



National Park Service Southeast Region Long Range Transportation Plan **Baseline Conditions Assessment Report**



U.S. Department of Transportation
Federal Highway Administration

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1 Introduction

This Baseline Conditions Assessment report is the first in a series of interim deliverables that will inform the Long Range Transportation Plan (LRTP) for the Southeast Region (SER) of the National Park Service (NPS).

The Baseline Conditions Assessment is intended to provide a snapshot of current transportation conditions in the region, and, as the name suggests, to establish a baseline against which the region's transportation needs and investment strategies will be assessed. This report draws upon the best available data, both quantitative and qualitative, to paint as complete a picture as possible of the current conditions and performance of the SER transportation system.

Purpose of the LRTP

The Southeast Region faces the critical challenge of balancing increasing demand for visitor access with an aging transportation network against a backdrop of shrinking financial resources – a situation that has created serious challenges for management at all levels of the region. The LRTP will help the region better understand existing and forecasted needs and create a framework for making effective transportation decisions and strategic program investments. It will establish regional goals, objectives, and performance measures; define existing conditions and transportation needs; identify safety, congestion, and capital improvement needs; and identify sustainable strategies that protect resources while maintaining quality visitor experiences. By looking to the future and understanding its challenges and opportunities, the region will be positioned to make quality transportation planning decisions over the next 20 years. It will also enable the region to keep pace with technological advancements in response to the changing needs/desires of an aging and culturally changing visitor population, and proactively protect the natural and cultural resources for the enjoyment of future generations.

The SER LRTP will be a program-oriented plan (similar to a statewide LRTP but addressing the NPS mission) and will not only play a critical role in promoting efficient and effective transportation systems for all users but will provide policy and program guidance for the region and parks by:

- Assessing current conditions and anticipated changes in multimodal transportation, needs, and funding using a 20-year planning horizon
- Formulating the long-term transportation vision, goals, and objectives of the region
- Aiding the region and individual park units in making better informed transportation investment decisions
- Providing a holistic and long-term view of transportation in relation to core operations, maintenance and other NPS programs and priorities
- Enabling the National Park Service to better synchronize transportation planning with other park planning efforts, such as General Management Plans, Foundation documents, Park Asset Management Plans, and with other transportation planning efforts being led by state departments of transportation and metropolitan planning organizations within the region



Goals and Objectives

The SER LRTP Core Team¹ developed goals and objectives for the LRTP (Table 1-1). These goals and objectives serve as the organizational framework for the LRTP process and this Baseline Conditions Assessment report is organized according to the goals, with each goal area addressed in a separate chapter.

Table 1-1: SER LRTP Goals and Objectives

Goal	Objectives
Asset Management Allocate transportation funding to ensure the long term viability of transportation systems.	• Maintain important transportation assets and services in good operating condition through targeted investment. • Use transportation management systems to assist in decision making for improving the overall condition, utilization, and effectiveness of the transportation asset portfolio over time. • Decommission or dispose of lowest priority transportation assets. • Search for innovative financial resources and partnerships to leverage additional funding for transportation projects.
Sustainable Operations Sustainably manage transportation assets and services.	• Identify and incorporate climate change mitigation/adaptation strategies into aspects of transportation management, planning, design, construction, maintenance, and operations over time as financially feasible. • Maintain flexible use of transportation funding sources while improving identification of transportation needs and expenditures. • Identify and prioritize investments based on legal requirements, agency mission, anticipated lifecycle costs, and consideration of potential future funding. • Utilize the planning process to strengthen effective regional and community relationships.
Safety Provide a safe transportation system for all users.	• Maximize safety of all visitors and staff while minimizing negative impact to park resources and values. • Address engineering, education, enforcement, and emergency response as part of the safety initiatives in the region. • Manage visitation and transportation operations to minimize visitor and wildlife incidents and multimodal conflicts.
Visitor Experience, Access and Mobility Maintain and enhance the quality of the park visitor experience.	• Understand and address impacts of congestion where it interferes with the visitor experience or where it damages resources. • Consider and implement, where feasible, improvements and ease of access to and within national park system units for all park users. • Advocate creating a range of appropriate transportation options that provide a network for seamless connections within each park unit and support, where feasible, extending that seamless connection into surrounding communities. • Support, improve or provide, where feasible, traveler information and wayfinding initiatives and, where appropriate, support interpretation and education opportunities that complement transportation.
Resource Protection Protect and preserve natural and cultural resources.	• Incorporate natural and cultural resource considerations into transportation decision making. • Support the protection and enhancement of cultural transportation resources.

¹ The SER LRTP Core Team consists of representatives from the NPS Southeast Regional Office (SERO), the NPS Washington Support Office (WASO) Facilities Planning Branch, FHWA Eastern Federal Lands Highway Division (FHWA-EFLHD), and a consultant team led by VHB.



Figure 1-1: Southeast Region Map



Source: National Park Service.

Note: NB = National Battlefield; NHP = National Historical Park; NHS = National Historic Site; NM = National Monument; N MEM = National Memorial; NMP = National Military Park; NP = National Park; N PRES = National Preserve; NRRRA = National River and Recreation Area; NS = National Seashore; NST = National Scenic Trail; PRES = Preserve; PKWY = Parkway



NPS Southeast Region Background

The NPS Southeast Region stretches from Kentucky to the Caribbean, and encompasses 66 park units across nine states and the territories of Puerto Rico and the U.S. Virgin Islands (Figure 1-1). The Southeast Region features an extraordinary variety of park types, missions, and environments. These include inland national parks, coastal fortifications, recreation areas, national seashores, national monuments, battlefields, historic sites, island parks and reefs, and parkways. Park unit locations range from urban to suburban to remote.

With this diversity in parks comes diverse transportation systems and planning needs. The region has a transportation portfolio of 4,820 assets with a current replacement value of \$8.7 billion. Those assets include roads, bridges, tunnels, parking lots, trails and other nonmotorized transportation assets, alternative transportation systems, and water-based transportation. In addition to maintaining this vast portfolio of transportation assets, parks in the region must serve increasing numbers of visitors while continuing to protect and preserve natural, cultural, and historical offerings; account for changing visitor demographics and the need to attract the next generation of park users; maximize the safety of park users; contend with increasing encroachment from nearby private development; and operate in a manner that is environmentally and financially sustainable. Furthermore, they must do all of this in a constrained fiscal environment.

Stakeholder Engagement

The SER LRTP Core Team engaged a variety of stakeholders to understand the different perspectives of individuals at numerous levels of the National Park Service and Federal Highway Administration (FHWA) Eastern Federal Lands Highway Division (EFLHD) management structure. Three stakeholder engagement efforts directly informed this Baseline Conditions Assessment report. First, the Core Team completed a series of focus park visits to representative park units in the region; second, the consultant team developed and distributed a transportation survey to all superintendents in the region to gain insight into the transportation network; and third, the Core Team conducted outreach to state Departments of Transportation (DOTs) and FHWA Federal Aid Highway Division Offices in the region through a pair of webinars. SER staff also set up a website to provide project information to the public as part of the Stakeholder Engagement piece of the LRTP effort.

FOCUS PARK VISITS

SER staff identified nine Focus Park units that are representative of the broad range of units in the region. The SER LRTP Core Team visited each of these Focus Parks over the course of several months in the fall of 2014. The Focus Park visits provided the Core Team with a better understanding of both shared and unique unit level transportation conditions, needs, opportunities, and strategies. Because the Core Team was not able to visit all 66 park units in the region, each Focus Park served as representative of other parks in the region with similar missions, settings, and transportation assets and challenges. The lessons learned from the Focus Park visits informed this Baseline Conditions Assessment. A summary report from each Focus Park visit can be found in Appendix A. The nine Focus Parks are comprised of the following park units.

- Big South Fork National River and Recreation Area, located in Tennessee and Kentucky, is an inland park that offers a range of outdoor recreational activities.
- Blue Ridge Parkway, located in North Carolina and Virginia, is a linear park featuring an historic motor road, a large number of transportation-related assets, and diverse recreational, cultural, and historic offerings.
- Fort Sumter National Monument (SC) is an urban, coastal park focused on interpretation of historic fortifications and featuring water-based alternative transportation systems.
- Great Smoky Mountains National Park, located in Tennessee and North Carolina, is the most visited unit in the NPS system and features a large transportation system.



- Gulf Islands National Seashore, located in Florida and Mississippi, is a coastal park that attracts large numbers of recreational visitors and features a water-based alternative transportation system.
- Kennesaw Mountain National Battlefield Park (GA) offers both historic and cultural interpretation and recreational opportunities, and experiences relatively high levels of congestion and non-recreation visits due to its location in an urban/suburban area.
- Mammoth Cave National Park (KY) preserves and interprets unique natural resources and features a large and diverse multimodal transportation system.
- San Juan National Historical Park (PR), one of six Caribbean park units in the Southeast Region, is an urban historical park with alternative transportation systems.
- Stones River National Battlefield (TN) is a relatively small battlefield park located in a suburban setting.

SOUTHEAST REGION TRANSPORTATION SURVEY

The consultant team, in conjunction with the SER LRTP Core Team, developed a survey instrument to collect additional information about transportation-related visitor experience within park units. The lessons learned from the Focus Park visits helped guide the survey design.

The purpose of the survey was to collect information that will help the NPS develop a LRTP for the Southeast Region. In particular, the survey instrument was designed to collect information about transportation-related conditions, needs and issues, and effects on park resources and visitors' experiences in each park unit in the region.

The survey was distributed to the superintendents of all 66 SER park units, and the survey results serve as the basis of a substantial portion of the baseline analysis contained in the Visitor Experience, Mobility and Access chapter of this report.

STATE DEPARTMENT OF TRANSPORTATION (DOT) AND FHWA FEDERAL AID HIGHWAY WEBINARS

The SER LRTP Core Team conducted two webinar presentations that were open to representatives of each State DOT and FHWA Federal Aid Highway Division Offices for the nine-state SER region in December 2014. The webinars outlined the overall SER LRTP approach, provided a preliminary assessment of baseline conditions, and afforded participants an opportunity to learn more about the LRTP process and ways in which their agencies could provide input on the LRTP effort.

PROJECT WEBSITE

A Planning, Environment and Public Comment (PEPC) site has been created for internal and external stakeholders to access project information, including select project documents, and to post comments. The final SER LRTP document will be posted to the website at the completion of this project.



2 Asset Management

Appropriate asset management is critical to investment decision making, total cost of facility ownership accounting, and asset maintenance. The Southeast Region manages a transportation portfolio of 4,820 assets worth \$8.7 billion.² The region has developed meaningful goals and objectives that focus on ensuring the long-term viability of the transportation network and finding innovative solutions for transportation investment and partnerships.

The purpose of this chapter is to provide a snapshot of transportation assets in the SER, their characteristics, condition, and unique needs. This analysis was completed primarily using data from the Facility Management System Software (FMSS) database, Roadway Inventory Program (RIP) database, and the Bridge Inventory Program (BIP) database. Data from FMSS was reviewed and adjusted by the Washington Support Office (WASO) and SER staff to better reflect the most recent consistently accurate available information.

Transportation Asset Inventory

The SER LRTP transportation asset inventory is made up of various types of transportation assets that each play a unique role in the larger transportation network. Transportation assets are characterized by type (asset code), as follows.

Roadways (1100) – Includes assets in FMSS coded as a Road. These assets may be paved or unpaved. The total lane miles and condition of these assets are characterized by the RIP database.

Parking (1300) – Includes assets in FMSS coded as Parking. These assets may be paved or unpaved. The total square footage and condition of these assets are characterized by the RIP database.

Bridges and Tunnels (1700, 1800) – Includes assets in FMSS coded as a Road Bridge or Road Tunnel. Bridge characteristics and conditions are described using the Federal Highway Administration (FHWA) BIP database and PONTIS modeling.

Nonmotorized (2100, 2200, 2300) – Includes assets coded in FMSS as Trails, Trail Bridges, or Trail Tunnels. A detailed review of trail classification and location resulted in many Recreation Trails being removed from the database. All remaining trails are considered Transportation Trails. Additionally, select kiosks are included in this dataset in locations where the kiosk serves as a contact station at a trail head.

Water (6200, 6300) – Includes infrastructure related to water services such as constructed waterways, docks, boat launches, shelters, marinas, and seawalls.

Rail (6500) – Includes assets related to rail systems.

² Derived from National NPS Transportation Asset Inventory. Data date: October 1, 2014.



This FMSS inventory was adjusted by WASO to maintain consistency with the National LRTP transportation asset database. Further adjustments were made by SERO to eliminate assets that are not part of the transportation network or are owned and operated by other stakeholders. The 4,820-asset inventory referenced earlier is the inventory that remains after these adjustments. Table 2-1 summarizes the characteristics of each asset type using the following measures.

Number of Assets – The number of asset locations as described in the FMSS database. Large assets, such as a roadway corridor, could be documented in multiple asset locations.

