding Opportunities
Great Lakes	2.0	2.3
Great Plains	0.8	0.7
Great Rivers and Trails	0.9	1.9
Black Hills	1.5	2.0
Urban Park Units	2.1	1.8

GOAL AREA: TRANSPORTATION AND RESOURCE PROTECTION

The results show the overall weighted ranking of transportation and resource protection issues and a weighted ranking by cluster.

Overall Weighted Ranking of Transportation and Resource Protection Issues

High Use Areas (including launch sites)	Lack of Context-sensitive Design	Vehicle and Wildlife Collisions
49	42	22



Weighted Ranking by Cluster

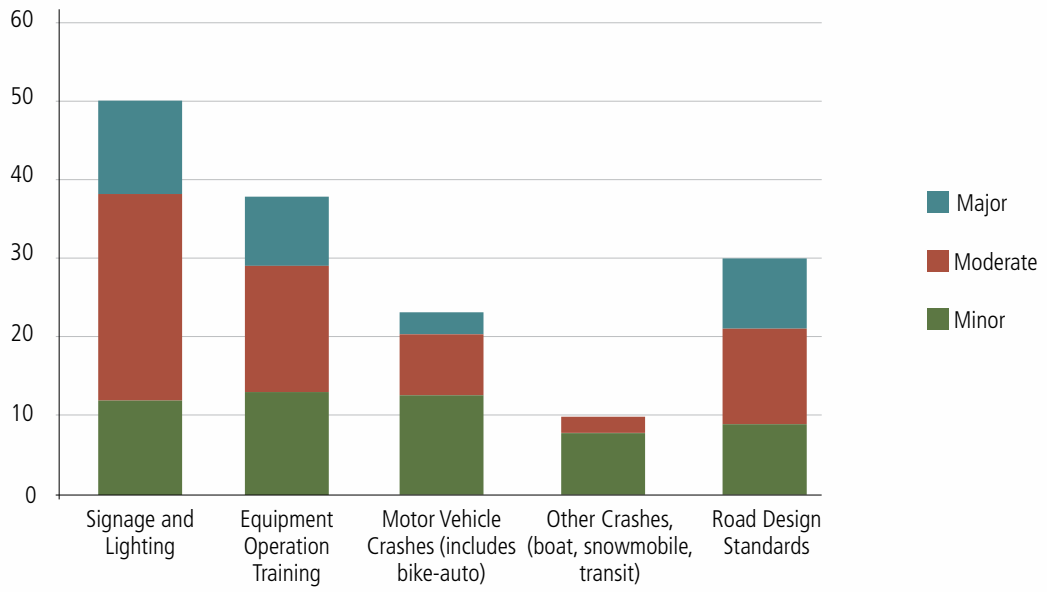
Cluster	High Use Areas (Including Launch Sites)	Lack of Context-Sensitive Design	Vehicle and Wildlife Collisions
Great Lakes	2.0	1.7	0.8
Great Plains	0.3	0.7	0.6
Great Rivers and Trails	1.7	1.4	0.6
Black Hills	2.0	1.5	1.3
Urban Park Units	1.4	1.0	0.3

GOAL AREA: TRANSPORTATION SAFETY

The results show the overall weighted ranking of transportation safety issues and a weighted ranking by cluster.

Overall Weighted Ranking of Transportation Safety Issues

Signage and Lighting	Equipment Operation Training	Motor Vehicle Crashes (includes bike-auto)	Other Crashes (boat, snowmobile, transit)	Road Design Standards
50	38	24	10	30