Current Replacement Value (CRV) – The financial cost of totally replacing an asset at current market pricing. Standard industry costs and engineering estimates of materials, supplies, and labor required to replace facility at existing size and functional capability. This cost includes current costs for planning/design, construction, and construction management.³

Deferred Maintenance (DM) – The backlog of maintenance costs associated with an asset. Maintenance that was not performed when it should have been or was scheduled to be and which, therefore, is put off or delayed. Continued deferment of maintenance will result in deficiencies.⁴

Asset Priority Index (API) – An asset evaluation process that quantifies the value of an asset in relation to the mission of the park. The API ranks assets according to a numeric rating system on a scale from zero to 100. The highest rating is 100 for an asset that is mission critical and irreplaceable.⁵

Facility Condition Index (FCI) – A measure of a facility’s relative condition at a particular point in time compared to similar facilities. The FCI rating is a ratio of the cost of repair of an asset’s deficiencies (deferred maintenance, recurring maintenance that has been deferred, component renewal that has been deferred, and immediate personnel hazard life safety repairs) divided by the current replacement value for the asset. Based on the NPS rating system, assets with an FCI of 0.0 to 0.10 are in “good” condition. Assets with an FCI greater than 0.10 up to 0.15 are in “fair” condition. Assets with an FCI greater than 0.15 up to 0.50 are in “poor” condition. Finally, assets with an FCI greater than 0.50 are in “serious” condition.⁶

Roads, parking, bridges, and tunnels make up \$8.2 Billion (about 95 percent) of the region’s total transportation asset inventory CRV of \$8.7 Billion. This should not be unexpected, as the region includes two parkway park units (Blue Ridge Parkway and Natchez Trace Parkway), extensive auto tour routes at Great Smoky Mountains National Park, with notable bridge and tunnel assets along each of those routes. Overall, the Southeast Region has the highest number of bridge/tunnel assets of any region in the National Park Service.

Total deferred maintenance in the region is estimated at \$1.36 billion. As described further in Chapter 3, the Southeast Region has averaged \$71.9 million in annual spending on transportation assets. To completely address the current backlog of deferred maintenance in the region would require the investment of 19 years of historical average annual spending. This estimate does not take into consideration the fact that deferred maintenance is continually growing for all assets.

³ NPS Asset Management Plan. National Park Service. March 30, 2009.

⁴ Ibid.

⁵ Ibid.

⁶ Ibid.

**Table 2-1: SER Transportation Asset Inventory Characteristics**

Transportation Asset Types	Number of Asset Locations	Quantity	Current Replacement Value	Deferred Maintenance ¹	Average Asset Priority Index	Average Facility Condition Index
Roads - paved	862	1,587 route miles	\$4,994,431,679	\$1,001,639,300	73	0.20 – poor
Roads - unpaved	526	595 route miles	\$370,593,033	\$43,906,331	57	0.12 – fair
Parking - paved	1,431	20.9 million sf	\$398,382,912	\$84,155,696	70	0.21 – poor
Parking - unpaved	246	1.7 million sf	\$14,607,777	\$2,025,354	56	0.14 – fair
Bridge Structures	950	1,029 structures/ 3.9 million sf	\$1,621,136,038	\$125,920,555	95	0.08 – good
Road Tunnels	32	34 structures/ 772,851 sf	\$799,281,501	\$15,831,709	96	0.02 – good
Transit Systems	-	21 systems	-	-	-	-
Transportation Trails	273	243 miles	\$147,148,902	\$43,418,398	66	0.30 – poor
Trail Bridges	234	234 structures/ 98,516 sf	\$21,782,994	\$678,777	61	0.03 – good
Trail Tunnels	2	2 structures/ 15,565 sf	\$20,388,076	\$53,944	51	<0.01 – good
Constructed Waterways	14	92 miles	\$42,922,708	\$281,933	48	0.01 – good
Marinas and Docks	246	585,352 lf	\$238,218,030	\$37,054,527	64	0.16 – poor
Railroad Assets	4	9,997 lf	\$3,808,839	\$632,613	76	0.17 – poor
Fleet Vehicles ²	-	20 vehicles	\$3,000,000 ²	-	-	-
Grand Total	4,820		\$8,672,702,489	\$1,355,599,137	72	0.16 – poor

Sources: SER asset inventory derived from National NPS Transportation Asset Inventory (Data date: October 1, 2014) unless otherwise noted.

Quantity of paved roads and parking are from 2014 National Park Service Pavement Condition Report, March 2015

Quantity of road bridges and tunnels are from Bridge Inventory Program (BIP) data. Provided by WASO, January 2015.

Data for transit systems and fleet vehicles are from NPS National Transit Inventory, 2013. Transit systems and fleet vehicles are not tracked in the FMSS database.

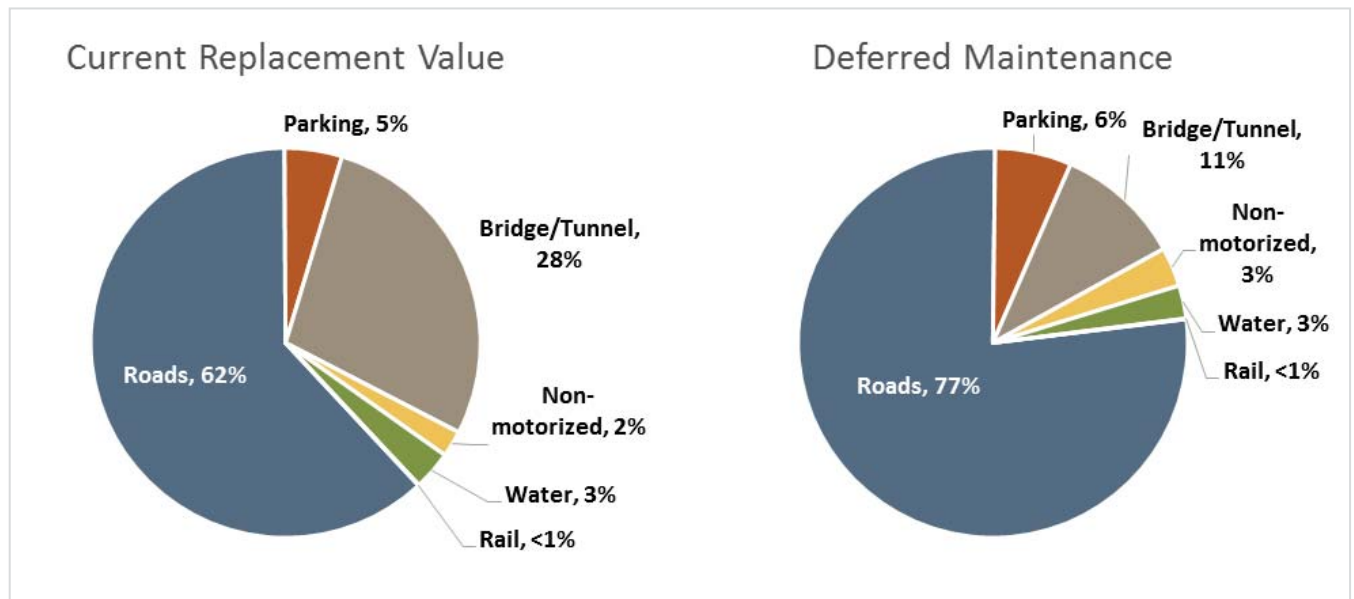
(1) 1,375 asset locations were noted to have zero dollars in deferred maintenance. Although this could indicate that the asset is newly constructed or rehabilitated, or not operated or maintained by the NPS unit, it is most commonly an indication of missing data. Deferred maintenance data are missing for some of all types of assets, most notably on unpaved, trail, and water assets.

(2) Six fleet vehicle assets of 20 on record are missing Estimated Replacement Cost data. Fleet Vehicles are not tracked in the FMSS database, the basis of the Transportation Asset Inventory.

Figure 2-1 and Figure 2-2 depict current replacement value and deferred maintenance across transportation asset types. Roads account for almost two-thirds of CRV and over three-quarters of DM. The overall average FCI for all SER roads is 0.19 (“poor”). Paved parking, nonmotorized transportation trails, marinas and docks, and rail assets are also, on average in “poor” condition, and account for about 12 percent of DM and nine percent of CRV. Bridges overall are in “good” condition and account for 28 percent of CRV and 11 percent of DM. The overall average FCI for all SER bridges and tunnels is 0.06 (“good”).



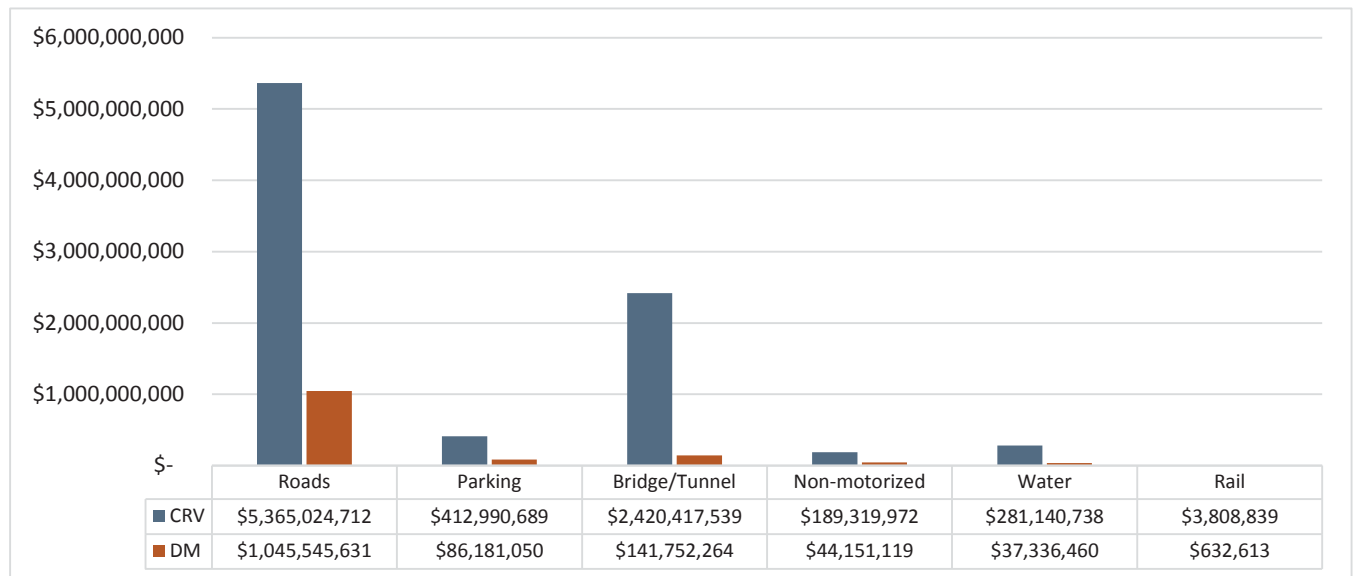
Figure 2-1: Comparison of Current Replacement Value and Deferred Maintenance across Asset Types



Source: SER asset inventory derived from National NPS Transportation Asset Inventory. Data date: October 1, 2014.

Note: 1,375 asset locations were noted to have zero dollars in deferred maintenance. Although this could indicate that the asset is newly constructed or rehabilitated, or not operated or maintained by the NPS unit, it is most commonly an indication of missing data. Deferred maintenance data are missing for some of all types of assets, most notably on unpaved, trail, and water assets.

Figure 2-2: Current Replacement Value and Deferred Maintenance by Asset Type



Source: SER asset inventory derived from National NPS Transportation Asset Inventory. Data date: October 1, 2014.

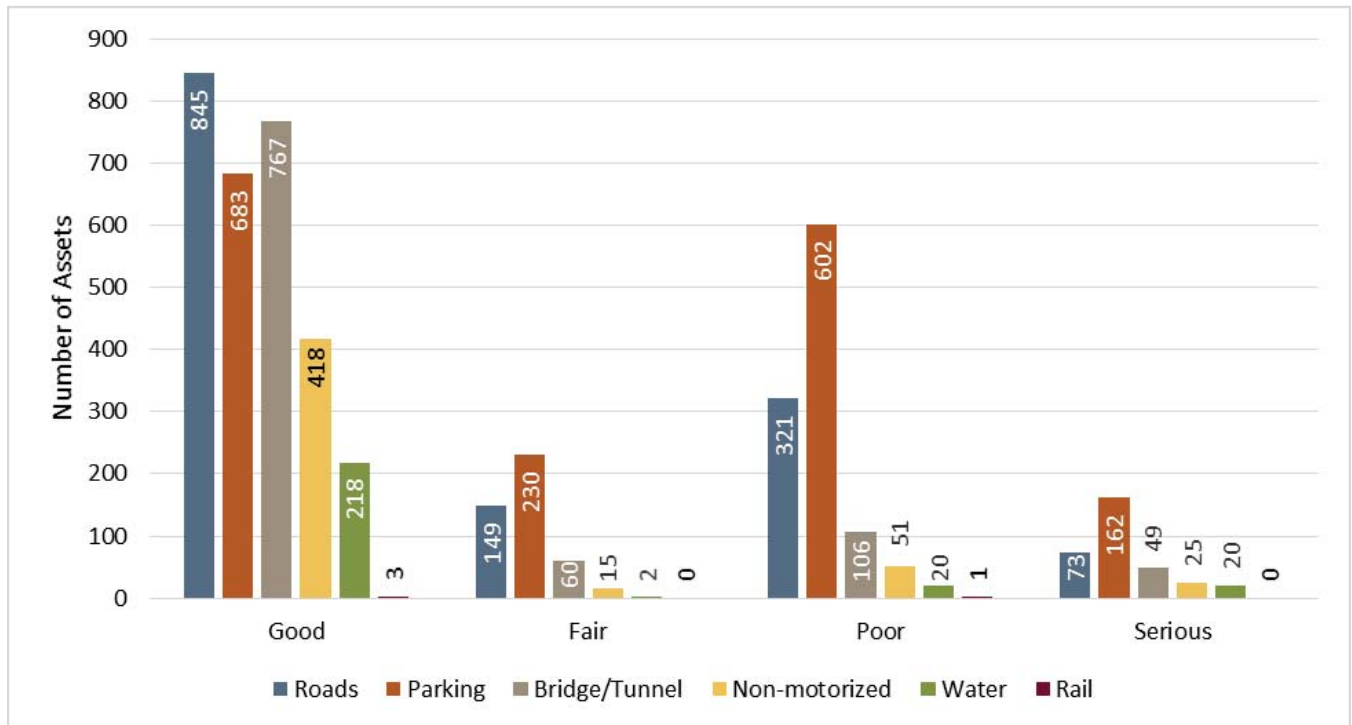
Note: 1,375 asset locations were noted to have zero dollars in deferred maintenance. Although this could indicate that the asset is newly constructed or rehabilitated, or not operated or maintained by the NPS unit, it is most commonly an indication of missing data. Deferred maintenance data are missing for some of all types of assets, most notably on unpaved, trail, and water assets.