Weighted Ranking by Cluster

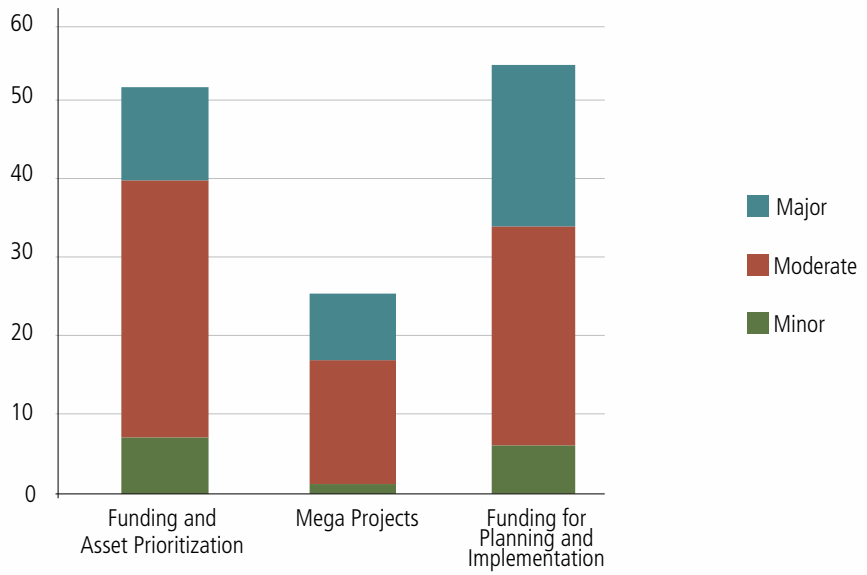
Cluster	Signage and Lighting	Equipment Operation Training	Motor Vehicle Crashes (Includes Bike-Auto)	Other Crashes (Boat, Snowmobile, Transit)	Road Design Standards
Great Lakes	1.33	1.50	1.00	0.83	1.00
Great Plains	1.33	1.00	0.22	0.11	0.67
Great Rivers and Trails	1.43	1.29	0.57	0.29	0.86
Black Hills	1.50	1.25	1.25	0.25	2.00
Urban Park Units	1.40	0.60	0.70	0.10	0.40

GOAL AREA: TRANSPORTATION FINANCE

The results show the overall weighted ranking of transportation finance issues and a weighted ranking by cluster.

Overall Weighted Ranking of Transportation Finance Issues

Funding and Asset Prioritization	Mega Projects	Funding for Planning and Implementation
51	26	55



Weighted Ranking by Cluster

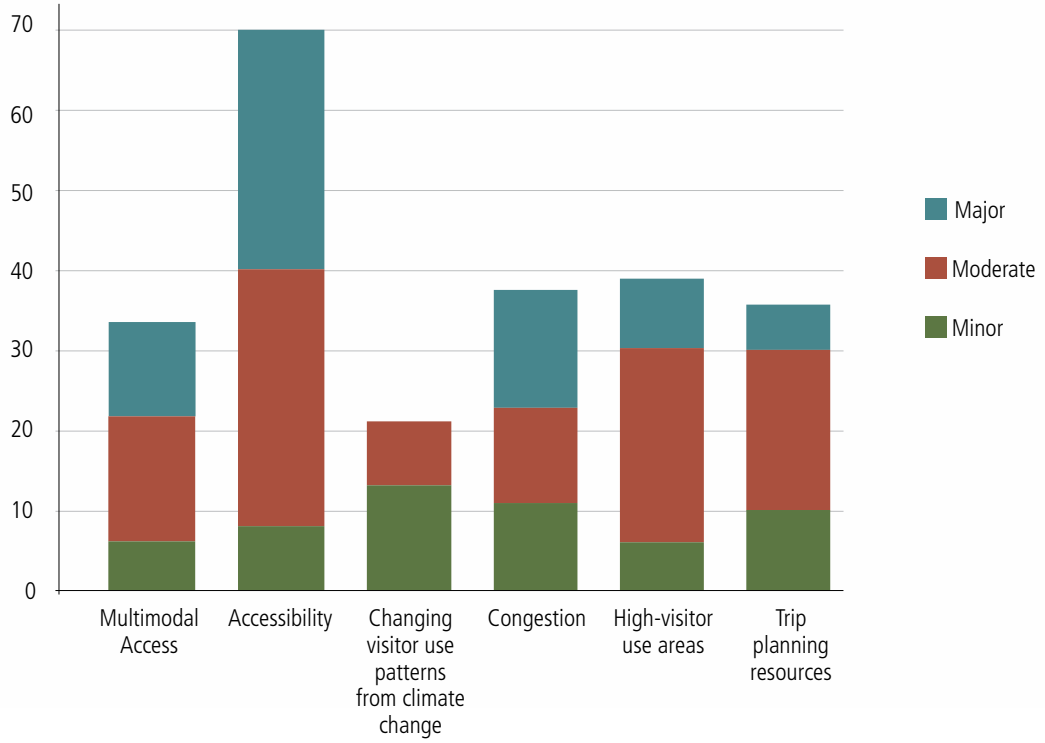
Cluster	Funding and Asset Prioritization	Mega Projects	Funding for Planning and Implementation
Great Lakes	2.0	1.2	2.2
Great Plains	0.8	0.0	0.8
Great Rivers and Trails	1.6	0.7	1.6
Black Hills	2.0	1.8	1.8
Urban Park Units	1.3	0.7	1.7