The majority of SER transportation assets are located in three park units: Blue Ridge Parkway, Natchez Trace Parkway, and Great Smoky Mountains National Park. As such, two-thirds of current replacement value and three-fourths of deferred maintenance are located within these three park units.



Figure 2-3 summarizes the condition of assets by the number of assets rather than by CRV which is used for calculating the FCI. The majority of SER transportation assets (61 percent) are in “good” condition. About one-third of assets (30 percent) are rated as being in either “poor” or “serious” condition, with the remaining nine percent of assets rated as being in “fair” condition.

Figure 2-3: Condition of Transportation Assets



Source: SER asset inventory derived from National NPS Transportation Asset Inventory. Data date: October 1, 2014.

Non-NPS Transportation Assets

Twenty-eight transportation assets in the LRTP asset inventory do not fall within the jurisdiction of the Southeast Region; therefore, improvements to these assets cannot be funded through the Federal Lands Transportation Program (FLTP). However, Federal Lands Access Program (FLAP) funds or other Title 23 federal aid highway programs are potential fund sources—available to parks through partnership arrangement—that could be applied to these assets. The CRV on these 28 assets is about \$930 million and deferred maintenance is just over \$5 million (Table 2-2). Because these assets are not within the authority of the SER, available data on condition and deferred maintenance needs may not be as current as for other assets. These 28 transportation assets represent critical infrastructure for the region, including the Cumberland Gap Tunnel used by U.S. Route 25E to traverse the park and the U.S. Highway 80 Scenic Byway from Selma to Montgomery, Alabama.

**Table 2-2: Characteristics of Non-NPS owned Transportation Assets**

Transportation Asset Types	No. of Assets	Current Replacement Value	Deferred Maintenance	Asset Priority Index	Facility Condition Index
Roadway	17	\$343,092,000	\$4,622,873	50	0.01 – good
Parking	7	\$2,691,200	\$480,039	45	0.18 – poor
Bridge and Tunnel	3	\$585,007,720	\$85,050	73	0.00 – good
Water	1	\$24,182	\$0	27	Not Available
Grand Total	28	\$930,815,100	\$5,187,962	51	0.01 – good

Source: SER asset inventory derived from National NPS Transportation Asset Inventory. Data date: October 1, 2014.

Note: Fourteen asset locations were noted to have zero dollars in deferred maintenance. Although this could indicate that the asset is newly constructed or rehabilitated, or not operated or maintained by the NPS unit, it is most commonly an indication of missing data. Facility Condition Index for Water assets is described as Not Available due to missing deferred maintenance data.

Roadway and Parking Transportation Assets

Transportation asset types were assigned based on asset codes and the function of the asset. The following sections describe asset conditions by asset type in further detail. The system of record for paved roadways and parking assets is the Roadway Inventory Program (RIP) database. The system of record for unpaved assets remains the National NPS Transportation Asset Inventory (October 2014).

PAVED ROADWAY ASSETS

The SER transportation asset inventory includes a total of 1,587 route miles of paved roads over 862 different asset locations. Eighty-five percent of lane miles are located in just five park units (Blue Ridge Parkway – 46%, Natchez Trace Parkway – 22%, Great Smoky Mountains National Park – 8%, Everglades National Park – 5%, Cape Hatteras National Seashore – 5%)

The system of record for paved asset condition is the Federal Highway Administration (FHWA) Roadway Inventory Program (RIP), which captures the majority of paved roadway assets. Paved assets throughout the National Park Service are field verified annually to continue to validate and improve the accuracy of the inventory. The RIP database records include the functional classification and condition of roadway assets. Each classification is described below.⁷

Class I - Principal Park Road/Rural Parkway. Roads which constitute the main access route, circulatory tour, or thoroughfare for park visitors. Qualifies for FHWA funding.

Class II - Connector Park Road. Roads which provide access within a park to areas of scenic, scientific, recreational or cultural interest, such as overlooks, campgrounds, etc. Qualifies for FHWA funding.

Class III - Special Purpose Park Road. Roads which provide circulation within public use areas, such as campgrounds, picnic areas, visitor center complexes, concessionaire facilities, etc. These roads generally serve low-speed traffic and are often designed for one-way circulation. Qualifies for FHWA funding.

Class IV - Primitive Park Road. Roads which provide circulation through remote areas and/or access to primitive campgrounds and undeveloped areas. These roads frequently have no minimum design standards and their use may be limited to specially equipped vehicles. Qualifies for FHWA funding.

Class V - Administrative Access Road. All public roads intended for access to administrative developments or structures such as park offices, employee quarters, or utility areas. Does not qualify for FHWA funding.

Class VI - Restricted Road. All roads normally closed to the public, including patrol roads, truck trails,

⁷ *Park Road Standards*, National Park Service, 1984.



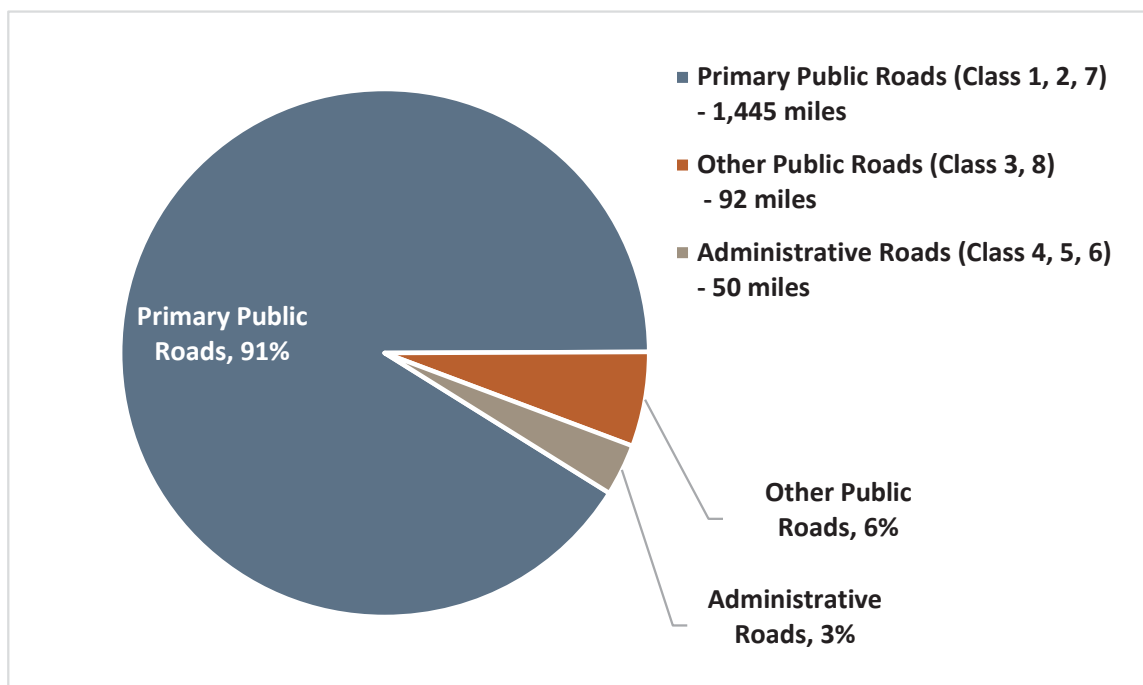
and other similar roads. Does not qualify for FHWA funding.

Class VII - Urban Parkway. These facilities serve high volumes of park and non-park related traffic and are restricted, limited-access facilities in an urban area. This category of roads primarily encompasses the major parkways which serve as gateways to our nation's capital. Other park roads or portions thereof, however, may be included in this category. Qualifies for FHWA funding.

Class VIII - City Street. City streets are usually extensions of the adjoining street system that are owned and maintained by the National Park Service. The construction and/or reconstruction should conform to accepted engineering practice and local conditions. Qualifies for FHWA funding.

For the purposes of functional classification, these eight RIP classifications are grouped based on use into three categories: Primary Public Roads (Functional Classes 1, 2, and 7), Other Public Roads (Functional Classes 3 and 8), and Administrative Roads (Functional Classes 4, 5, and 6) for the purposes of NPS pavement condition reporting. The *2014 NPS Pavement Condition Report* finds that the majority of SER roads are Primary Public Roads, making up 91 percent of the RIP inventory (1,445 lane miles). The remaining Other Public Roads make up about six percent of the inventory, and Administrative Roads make up the final three percent of the roadway inventory. Figure 2-4 illustrates this breakdown.

Figure 2-4: Total Route Miles of Paved SER Roadway Assets



Source: 2014 National Park Service Pavement Condition Report, Federal Highway Administration – Eastern Federal Lands Pavement Section, March 2015. HPMA Report FY15-NPS01.

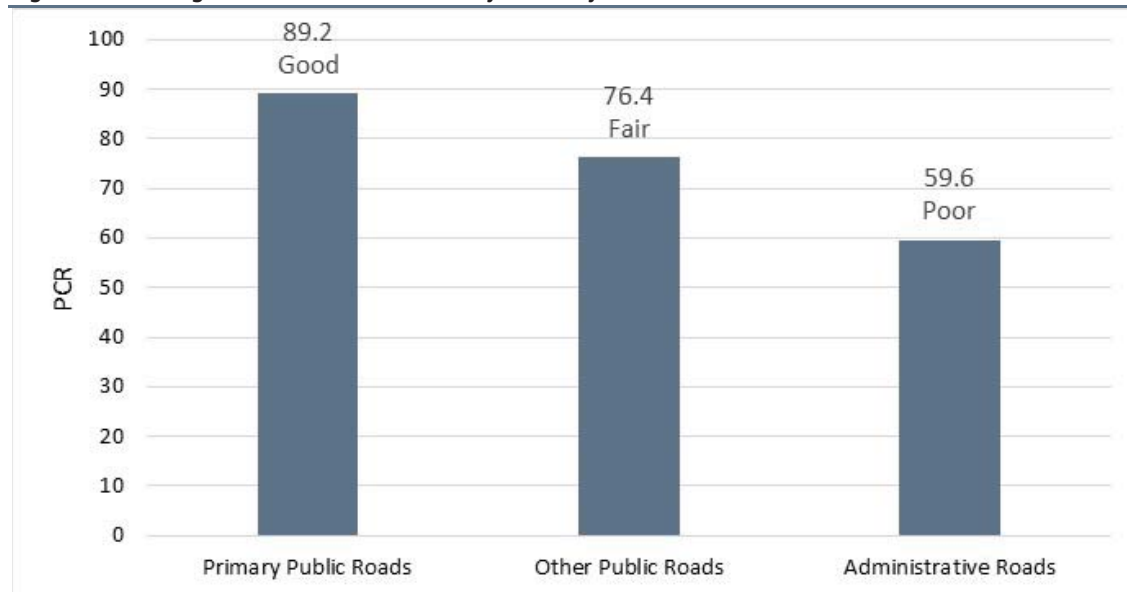


PAVED ROADWAY ASSET CONDITION

Pavement Condition Rating (PCR) is the measure of effectiveness used in the RIP database. Highway Pavement Management Application (HPMA) software is used to track and project the condition of pavement assets. This rating ranges from zero to 100 with 100 being the highest possible rating for a new or recently constructed or rehabilitated asset.

The average PCR for all paved roads in the SER is 87.5, which is classified as “good” condition.⁸ Primary Public Roads have a PCR of 89.2 meaning they are in “good” condition, Other Public Roads have a PCR of 76.4 meaning they are in “fair” condition, and Administrative Roads have a PCR of 59.6 meaning they are bordering on being in “poor” condition (Figure 2-5).