GOAL AREA: TRANSPORTATION RELATED VISITOR EXPERIENCE

The results show the overall weighted ranking of transportation-related visitor experience issues and a weighted ranking by cluster.

Overall Weighted Ranking of Transportation Related Visitor Experience Issues

Multimodal Access	Accessibility	Changing Visitor Use Patterns From Climate Change	Congestion	High-Visitor Use Areas	Trip Planning Resources
34	70	21	38	39	36

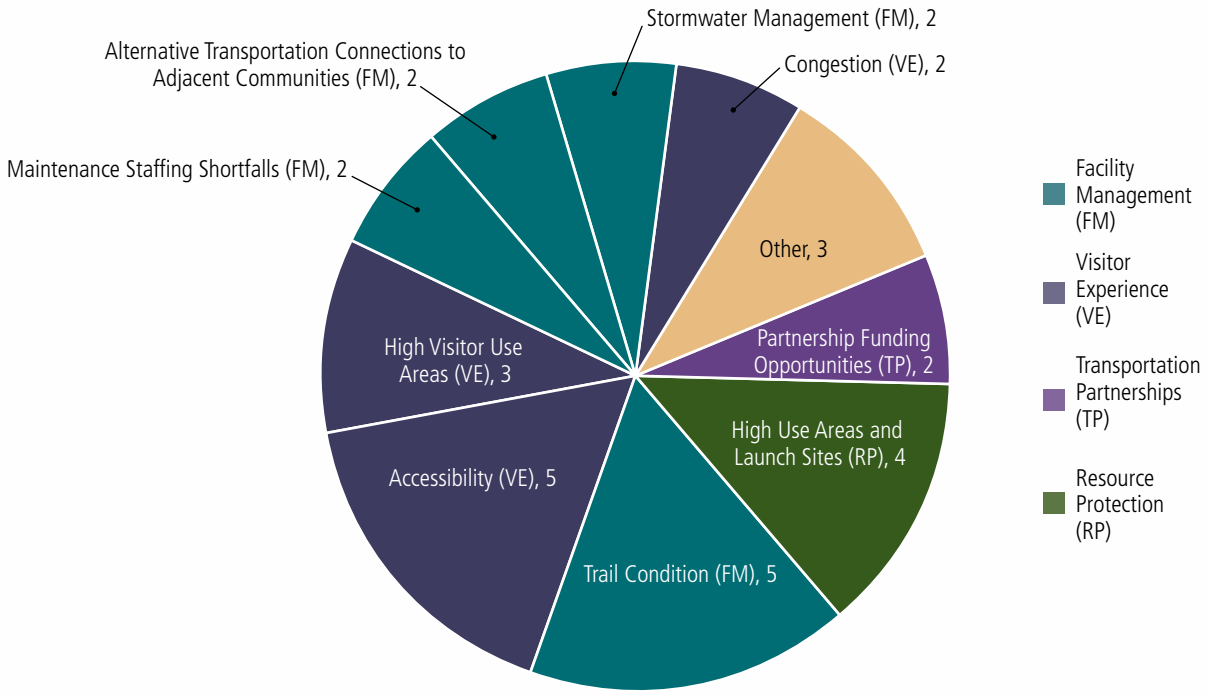


Weighted Ranking by Cluster

Cluster	Multimodal Access	Accessibility	Changing Use Patterns From Climate Change	Congestion	High-Visitor Use Areas	Trip Planning Resources
Great Lakes	1.83	2.00	0.83	1.83	1.33	1.50
Great Plains	0.44	1.67	0.33	0.56	0.33	0.33
Great Rivers and Trails	0.43	2.00	0.29	1.14	1.57	0.86
Black Hills	1.25	2.00	1.25	1.25	1.50	1.25
Urban Park Units	1.10	2.10	0.60	0.90	1.10	1.30

OVERALL HIGHEST PRIORITY ISSUES

The following chart shows the overall highest priority issues identified through the MWR park unit superintendent survey on regional transportation.



Appendix B. Midwest Region Park Unit Clusters

The National Park Service (NPS) Midwest Region's clusters are designed to provide a context to talk about issues, objectives and strategies within the Long Range Transportation Plan that may be vital to a subset of park units but would not apply universally to the region. Park unit clusters are illustrated in Figure B-1 and Table B-1 and described in the following paragraphs.

Figure B-1. MWR Long Range Transportation Plan Transportation Analysis Clusters

Source: NPS DSC Planning Division (January 2015. Updated September 2016.)

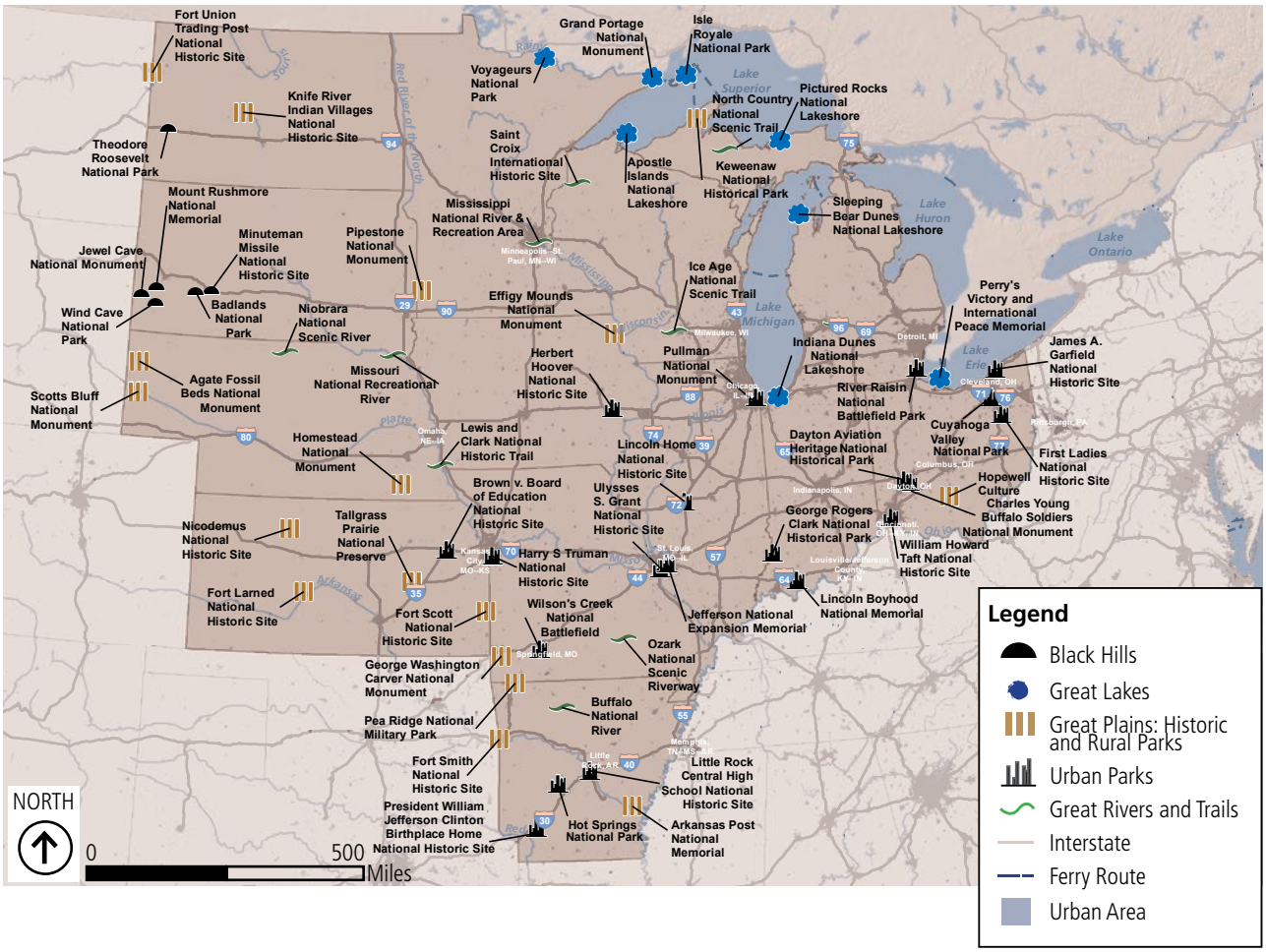


Table B-1. MWR Park Units, by Cluster

GREAT LAKES

- Apostle Islands National Lakeshore
- Grand Portage National Monument
- Indiana Dunes National Lakeshore
- Isle Royale National Park
- Perry's Victory & International Peace Memorial
- Pictured Rocks National Lakeshore
- Sleeping Bear Dunes National Lakeshore
- Voyageurs National Park.

GREAT RIVERS AND TRAILS

- Buffalo National River
- Ice Age National Scenic Trail
- Lewis and Clark National Trail
- Mississippi National River & Recreation Area
- Missouri National Recreational River
- North Country National Scenic Trail
- Niobrara National Scenic River
- Ozark National Scenic Riverways
- Saint Croix National Scenic Riverway.

GREAT PLAINS: HISTORIC AND RURAL PARKS

- Agate Fossil Beds National Monument
- Arkansas Post National Monument
- Effigy Mounds National Monument
- Fort Larned National Historic Site
- Fort Smith National Historic Site
- Fort Scott National Historic Site
- Fort Union Trading Post National Historic Site
- George Washington Carver National Monument
- Homestead National Monument of America
- Hopewell Culture National Historic Park
- Keweenaw National Historic Park
- Knife River Indian Villages National Historic Site
- Nicodemus National Historic Site
- Pea Ridge National Military Park
- Pipestone National Monument
- Scotts Bluff National Monument
- Tallgrass Prairie National Preserve

URBAN PARK UNITS