Figure 2- 5: Average PCR of SER Paved Roadway Assets by Classification



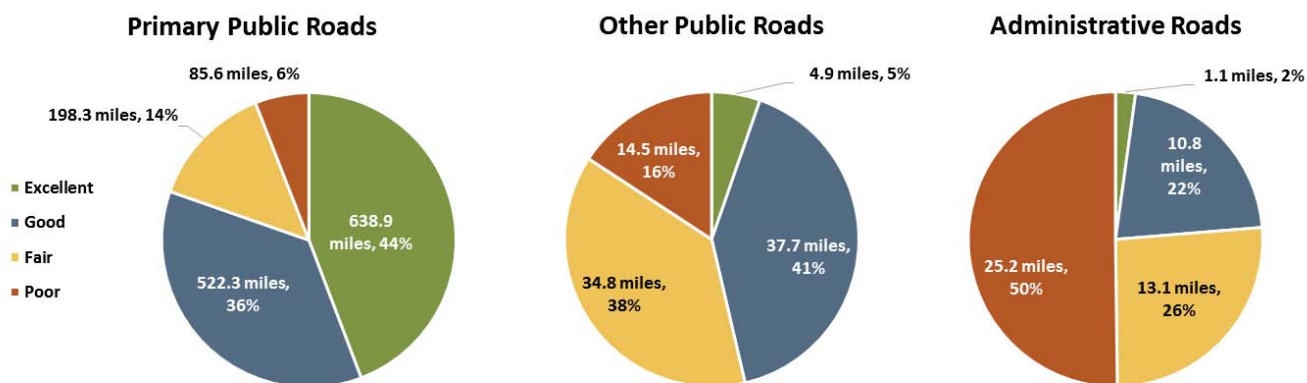
Source: 2014 National Park Service Pavement Condition Report, Federal Highway Administration – Eastern Federal Lands Pavement Section, March 2015. HPMA Report FY15-NPS01.

Figure 2-6 breaks down each of the major classifications by asset condition. As Figure 2-6 would suggest, the majority of Primary Public Roads are in “excellent” or “good” condition. The majority of Other Public Roads are in “good” or “fair” conditions. Administrative Road conditions vary between “good”, “fair”, and “poor” condition.

⁸ PCR ≥ 95 = “excellent” condition, PCR ≥ 85 and < 95 = “good,” PCR ≥ 60 and < 85 = “fair,” and PCR < 60 = “poor.”



Figure 2-6: PCR Category Breakdown of SER Class 1 and 2 Lane Miles



Source: 2014 National Park Service Pavement Condition Report, Federal Highway Administration – Eastern Federal Lands Pavement Section, March 2015. HPMa Report FY15-NPS01.

UNPAVED ROADWAY ASSETS

The SER transportation asset inventory includes 595 miles of unpaved roads over 526 asset locations in 43 park units. Half of those miles are located in four park units: Great Smoky Mountains National Park (25.6%), Big South Fork National River and Recreation Area (11.0%), Cumberland Island National Seashore (9.2%), and Cape Lookout National Seashore (6.6%). Because these assets are not included in the Roadway Inventory Program database they are not assigned a functional classification. Oftentimes, unpaved roads are used to provide localized access to low vehicle volumes.

Nine of the 43 park units with unpaved roadway assets are showing zero deferred maintenance on these assets. Although unpaved roadways may not depreciate in the same way that a paved roadway would, this lack of deferred maintenance could also indicate that there is missing data. Filling data gaps and validating asset data is a need in the SER that should be reflected in the LRTP. Using the available deferred maintenance data, unpaved roadways in the SER are generally in fair condition with an FCI of 0.12.

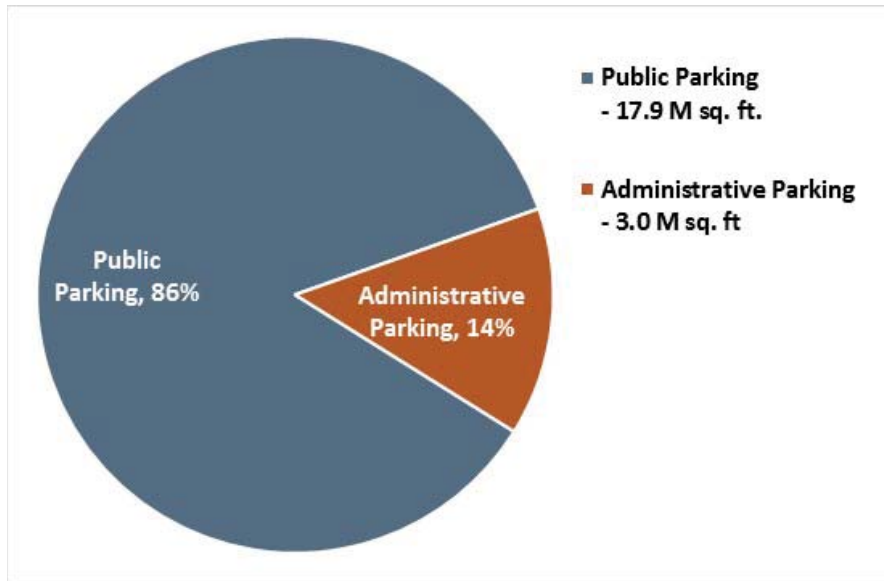
PAVED PARKING ASSETS

SER has a total of 20.9 M square feet of parking, or more than 50,000 parking spaces, among 1,431 parking areas. Not surprisingly, the three parks with the highest portion of parking assets by both quantity and acreage are Blue Ridge Parkway, Natchez Trace Parkway, and Great Smoky Mountains National Park.

Similar to paved roadway assets, the system of record for paved parking assets is the RIP database. The RIP database records parking assets as either public or administrative and tracks the condition of the asset. Figure 2-7 shows that there is nearly six times as much paved public parking in the region than there is paved administrative parking.



Figure 2-7 Total Area of Paved SER Parking Assets

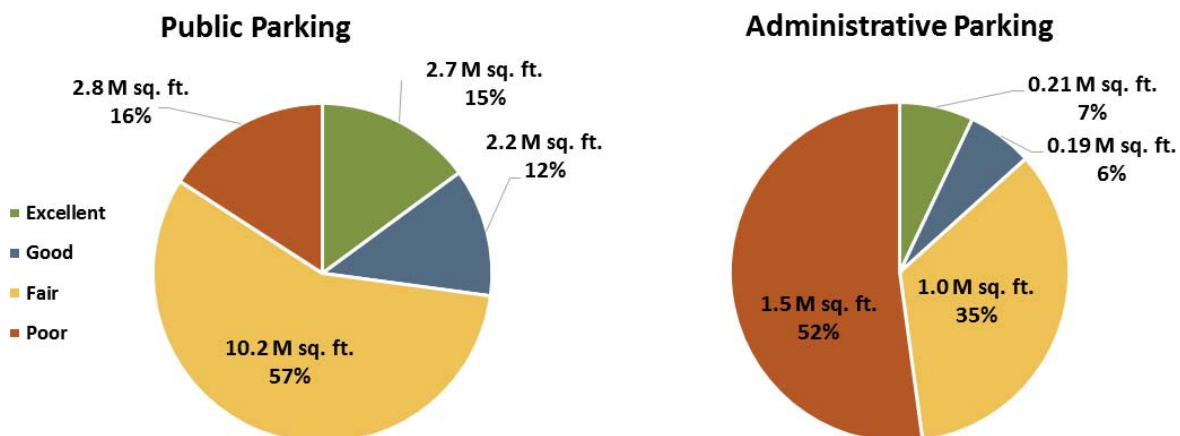


Source: 2014 National Park Service Pavement Condition Report, Federal Highway Administration – Eastern Federal Lands Pavement Section, March 2015. HPMA Report FY15-NPS01.

PAVED PARKING ASSET CONDITION

The average PCR for parking areas in the SER is 71.9, classified as “fair” condition. More than half (57%, by square footage) of public parking areas are classified as being in “fair” condition. Approximately 27 percent of public parking areas are rated as “excellent” or “good”, while 16 percent of public parking areas are rated as “poor”. By comparison, more than half (52%) of administrative parking areas in the region are rated as “poor”, with another third rated as “fair”. Thirteen percent of administrative parking areas are classified as being in “excellent” or “good” condition. Figure 2-8 shows a breakdown of PCR by category for public and administrative parking areas in the region.

Figure 2-8: PCR Category Breakdown for SER Public and Administrative Parking Areas



Source: Roadway Inventory Program, Cycle 4. Provided by WASO. April 2015.



UNPAVED PARKING ASSETS

The SER transportation asset inventory includes 1.7 million square feet of unpaved parking over 246 asset locations in 39 park units. Nearly half of those parking areas (by square footage) are located in four park units: Big South Fork National River and Recreation Area (16.0%), Great Smoky Mountains National Park (13.8%), Little River Canyon National Preserve (8.8%), and Chattahoochee River National Recreation Area (8.2%). Because these assets are not included in the Roadway Inventory Program database they are not classified as public or administrative.

Nineteen of the 39 park units with unpaved parking assets are showing zero deferred maintenance on these assets. Although unpaved parking may not depreciate in the same way that a paved parking areas would, this lack of deferred maintenance could also indicate that there is missing data. Filling data gaps and validating asset data is a need in the SER that should be reflected in the LRTP. There are 982 road bridge or tunnel asset locations in SER among 24 parks. These assets serve a wide range of functions from narrow bridges carrying a single lane of traffic over a stream to a bridge that is almost a mile long on Natchez Trace Parkway spanning the Tennessee River.

Similar to other surface transportation assets, the vast majority of assets are located in three park units: Natchez Trace Parkway, Great Smoky Mountains National Park, and Blue Ridge Parkway. Other notable bridge assets include the U.S Route 25E bridge over Davis Branch Creek at Cumberland Gap National Historical Park and Fort Pulaski National Monument entrance road bridge over the South Channel of the Savannah River. Table 2-3 characterizes bridge and tunnel assets in the SER.

Table 2-3: SER Bridge and Tunnel Asset Characteristics

Park Unit	No. of Asset Locations	Percentage	Quantity (square feet)	Percentage
Blue Ridge Parkway	202	21%	1,320,987	28%
Great Smoky Mountains NP	187	19%	415,610	9%
Natchez Trace Parkway	484	49%	2,376,163	50%
Remaining Units	109	11%	603,010	13%
Total	982		4,715,770	

Source: SER asset inventory derived from National NPS Transportation Asset Inventory. Data date: October 1, 2014.

When compared to other asset types among the SER transportation asset inventory, bridge and tunnel assets are in the best condition. The average FCI for all SER bridges and tunnels is 0.06 (“good”). In addition, similar to HPMA modeling for roads, bridge conditions can be modeled and projected by FHWA using PONTIS software. This software provides a “Bridge Health Index” (BHI), similar to a PCR for roads. A BHI of 100% is the highest rating. Bridge and tunnel structures in the SER have an average overall BHI of 94%.

The FHWA’s Bridge Inventory Program (BIP) includes cyclical inspections of NPS bridges and tunnels. As part of this inspection structures are evaluated and assigned a Priority Improvement Code to describe the condition of the asset. The codes are letter grades ranging from A to E with an A grade being the most critical condition, in greatest need of repair.

A – Assigned to those bridges found to be most critically deficient, and therefore requiring replacement or major rehabilitation as soon as possible. To receive an “A” priority, a bridge must be closed, be in imminent danger of collapse, or meet all three of the following criteria: 1. severe structural inadequacy; 2. high traffic volume; and 3. vital importance to the community or area.

B – Denotes less critically deficient or unsafe bridges, or bridges with serious deficiencies that can remain in service with frequent inspections and/or reduced loads.

C – Assigned to the least deficient group, including those bridges which are structurally sound and capable



of carrying legal loads, but which are functionally obsolete or require a high degree of maintenance or repairs to prevent a serious deficiency.

D – Denotes bridges which are structurally sound and capable of carrying legal loads. These bridges may or may not require preventive maintenance.

E – Is used to denote structures under construction/reconstruction or a “temporary” structure. Once the structure has been finished or inspected, the above priority codes apply.

As illustrated in Table 2-4, three-quarters of bridge and tunnel assets in the region are coded as a D, which is the best condition rating assigned to structures open to public use and signifies low priority needs. Most of the other bridges and tunnels are coded as a C, which is still structurally sound, but may be functionally obsolete or require notable maintenance to prevent them from becoming structurally deficient in the future. Twenty-two bridges are coded as an A (critically deficient) and most of these are in Big Cypress National Preserve, unneeded and targeted for demolition. There are also 15 bridges under construction and classified as Priority E.

Table 2-4: SER Bridge and Tunnel Priority Improvement Code

	Total Bridges and Tunnels	Number of Bridges and Tunnels				
		Priority A	Priority B	Priority C	Priority D	Priority E
Natchez Trace Parkway	494	0 (0%)	2 (6%)	54 (30%)	433	5 (33%)
Great Smoky Mountains National Park	200	1 (5%)	18 (55%)	53 (29%)	123	5 (33%)
Blue Ridge Parkway	205	0 (0%)	4 (12%)	53 (29%)	148	0 (0%)
Big Cypress National Preserve	46	19 (86%)	5 (15%)	4 (2%)	15 (2%)	3 (20%)
Remaining Park Units	75	2 (9%)	4 (12%)	16 (9%)	51 (7%)	2 (13%)
Total	1020	22	33	180	770	15

Source: Bridge Inventory Program. Provided by WASO, January 2015.