- Brown v. Board of Education National Historic Site
- Charles Young Buffalo Soldiers National Monument
- Cuyahoga Valley National Park
- Dayton Aviation Heritage National Historic Park
- First Ladies National Historic Site
- George Rogers Clark National Historic Park
- Harry S Truman National Historic Site
- Herbert Hoover National Historic Site
- Hot Springs National Park
- James A Garfield National Historic Site
- Jefferson National Expansion Memorial
- Lincoln Boyhood National Memorial
- Lincoln Home National Historic Site
- Little Rock Central High School National Historic Site
- Mississippi National River and Recreation Area
- President William Jefferson Clinton Birthplace Home National Historic Site
- Pullman National Monument
- River Basin National Battlefield Park
- Ulysses S Grant National Historic Site
- William Howard Taft National Historic Site
- Wilson's Creek National Battlefield

BLACK HILLS

- Badlands National Park
- Jewel Cave National Monument
- Mount Rushmore National Memorial
- Minuteman Missile National Historic Site
- Theodore Roosevelt National Park
- Wind Cave National Park

Cluster Descriptions

GREAT LAKES CLUSTER

The Great Lakes cluster includes park units where the majority of recreation opportunities associated with these sites are water based, and visitors interact with these sites through water-related transportation. These park units tend to be at the "end of the road," and as a result can be challenging to access, especially during the winter months. These park units have highly seasonal visitation (when compared to other park units in the region that see more year-round visitation). They have the vast majority of the region's marina assets, and because of their northern orientation, they require considerable snow removal operations to keep park unit roads open. Many of these park units rely on commercial services to provide critical transportation services (i.e., ferries). Finally, many of these park units have a high level of cross-agency interaction with the US Coast Guard.