Note: Nine structures regionwide, including six at Great Smoky Mountains National Park, are not assigned a Priority Improvement Code in the database.



Alternative Transportation Systems

Alternative transportation systems (ATS) help SER parks minimize resource impacts where traffic volume on existing roadway infrastructure has reached or is over capacity. These systems are important because of their contributions to preserving resources including improvements to air quality, soundscapes, and reduced wildlife/auto collisions. ATS also demonstrates leadership in using alternative transportation to reduce fossil fuel consumption and greenhouse gas emissions.

NPS currently has 131 alternative transportation systems in 66 park units nationwide. The systems are provided through a combination of contractual, concession and/or partnership agreements. Twenty systems (15%) are owned and operated by the NPS, 84 (64%) are contracted by the NPS through concession contracts, 12 (9%) are operated by service contracts, and 15 (12%) are provided under cooperative agreements with public or private partners.⁹

TRANSIT SYSTEMS

Transit systems are the motorized form of ATS that can provide access for multiple visitors at once. In addition to reducing congestion, transit services enable visitors to enjoy the surrounding features without needing to focus on driving, and may include interpretive services to enhance the visitor experience and provide education along the route.

Fourteen parks in the SER have active transit alternative transportation systems. Table 2-5 describes each of these services. These systems cover two modes—on-road transit (shuttle, bus, van, tram) and water transit (boat, ferry)—and a variety of purposes. At Gulf Islands National Seashore, visitors can experience the waters of the Gulf coast and West Ship Island, which is inaccessible without water service. Carl Sandburg Home National Historic Site uses an electric shuttle to provide mobility assistance, and Kennesaw Mountain National Battlefield Park uses a shuttle as part of a safety and congestion management strategy on weekends and holidays. The only means of access for visitor and staff to isolated Dry Tortugas National Park is by either boat or seaplane.

The majority of alternative transportation systems in the SER provide “critical access” to the parks. This includes parks that are entirely accessible only by water, such as Fort Sumter National Monument, or parks with key districts accessible only by water, such as West Ship Island in Gulf Islands National Seashore. Four services are under the ownership of the NPS and the remaining are under private contract.

⁹ NPS, “Alternative Transportation In The Parks,” http://www.nps.gov/transportation/alternative_transportation.html. Accessed: July 2015.



Table 2-5: SER Transit Systems

	Park Unit	System Name	Mode	Owner/Operator	2013 Ridership ¹
critical	Biscayne NP	Biscayne National Underwater Park Tours	Boat/Ferry	Biscayne National Underwater Park, Inc.	7,000
access	Buck Island Reef NM	Big Beard's Adventure Tours	Boat/Ferry	Big Beard's Adventure Tours	12,405
systems	Buck Island Reef NM	Caribbean Sea Adventures	Boat/Ferry	Caribbean Sea Adventures	8,988
	Buck Island Reef NM	Dragonfly	Boat/Ferry	Dragonfly	654
	Buck Island Reef NM	Jolly Roger Charters	Boat/Ferry	Jolly Roger Charters	1,515
	Buck Island Reef NM	Llewellyn's Charters	Boat/Ferry	Llewellyn's Charters	677
	Buck Island Reef NM	Teroro II, Inc.	Boat/Ferry	Teroro II, Inc.	2,454
	Cumberland Island NS	Ferry service	Boat/Ferry	Lang's Seafood, Inc.	n/a
	Dry Tortugas NP	Ferry service	Boat/Ferry	Yankee Freedom II	n/a
	Fort Matanzas NM/ Castillo de Sand Marcos NM	Ferry service	Boat/Ferry	National Park Service	131,284
	Fort Sumter NM	Ferry service	Boat/Ferry	Fort Sumter Tours, Inc. (Rick Mosteller)	614,138
	Gulf Islands NS	Ship Island Ferry	Boat/Ferry	Pan Isles, Inc.; Ship Island Excursions	80,400
	Kennesaw Mountain NBP	Shuttle Bus	Shuttle/Bus / Van/Tram	JTJ Resources, LLC	11,594
	Mammoth Cave NP	Cave Tours Bus Shuttle	Shuttle/Bus / Van/Tram	Forever Resorts	360,000
	Mammoth Cave NP	Green River and Houchin Ferries	Boat/Ferry	National Park Service	n/a
	San Juan NHS	San Juan Trolley	Shuttle/Bus / Van/Tram	CODEVISA	560,228
interpretive	Blue Ridge Parkway	Sharp Top Mountain Shuttle	Shuttle/Bus / Van/Tram	DNC at Peaks of Otter, Inc.	3,232
tours	Cumberland Island NS	Land and Legacies Tour	Shuttle/Bus / Van/Tram	National Park Service	4,389
	Everglades NP	Gulf Coast and Flamingo Boat Tours	Shuttle/Bus / Van/Tram	Everglades National Park Boat Tours	103,172
	Everglades NP	Shark Valley Tram Tour	Shuttle/Bus / Van/Tram	Shark Valley Tram Tours	66,558
special needs	Carl Sandburg Home NHS	Electric Shuttle	Shuttle/Bus / Van/Tram	National Park Service	5,227
total	21 systems				1,973,915

Source: NPS National Transit Inventory, 2013. Volpe, July 2014.

Note: n/a represents data that are not available.

The 2013 ridership reported in Table 2-5 represents about seven percent of the total ridership service-wide. Two transit systems ranked in the top 10 nationally for passenger boarding based on 2012 and 2013 system data: Fort Sumter National Monument – Fort Sumter Tours and San Juan National Historic Site – San Juan Trolley. These two services make up 60 percent of the total ridership in the SER.



TRANSIT ASSETS

In terms of transit fleet vehicles, the SER owns 20 vehicles operating on eight transit systems. These 20 vehicles include a wide range of vehicle types including shuttle buses, trolleys, vans, golf carts, and ferries. The estimated replacement value of the NPS-owned vehicle fleet is \$2.9 million.

In addition to the NPS-owned fleet described, there are also 44 fleet vehicles operating on transit systems in the SER that are not owned by the NPS. The majority of these vehicles are ferries or boats (32 vehicles), the remaining vehicles include ten trams/buses and two trucks.

Aside from fleet vehicles, transportation assets related to transit include marinas, constructed waterways/trails, boat launches/ramps, docks, piers, and railways/transit infrastructure. Many SER park units are located along the Atlantic and Gulf coasts, meaning that the SER has many water assets. Asset and condition data for these assets is limited to the SER transportation asset inventory, presented at the beginning of this chapter. As noted in Table 2-1, these assets, collectively, have a value of \$240 million, and deferred maintenance of \$37 million. Marinas and docks make up the majority of this asset type in value making up 84 percent of CRV and 98 percent of DM. Constructed waterways are generally rated in “good” condition, while marinas and docks are generally rated as being in “poor” condition.

There are four railway assets in the SER with about \$4 million in CRV and \$0.6 million in DM. These assets represent two railway systems at Big South Fork National River & Recreation Area and Blue Ridge Parkway.

TRAILS

Of the nearly 18,000 miles of trails throughout all units of the National Park System, most are natural surfaced trails in backcountry settings. However, front country trails are also an important element of the transportation system, often connecting built facilities to popular overlooks, other tourist destinations, and local communities. In addition, front country trails can provide an alternative to private motor vehicle access to many park units. A total of 5,012 miles of NPS front-country trails are paved, helping to disperse users and allowing visitors who bicycle or walk to have a more first-hand park experience.

Similar to transit infrastructure, trails, trail bridges, and trail tunnels quantity and condition data are tracked by the NPS and found in the transportation asset inventory. As presented in Table 2-1, there are a total of 240 miles of trail assets in the SER spread across 40 park units and 236 trail bridges/tunnels across 21 park units.¹⁰

The majority of trails are located in Big South Fork National River & Recreation Area (67 miles, 28%), followed by Mammoth Cave National Park (35 miles, 14%), Natchez Trace Parkway (20 miles, 8%), and Blue Ridge Parkway (18 miles, 8%). Overall, trail assets have the highest FCI of any asset type at 0.30 – “poor” condition. Trail bridges and tunnels, however, are both recorded in “good” condition based on FCI. It should be noted that there is a lack of deferred maintenance data among all types of trail assets that should be considered during the development of the SER LRTP.

¹⁰ Note: Transportation trails, bridges, and tunnels are those nonmotorized assets that “... are essential to or supportive of a park’s multimodal transportation network, providing access to points of interest or connectivity among multiple modes of transportation.” “DRAFT Proposal: Servicewide Definition of NPS Transportation Assets”. National Park Service – Park Facility Management. 11/24/2014.



3 Sustainable Operations

Sustainability is the practice of preserving resources in the present to be shared in the future. The NPS is committed to sustainable practices in every facet of its operation. For the NPS, sustainability involves achieving a balance between economic, environmental, and social needs. This chapter details practices that the SER is undertaking or has undertaken to achieve this balance.

Environmental Sustainability

Environmental sustainability is at the core of the mission of the National Park Service. The NPS is tasked with preserving natural and cultural resources to educate future generations. Extreme weather events and the reality of climate change have placed a renewed emphasis on the importance of sustainable decision making and behavior. Sustainability includes economic, environmental, and social strategies. The SER is home to irreplaceable resources that must be managed effectively for future generations.

In recent years, the NPS has begun to codify policy, goals, and objectives surrounding sustainability and climate change. Those guidance documents include the Climate Change Response Strategy (2010), The National Park Service Green Parks Plan (2012), and the Climate Change Action Plan (2012-2014). Such guidance documents note the impact that transportation has on sustainability, greenhouse gas emissions, and ultimately climate change. The Climate Change Response Strategy calls for increased use of alternative fuels and alternative transportation systems to reduce the carbon footprint of the NPS. The Green Parks Plan highlights adoption of greener transportation methods as one of nine strategic goals for the NPS, and includes objectives related to reducing emissions, improving fleet fuel efficiency, and supporting alternative commuting practices. The Climate Change Action Plan identifies implementation of climate change guidance in LRTPs as a high priority, and recommends increased coordination with the Clean Cities National Parks Initiative. Additionally, “A Call to Action: Preparing for a Second Century of Stewardship and Engagement” (2011, updated 2014), serves as a guiding document for all National Park Service activities through 2016, and calls on park units to help enhance green spaces, reduce energy consumption, and reduce greenhouse gas emissions toward more sustainable communities. Each of these documents provides guidance to parks on the economic, environmental, and social “legs of the stool.” In the SER, sustainable transportation planning efforts ensure that these considerations are factored into decisions affecting transportation activities.

The SER oversees project design and delivery to reduce or mitigate adverse effects of transportation and maximize benefits for resources. The region encourages parks to incorporate green and recycled materials in infrastructure, as well as reducing waste, tailpipe emissions, and other negative environmental impacts resulting from transportation management and operation. The region seeks to adapt to the changing environments with effective strategies that best preserve resources for the future enjoyment of visitors.

Transportation is vital to achieving quality of life for individuals, building lasting communities, and enabling a strong economy; however, transportation systems, without proper management, have also been cited as a detriment to the environment, specifically as a significant source of greenhouse gas emissions. The impact of greenhouse gases and climate change on communities and society at large will be an important consideration for all future transportation planning efforts.

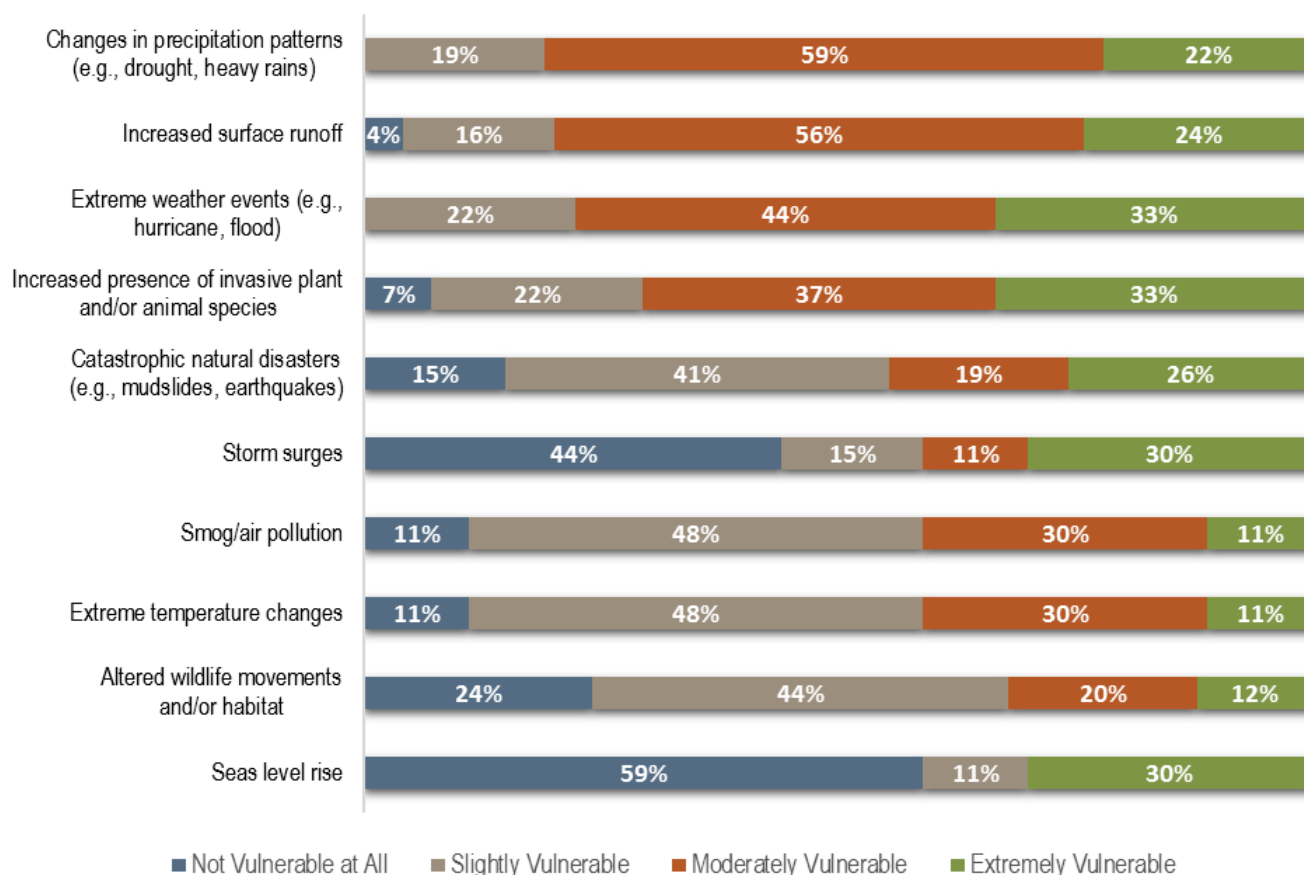
All respondents in a recent survey of park superintendents in the SER,¹¹ reported that their respective

¹¹ Survey administered as part of SER LRTP study process. Responses were received for 30 of 66 SER park units. See Appendix B for details on methodology and results.



transportation facilities and network are moderately to extremely vulnerable to at least one climate change issue, and the majority (59%) report that their transportation facilities and network are extremely vulnerable to at least one climate change issue (Figure 3-1). The most commonly expressed issues that SER park units are vulnerable to are changes in precipitation patterns (81% of respondents), extreme weather events (77%), and increased surface runoff associated with such events (80%).

Figure 3-1: Survey Results - Vulnerability of each park's transportation facilities/network to various climate change issues



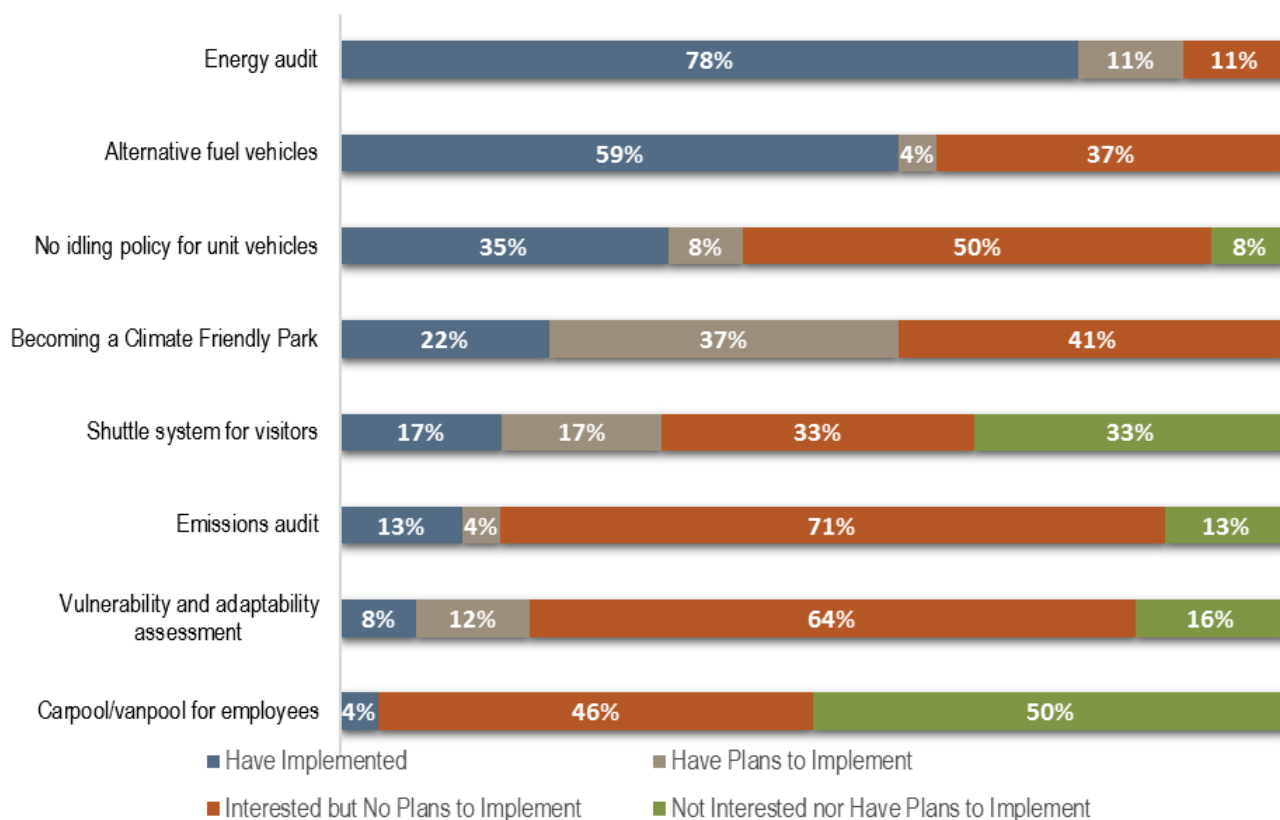
Source: NPS SER LRTP Transportation Survey Results. RSG, February 2015.

Almost every survey respondent (96%) reported their park unit has already implemented or plans to implement an activity or initiative to help address the potential effects of climate change within their unit (Figure 3-2). Most (89%) have already implemented at least one initiative.

- The most common initiative implemented is an energy audit (78% have implemented);
- Close to two-thirds (63%) have or are planning to add alternative fuel vehicles in their unit fleet;
- Climate change initiatives that are of most interest to survey respondents, who have not already implemented or do not yet have plans to implement, include performing an emissions audit (cited by 71% of respondents), performing a vulnerability and adaptability assessment (64%), instituting a no idling policy for unit vehicles (50%), and initiating a carpool/vanpool for employees (46%).



Figure 3-2: Survey Results - Parks' current or planned activities to help address climate change



Source: NPS SER LRTP Transportation Survey Results. RSG, February 2015.

The NPS has partnered with the U.S. Department of Energy to establish the Clean Cities National Parks Initiative, which supports transportation projects that cut petroleum use and greenhouse gas emissions and that educate the public on the environmental benefits of doing so. Through this initiative, several SER parks are adding propane and electric vehicles to their fleets and removing older less efficient diesel burning trucks. Great Smoky Mountains National Park is working to install DC fast and Level II charging stations for electrically powered public vehicles.

CLIMATE-FRIENDLY PARKS

The Climate Friendly Parks (CFP) program began as a collaborative effort between the NPS and the U.S. Environmental Protection Agency (EPA), but is now administered completely within the NPS. Program goals are to address sustainability and climate change aspects both within the park boundaries and working in partnership with communities surrounding the park. This is accomplished by providing park units with comprehensive support, management tools, and resources to address sustainability and climate change impacts, specifically focusing on the following goals:¹²

- Measure baseline park-based greenhouse gas (GHG) emissions.
- Educate park staff and the public about climate change and demonstrate ways individuals and groups can take action to address the issue.
- Develop strategies and specific actions to address sustainability challenges, reduce GHG emissions, and anticipate the impacts of climate change on park resources.

The CFP program is a nationally recognized program which provides a universal context in which parks

¹² National Park Service. "Climate Friendly Parks Program". <http://www.nps.gov/climatefriendlyparks/index.html>, 2015.



have the ability to become more sustainable and to teach visitors about sustainability both while visiting the park and in their lives outside of the park. This is important because due to their visibility and large number of protected resources, national parks are places where the effects of climate change are particularly impactful to large audiences. Some of the resources that the program offers include:

- ❶ Staff training and/or a CFP workshop designed specifically for the needs of an individual park.
- ❷ Park unit specific GHG Emissions Inventory using a carbon management inventory tool designed specifically for national park system units, called the Climate Leadership in Parks (CLIP) tool.
- ❸ Environmental Management System (EMS) expertise.
- ❹ Assistance in identifying, implementing, and complying with Green Parks Plan goals.
- ❺ Technical assistance developing park-specific action ideas to be placed in either a comprehensive EMS or an Action Plan, including tools to help develop action items such as the CLIP Module 2 (Action Planning Module).

The Climate Friendly Parks program requires member parks to follow a four-step certification process to receive the Climate Friendly Park designation:

1. Submit a CFP application
2. Baseline Data Collection – GHG Inventory and Identify Key Challenges
3. Workshop/Training for park staff
4. Complete a Comprehensive Environmental Management System or an Action Plan

Upon completion of these four milestones, the park is certified as a Climate Friendly Park. Ongoing tasks are requested in order to maintain this certification, consisting of workshop follow-up assistance, Environmental Management System Yearly Work Plan and/or implementation of Action Plan, monitoring progress, and reporting results annually. The CFP program empowers park employees to work together in innovative ways and provide leadership on climate stewardship. CFP designation helps individual park units raise awareness of and educate the public on the impact of emissions and climate change, and raises the profile of park units among a public that increasingly places value on environmental stewardship and green initiatives. CFP designation also helps the NPS meet energy, water, and waste reduction targets established in an Executive Order signed by President Obama in 2009.¹³

There are seven SER parks currently certified as Climate Friendly Parks, with two other parks in the certification process. Table 3-1 lists the park units that are currently certified or are in the process of becoming certified as Climate Friendly Parks. One of the nine focus parks, Great Smoky Mountains National Park, is certified as a Climate Friendly Park. Two other focus parks, Mammoth Cave National Park and San Juan National Historic Site, are in the process of becoming certified, currently having met two and three of the milestones, respectively.

¹³ U.S. Department of the Interior, Office of Inspector General, Evaluation – National Park Service: Climate Friendly Parks Initiative, 2011.

**Table 3-1: Climate Friendly Parks in SER**

Park Unit	State	Number of Milestones Met	Climate-Friendly	Focus Park
Buck Island Reef National Monument	VI	4	✓	
Carl Sandburg Home National Historic Site	NC	4	✓	
Christiansted National Historic Site	VI	4	✓	
Congaree National Park	SC	4	✓	
Everglades National Park	FL	4	✓	
Great Smoky Mountains National Park	TN, NC	4	✓	✓
Mammoth Cave National Park	KY	2		✓
Salt River Bay National Historical Park and Ecological Preserve	VI	4	✓	
San Juan National Historic Site	PR	3		✓

Source: NPS CFP Program, http://www.nps.gov/climatefriendlyparks/parks/applicant_parks.html.

****UPDATED DATA AS OF SEPTEMBER 2016 ****

As of June 2016, 12 Southeast Region park units were certified as Climate Friendly Parks (Table 3-2). As a supplement to parks' efforts to attain CFP certification, WASO has been conducting workshops on vulnerability and adaptation with park units in the region. WASO conducted workshops at seven Southeast Region parks in 2015, with plans to hold workshops at another seven parks by the end of 2016.

Table 3-2: SER Climate Friendly Parks – Updated September 2016

Park Unit	State
Big South Fork National River and Recreation Area	Kentucky, Tennessee
Buck Island Reef National Monument	US Virgin Islands
Cape Hatteras National Seashore	North Carolina
Carl Sandburg Home National Historic Site	North Carolina
Christiansted National Historic Site	US Virgin Islands
Congaree National Park	South Carolina
Everglades National Park	Florida
Fort Raleigh National Historic Site	North Carolina
Great Smoky Mountains National Park	Tennessee, North Carolina
Obed Wild & Scenic River	Tennessee
Salt River Bay National Historical Park and Ecological Preserve	US Virgin Islands
Wright Brothers National Monument	North Carolina



CLIMATE CHANGE AND VULNERABILITY

Climate change refers to variation of weather patterns over a long period of time. While climate change has occurred throughout much of the planet's history, there is a concern that observed changes in temperature, precipitation, and sea level suggest that climate change has been occurring at an accelerating pace in recent years. As the planet has been warming, one of the primary effects is a gradual rise in sea level elevation. This makes low-lying coastal areas vulnerable to flooding and erosion, and is a particular concern for the many seashore and coastal sites in the SER. In addition, the warmer environment allows the atmosphere to contain more water, which has the potential to result in greater amounts of precipitation and more intense storms being observed. It is predicted that climate change could result in increased harmful algal blooms and disease-causing agents in inland and coastal waters, which were not previously a concern in the SER.¹⁴

While climate change can have a great effect on low-lying coastal areas, storms can also impact areas far away from the coast. Higher average temperatures may also result in change to the duration of seasons and an increase in the number of extreme heat days. Increases in frequency, intensity, and duration of extreme heat events will continue to affect public health, natural and built environments, and energy use and production.¹⁵

Climate change could impact the built environment through gradual inundations from sea level rise or enhanced storm surges from higher seas. Altered freeze-thaw cycles can accelerate the degradation of building material, and changes in precipitation and humidity can accelerate rot and the need for maintenance in wood.¹⁶

Understanding how park resources are vulnerable to climate change will aid regional and park managers in making better decisions about how to preserve these resources for future generations. While scientists are currently forecasting the magnitude and secondary impact of these long term changes, some agencies are presently in the process mitigating or adapting to the impacts of climate change. **Mitigation** includes measures to minimize the causes of climate change caused by human activity (e.g., reducing energy use or greenhouse gas emissions). **Adaptation** involves taking steps to protect, modify, or abandon at-risk resources. The NPS has a vested interest in protecting its resources from the adverse effects of climate change, as these assets are irreplaceable treasures that need to be preserved for future generations to enjoy. Potential changes to the global climate may also influence seasonal visitation patterns over the long term, which can place strain on the park's resources.