Contributing Units: Apostle Islands National Lakeshore, Grand Portage National Monument, Indiana Dunes National Lakeshore, Isle Royale National Park, Perry's Victory & International Peace Memorial, Pictured Rocks National Lakeshore, Sleeping Bear Dunes National Lakeshore, Voyageurs National Park

GREAT RIVERS AND TRAILS CLUSTER

The park units in the Great Rivers and Trails cluster are all characterized by long and linear historical and cultural transportation corridors that have many entrance and access points. Often visitors are entering these park units in one location and traveling by river or trail to another location where they depart from the park unit. This unique use pattern requires a transportation system that can support this type of access and egress for a wide variety of recreational opportunities. The great rivers in this cluster all tend to have a lot of commercial activity that supports and surrounds the high number of visitors who access these rivers.

Contributing Units: Buffalo National River, Ice Age National Scenic Trail, Lewis and Clark National Trail, Mississippi National River & Recreation Area, North Country National Scenic Trail, Niobrara National Scenic River, Ozark National Scenic Riverways, Saint Croix National Scenic Riverway

GREAT PLAINS: HISTORIC AND RURAL PARK UNITS CLUSTER

The historical and rural park units that make up the Great Plains cluster are more remote and have longer travel distances from major highways, making these park units more removed from larger transportation systems. As these park units are typically at the "end of the road," they attract visitors who seek them out and often have to do advance trip planning to visit them. Visitation to these park units is often low when compared to others in the region, and most of the visitation comes from repeat local visitors. Most of the transportation in these park units is land based, and the NPS tends to own a higher proportion of the transportation assets that support these units than others in the region, many of which are historic.

Contributing Units: Agate Fossil Beds National Monument, Arkansas Post National Monument, Effigy Mounds National Monument, Fort Larned National Historic Site, Fort Smith National Historic Site, Fort Scott National Historic Site, Fort Union Trading Post National Historic Site, George Washington Carver National Monument, Homestead National Monument of America, Hopewell Culture National Historic Park, Keweenaw National Historic Park, Knife River Indian Villages National Historic Site, Nicodemus National Historic Site, Pea Ridge National Military Park, Pipestone National Monument, Scotts Bluff National Monument, Tallgrass Prairie National Preserve

URBAN PARK UNITS CLUSTER

The Urban Park Units cluster is characterized by those park units that are wholly or immediately proximal to urban areas and where the transportation system is highly varied. Transportation to and within the park units in this cluster tend to be multimodal (e.g., shuttles, bicycles, boats) with a reliance on non-NPS transportation services (e.g., roads, buses, transit services) to bring visitors to these park units. The park units in this cluster tend to be smaller and often do not own the road systems that facilitate access to them. Most of these park units are day trip destinations and have a high turnover rate on visitation. Most, if not all, of these park units could be characterized as historical or cultural resource parks (although some park units, such as Mississippi National River & Recreation Area, include significant natural resources). When compared to other park units in the region, park units in this cluster are more often subject to high levels of congestion, which may be the result of transportation issues within and/or outside of the park unit boundaries.

Contributing Units: Brown v. Board of Education National Historic Site, Charles Young Buffalo Soldiers National Monument, Cuyahoga Valley National Park, Dayton Aviation Heritage National Historical Park, First Ladies National Historic Site, George Rogers Clark National Historic Park, Harry S Truman National Historic Site, Herbert Hoover National Historic Site , Hot Springs National Park, James A Garfield National Historic Site, Jefferson National Expansion Memorial, Lincoln Boyhood National Memorial, Lincoln Home National Historic Site, Little Rock Central High School National Historic Site, Mississippi National River & Recreation Area, President William Jefferson Clinton Birthplace Home National Historic Site, Pullman National Monument, River Raisin National Battlefield Park, Ulysses S Grant National Historic Site, William Howard Taft National Historic Site, Wilson's Creek National Battlefield

BLACK HILLS (DAKOTAS) CLUSTER

The park units in the Black Hills cluster have similar access roads, recreational activities, and shared tour routes that link them together. There are commercial partners providing a variety of visitor services through concession contracts (including the Mount Rushmore National Memorial parking garage referenced in this document) and through commercial use authorizations or CUAs. This cluster has a transportation system mostly characterized by land-based transportation. As these park units are proximal to one another, they share a regional transportation infrastructure and often rely on state highways for visitor access. Many visitors to these park units participate in scenic driving as a primary recreational activity, and the NPS owns a high proportion of the roads within the park units in this cluster. As these park units are relatively close to one another, visitors will often visit multiple park units in this cluster in a single trip. Additionally, the local economies greatly benefit from the tourism, which is partially driven by the presence and proximity of this collection of park units.