According to *Adapting to Climate Change in Coastal Parks* (2015), an NPS report that estimates the exposure of NPS assets to sea-level rise and associated storm vulnerability, more than one-third of coastal park assets, with a cumulative value of over \$40 billion, are highly vulnerable to sea-level rise.¹⁷ The SER had more parks categorized as "High" exposure to sea-level rise than any other NPS region, with 11 of the 13 coastal parks in the region classified as having "High" exposure. Furthermore, at 10 of the 13 SER coastal parks, fully 100 percent of park assets were designated as "High" exposure.

The U.S. Geological Survey has conducted Coastal Vulnerability Index (CVI) assessments at five park units in the SER since 2001. A CVI assesses hazards associated with future sea-level change and identifies those areas that are most likely to be affected by future sea-level rise. The CVIs conducted at SER parks found that: approximately half of the shoreline at Cape Hatteras National Seashore and at Cumberland Island National Seashore had a vulnerability rating of "Very High" or "High;" more than 40 percent of the shoreline at Dry Tortugas National Park and at Gulf Islands National Seashore had a vulnerability rating

¹⁴ National Park Service, National Park Service Southeast Region Climate Change Response Strategy and Action Plan [Draft], 2015.

¹⁵ Ibid.

¹⁶ Ibid.

¹⁷ National Park Service, *Adapting to Climate Change in Coastal Parks*, 2015. Accessed at http://www.nature.nps.gov/geology/coastal/coastal_assets_report.cfm.



of “Very High” or “High;” and more than one-third of the shoreline at Virgin Islands National Park had a vulnerability rating of “Very High” or “High.”

Social Sustainability and Livability

Many SER park units have undertaken efforts to promote social sustainability through partnerships, outreach, education, and access, and in doing so have underscored their commitment to Ladders of Opportunity, one of FHWA’s Planning Emphasis Areas for 2015. The Ladders of Opportunity initiative seeks to identify connectivity gaps in essential services, in an effort to use transportation infrastructure to promote increased access to opportunities for community residents to experience an improved quality of life.

Nearly all of the SER parks partner with official Friends Groups that support the parks through fundraising, program development and administration, and construction. Many park units also offer educational and recreational programming, and in some cases facilitate transportation services, to school groups. Blue Ridge Parkway has established more than 18 educational TRACK Trails through the Kids In Parks program. San Juan National Historic Site’s Little Masons program teaches students about traditional masonry techniques and the importance of historic preservation.

Several SER LRTP Focus Parks have made concerted efforts to improve park access for traditionally underserved communities. As part of the design and construction of the Paseo del Morro, San Juan National Historic Site plans to create multiple connections between an isolated, low-income neighborhood bordering the park and the surrounding city streets and parkland in Old San Juan. Kennesaw Mountain National Battlefield Park is working with local public transit agencies to establish new or expanded transit service to the park, which would increase access for disadvantaged populations. All of the Focus Parks work closely with their respective gateway communities to promote greater access to park units, reduce congestion in and around park units, and improve quality of life for gateway community residents.

The Rivers, Trails, and Conservation Assistance (RTCA) program brings its extensive transportation and community planning tools to bear in working with park units to support livability initiatives, including engaging youth, enhancing recreational opportunities, and promoting healthy lifestyles. In 2015, the RTCA provided technical assistance on 30 projects in the SER.

Those projects included:

- Planning a trail network to connect Chickamauga and Chattanooga National Military Park to the historic Glass Street community in east Chattanooga, Tennessee
- The development of a gateway park that links to Ninety Six National Historic Site in South Carolina via a system of greenway corridors
- The development of a regional master plan including four counties in Kentucky, Tennessee, and Virginia, with a focus on the development and promotion of alternative transportation and recreation options in and around Cumberland Gap National Historical Park¹⁸

The NPS began partnering with the Conservation Fund’s Federal Lands Livability Initiative in 2013 to conduct livability assessments and workshops on federal lands and in gateway communities across the country. One such livability assessment in northwest Alabama included recommendations for improved connections and cooperation between Natchez Trace Parkway and gateway communities in the area, including promotion of the park’s bicycle-only campground at Colbert Ferry, identification of partnership

¹⁸ National Park Service, Rivers, Trails, and Conservation Assistance Program, accessed at www.nps.gov/orgs/rtca.



and funding opportunities, and efforts to get area residents to see the parkway as “more than just a road.”¹⁹

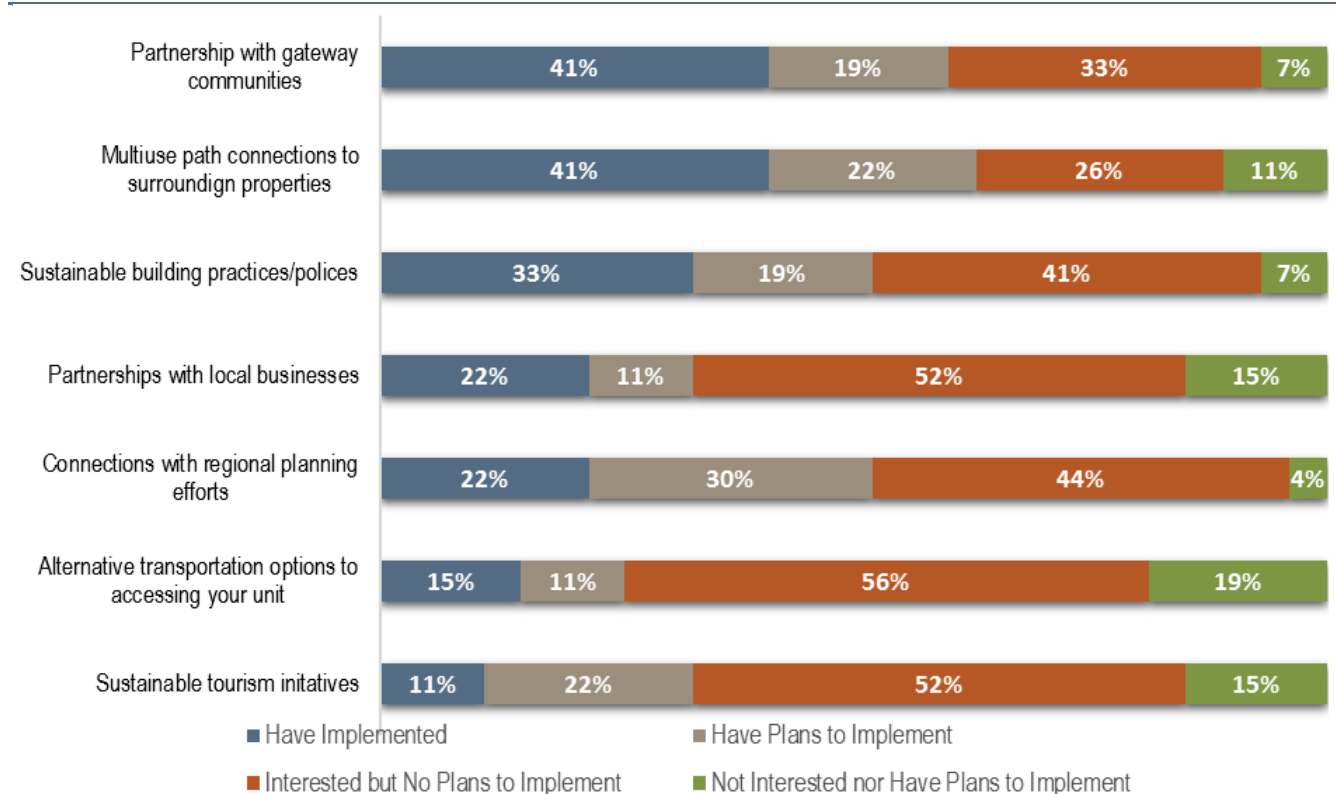
Most of the SER Transportation Survey respondents (85%) report that at least one action to help influence livability or sustainability within the community surrounding their unit has been implemented or is planned to be implement, as shown in Figure 3-3. The most commonly reported actions that park units have taken or plan to take include:

- Providing multiuse path connections to surrounding properties (cited by 63% of respondents)
- Developing partnerships with gateway communities (60%)
- Implementing sustainability building practices/policies (52%)
- Making better connections in the future with regional planning efforts (52%)

Livability and sustainability actions that are of most interest to survey respondents, at parks that have not already implemented or do not yet have plans to implement, include:

- Having alternative transportation options to access their unit (56%)
- Instituting sustainable tourism initiatives (52%)
- Having partnerships with local businesses (52%)
- Making connections with regional planning efforts (44%)

Figure 3-3: Survey Response - Parks’ current or planned actions to influence livability/sustainability within surrounding communities



Source: NPS SER LRTP Transportation Survey Results. RSG, February 2015.

¹⁹ The Conservation Fund, Appalachian Gateways Initiative: An Assessment and Recommendations Report for Natural and Cultural Heritage Tourism Development in Muscle Shoals National Heritage Area Alabama, 2011.



Financial Sustainability

Baseline transportation spending can be established looking at historical funding trends. Establishing this baseline provides a foundation for forecasting future available funding for transportation. The historic financial analysis captures all transportation fund sources spent by the region over eight years, FY06 through FY13. It reflects:

- Obligations, awards and authorizations for transportation assets
- Adjustment of all prior year dollar amounts to equivalent 2014 dollar values
- Calculation of an annualized average transportation funding expenditure rate

The financial data was extracted from various financial and project management data tracking systems, such as the NPS Administration Financial System (Version 3) and the joint Federal Highway Administration (FHWA)/NPS Park Roads and Parkways Transportation Allocation and Tracking System. To simplify reporting, the dataset was consolidated, coded and grouped by funding authorizations, funding programs, work types and asset types. All figures in this section are adjusted to fiscal year 2014 (FY14) dollars and all identifiable American Recovery and Reinvestment Act (ARRA) investments were removed.

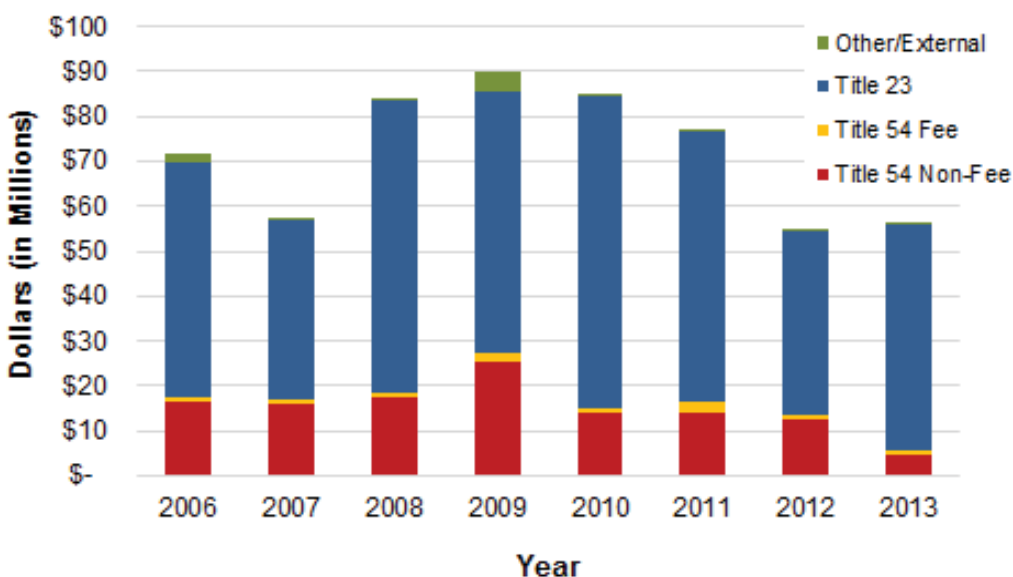
SUMMARY OF HISTORICAL EXPENDITURES

From FY06 through FY13, the SER invested approximately \$682 million in transportation assets, or an annual average value of about \$71.9 million adjusted for inflation. The National Park Service invested \$750 million in nearly 800 projects to stimulate the economy through ARRA. Projects funded preserved and protected national icons and historic landscapes, improved energy efficiency and renewable energy use, remediated abandoned mine lands, and provided \$15 million in grants to protect and restore buildings at historically black colleges and universities. Additional funding through FHWA improved park roads for millions of visitors. The region received \$43.0 million in ARRA funding in 2009; however, funds provided by the ARRA are excluded from these totals because ARRA is considered to be a unique, one-time funding source, and inclusion of these funds would skew the historical expenditure averages.