Contributing Units: Badlands National Park, Jewel Cave National Monument, Mount Rushmore National Memorial, Minuteman Missile National Historic Site, Theodore Roosevelt National Park , Wind Cave National Park

Appendix C. Development of the Midwest Region Financial Strategy

For the purposes of identifying a preferred regional transportation investment strategy for the Midwest Region (MWR), the project team modeled region-specific versions of the five financial strategies developed and modeled for the National Long Range Transportation Plan (LRTP), with the goal of illustrating the performance outcomes of several different investment decisions on the MWR transportation system. (For more details on the development and modeling of these strategies, please see the National LRTP.) The financial modeling process translates those strategies into forecasted effects, including the future condition of facilities, the deferred maintenance backlog and the funding of programmatic needs.

Each strategy is modeled with the constraint of the $20 million forecasted to be available in the region for transportation in future years. The time horizon for the models is six years. This funding level is input into one of several models developed to forecast future condition (the Highway Pavement Management Application [HPMA] for pavement, Pontis for bridges and a Microsoft Excel model for multimodal assets). These models forecast the future aggregate condition for the region's assets of that particular category for that level of funding. The model forecasts condition at the end of a six-year period, which is the result of a constraint associated with the HPMA.

Financial inputs into these models can be targeted in three main ways: by asset priority, asset category and work type. Each strategy varies in how these inputs are set, but as the overall funding level for each strategy is identical, there are tradeoffs inherent with selecting one strategy over the others.

A strategy reflecting the current investment approach of the regional funding programs was modeled for comparison purposes. This particular strategy is not a candidate for implementation as it does not reflect the investment requirements of the Capital Investment Strategy (CIS), while all "action" strategies do include these requirements. These strategies are described below.

CURRENT STRATEGY

This strategy is intended to show the effects of continuing current regional spending patterns on transportation projects, based on asset category, work type and priority (either optimizer band or functional class).

CURRENT STRATEGY PLUS CIS

This strategy continues the historical investment approach by asset category and work type, but aligns itself with the CIS by strictly prioritizing investments to the highest priority needs. Any funds left over are then invested in high-priority needs, with no needs for a particular priority level being funded until all needs of higher priority assets are addressed.

ADDRESS DEFERRED MAINTENANCE PLUS CIS

In addition to strictly adhering to CIS asset priority requirements, this strategy accelerates the reduction of deferred maintenance by redirecting two-thirds of investments in day-to-day work types (e.g., Facility Operations, Preventive Maintenance) to recurring maintenance and component renewal. Transit funding is unaffected because of fund source constraints.

ADDRESS OPERATIONS AND MAINTENANCE PLUS CIS

In addition to strictly adhering to CIS asset priority requirements, this strategy meets all operations and preventative maintenance needs by redirecting investments from low-priority planning and administration, capital and recurring maintenance needs. It provides a contrast to the deferred maintenance-focused strategies as it leaves relatively little available for deferred maintenance purposes.

MULTIMODAL PLUS CIS

In addition to strictly adhering to CIS asset priority requirements, this multimodal strategy redirects investments from other priority roads and bridges to highest and high-priority transit, trails, intelligent transportation systems, marinas and other supporting infrastructure to help support transportation within the national park units by means other than the private car.

The following figures, Figures A-1 and A-2, show how the funding inputs vary in terms of allocation to specific asset categories and outcomes, the latter which refers to work types that have a significant impact on asset condition versus those that do not. In the first figure, allocations by asset category are consistent across all but the multimodal "action" strategy, even as they vary by work type. The second figure shows the difference between increased focus on reducing deferred maintenance (Address Deferred Maintenance + CIS) versus fulfilling a larger share of required operations and maintenance activities (Address Operations and Maintenance + CIS).

Table A-1. MWR Transportation Investment Strategies

Strategy	Invests in…	At the Expense of…
Current Strategy	Status quo	Highest priority needs
Business as Usual + CIS Priority	Highest priority assets	Lower priority assets
Address Deferred Maintenance + CIS Priority	Reducing the deferred maintenance backlog	Day-to-day operations and maintenance
Address O&M + CIS Priority	All operations and maintenance needs	Planning, capital , deferred maintenance backlog
Multimodal + CIS Priority	High-priority trails, transit, etc.	Low-priority paved roads and parking

Figure A-1. Funding Inputs, by Asset Category (in Millions)

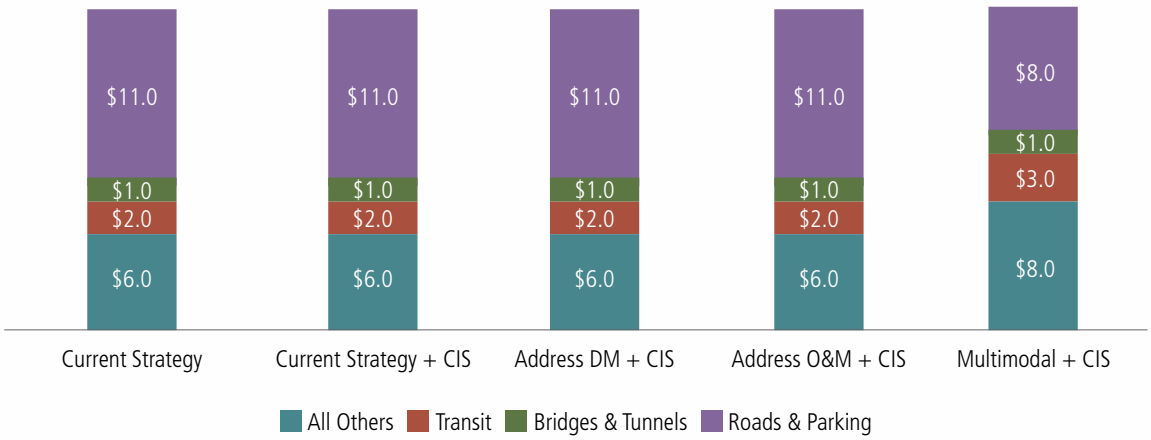
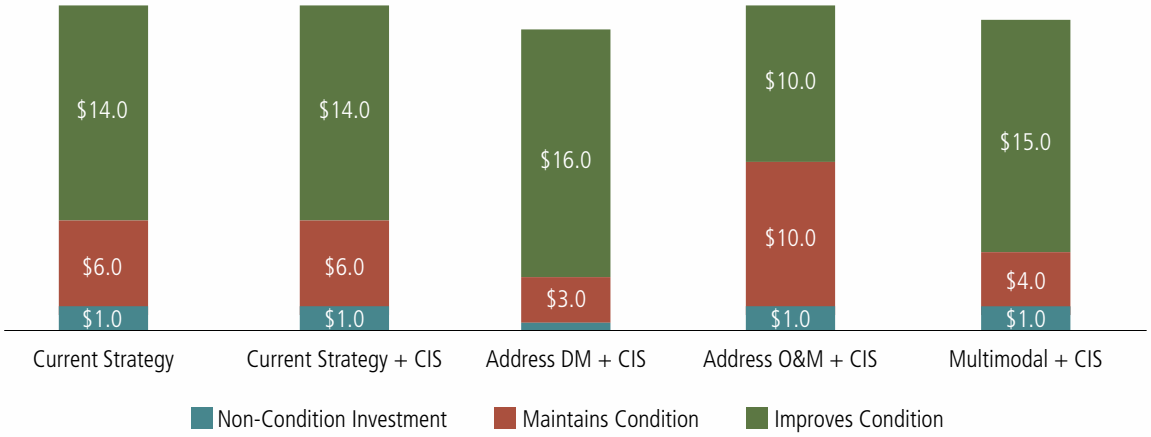


Figure A-2. Funding Inputs, by Outcome (in Millions)



As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historic places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under US administration.

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National Park Service

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