Looking at funding obligations by source, transportation investment peaked at \$90.0 million in FY09 and gradually decreased to roughly \$55 million during both FY12 and FY13 (Figure 3-4). The \$54.8 million investment in FY13 was the smallest amount allocated to transportation assets during this eight-year period. As evidenced in Figure 3-4, most transportation funding in any year came from Title 23 FHWA program funding.



Figure 3-4: Total Funding Obligations per Fiscal Year, 2006-2013



Source: NPS Administrative Finance System

The region dedicated 85 percent (\$491 million) of the eight-year total transportation investment (\$575 million) to improving paved assets (roads, bridges, parking and tunnels). An additional eight percent (\$46 million) went to operating, maintaining and rehabilitating trail assets. Marinas and waterways, received \$13 million or two percent of the total transportation investment. Approximately \$12 million of funding (another two percent) targeted transit systems. The remaining eight percent or \$6.5 million was invested in other transportation assets (e.g., ITS and buildings) or transportation planning activities, with \$6.4 million going toward the latter.

A significant target of funding, the Foothills Parkway in Great Smoky Mountains National Park, received \$58.9 million over the eight-year period from FHWA Category I, II and III funding plus transportation earmarks. Of that amount, \$36.5 million came from Category II funds, dedicated to parkway projects. Approximately \$19.7 million in transportation earmarks from FY06 through FY09 were dedicated to the parkway. The remaining \$2.7 million came from Category I funds for recurring pavement preservation and other rehabilitation needs along the parkway. Annually, funding for the Foothills Parkway project represents more than 10 percent (\$7.4 million) of the \$71.9 million historic annual average transportation expenditures. From a long range planning view, those targeted funds, especially the \$7.0 million in earmarks and Category II funding, should be viewed as unique and not as a component of the broader transportation funding pool available for other priority transportation infrastructure in the region.

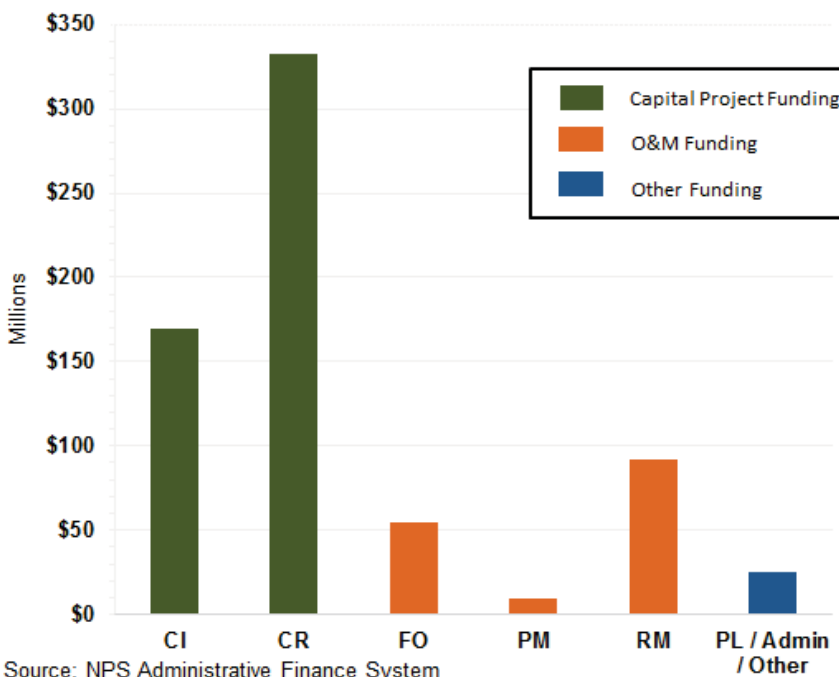
Any other future large targeted investments will similarly impact spending trends and their impact should be carefully considered in terms of overall regional funding levels. For example, the planned improvements to the Tamiami Trail corridor (US Route 41) associated with Everglades National Park is scheduled to receive an annual allocation of \$8 million in NPS focused FLTP funding from FY16 through FY20. The \$8 million reflects the NPS matching commitment from FLTP funds in response to the TIGER grant for this project that was awarded to the Florida Department of Transportation (FDOT). This commitment does impact the SER parks: FLTP program funding for the region, with this reduction resulting in fewer transportation projects being funded elsewhere at SER parks.

In contrast, GRSM has an active TIGER application pending submission and approval to complete the final paving of a 16-mile section of the Foothills Parkway. These funds will have little or no impact on funding levels elsewhere in the region, but it does represent a significant investment in transportation infrastructure (by the USDOT and the State of Tennessee) needed for the opening of a contiguous 33-mile section of parkway.



In terms of work type, the region focused 70 percent (\$443 million) of the total transportation funding investment on capital improvement (CI) (\$118 million) and component renewal (CR) (\$325 million) projects (Figure 3-5). Another 18 percent (\$111 million) was spent on operations and maintenance (O&M), split across facility operations (FO), recurring maintenance (RM) and preventive maintenance (PM). The remaining 13 percent (\$81 million) went to administrative, planning and other miscellaneous (unclassifiable) spending. This historical 4:1 ratio of capital improvement to O&M does not reflect the renewed NPS focus on preventive maintenance and other O&M sustainment needs. Major ongoing capital projects such as those benefitting the Foothills Parkway and the Natchez Trace Parkway are also likely affecting this ratio.

Figure 3-5: Total Funding by Work Type, FY 2006-2013 (\$ millions)



****UPDATED DATA AS OF SEPTEMBER 2016 ****

The NPS is committed to providing a portion of FLTP funds—\$8.4 million per year—to planned capital improvements to the Tamiami Trail, a non-NPS owned highway owned and managed by FDOT. That investment amount represents 13 percent of the region’s total available annual funding. The entire \$8.4 million per year over the period of FY 2016 – FY 2020 will be funded out of the FLTP annual allocation to the SER.

An estimated \$35 million is needed to complete Sections E and F of the Foothills Parkway, between Walland and Wears Valley, at Great Smoky Mountains National Park. That work includes completion of the 1.65 mile section of the Foothills Parkway known as the “missing link” and paving the full 16 miles of Sections E and F. Great Smoky Mountains National Park has worked closely with the Tennessee Department of Transportation (TDOT), FHWA Eastern Federal Lands Highway Division, and the NPS Southeast Region to identify funding sources to complete the sections and open them to the public. Those collaborative efforts have borne considerable fruit to date, as Great Smoky Mountains National park and TDOT were awarded a \$10 Million TIGER grant in July 2016. The State of Tennessee has also committed to contribute an additional \$15 Million to the project.

ANNUALIZED FUNDING

Table 3-3, organized by funding authorization, program and account, shows the make-up of the \$71.9 million average annual transportation funding for the region. Comparing the 8-year average annual



funding to the most recent 3-year average shows a 15 percent decline in annual funding for transportation in the Southeast in recent years.

Table 3-3: SER Average Annual Transportation Funding by Source, FY06 – FY13

Fund Source	Fund Administration	8-Year Annual Average (FY 2006 - 2013)	8-Year % of Total Funds	3-Year Annual Average (FY 2011 - 2013)	3-Year % of Total Funds
Title 23 FHWA Cat I - 3R & 4R	WASO / SER	\$40,663,060	56.6%	\$39,125,572	62.7%
Title 23 FHWA Cat II	WASO / SER	\$8,100,257	11.3%	\$6,553,470	10.5%
Title 54* Non-Fee Operational Park Base	Park Unit	\$5,469,799	7.6%	\$3,345,406	5.4%
Title 54* Non-Fee Cyclic Maintenance	SER	\$4,630,115	6.4%	\$4,731,406	7.6%
Title 23 Transportation Earmarks	WASO / SER	\$2,462,272	3.4%	-	0.0%
Title 54* Non-Fee Repair/Rehab	WASO	\$1,886,454	2.6%	\$1,527,812	2.4%
Title 54* Non-Fee Emergency Storm & Flood Damage	WASO	\$1,321,686	1.8%	\$166,503	0.3%
Title 54* Non-Fee Line Item Construction	DOI	\$1,047,817	1.5%	\$137,278	0.2%
Title 23 FHWA Cat III - ATP	WASO / SER	\$955,201	1.3%	\$2,163,592	3.5%
Title 23 Other FHWA Programs	FHWA	\$862,524	1.2%	\$1,833,975	2.9%
Other/External TRIP/ATPPL	DOI / FHWA / FTA	\$753,148	1.0%	\$41,528	0.1%
Title 23 Public Lands Highway - Discretionary	FHWA	\$740,988	1.0%	-	0.0%
Title 54* Recreation Fee 80%	Park Unit	\$740,517	1.0%	\$955,255	1.5%
Title 54* Non-Fee Other	NPS (Varies)	\$736,931	1.0%	\$454,893	0.7%
Title 23 Scenic Byways	FHWA	\$491,116	0.7%	\$601,888	1.0%
Title 54* Transportation Fee	Park Unit	\$393,458	0.5%	\$493,102	0.8%
Other/External Reimbursable Agreements and Donations	Park Unit	\$256,234	0.4%	\$ 62,855	0.1%
Title 23 FHWA Emergency Relief for Federally Owned Roads	FHWA	\$224,487	0.3%	\$ 87,706	0.1%
Title 54* Recreation Fee 20% and Other Recreation Fees	SER / Park Unit	\$130,085	0.2%	\$146,270	0.2%
Title 54* Concession Franchise Fee 80%	Park Unit	\$17,902	0.0%	\$ 9,626	0.0%
SER Total		\$ 71,884,052	100.0%	\$ 62,438,139	100.0%

Source: NPS Administrative Finance System

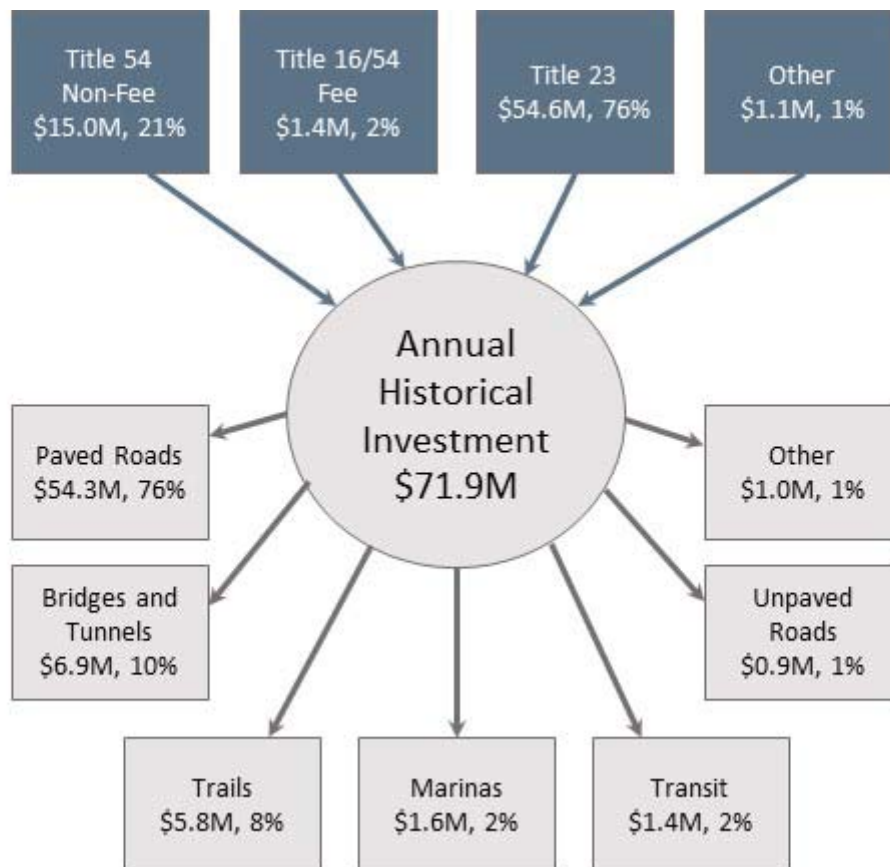
Note: Title 54 was formerly Title 16 in U.S. Code. Change to U.S. Code was made in 2015.



FUNDING SOURCES

The FHWA programs authorized under United States Code (USC) Title 23 and the Department of the Interior programs authorized under USC Title 54 combined to provide nearly 99 percent of the SER's transportation funding. These funds supported 11 types of transportation asset types.²⁰ Of these asset types, paved roads, trails, and road bridges and tunnels received 94 percent of the total investment. Figure 3-6 shows the breakout of average annual funding sources and asset types.

Figure 3-6: SER Average Annual Funding Sources and Expenditures by Asset Types



*Other includes transit systems, transportation-related buildings and miscellaneous assets such as ITS

Title 23 Fund Sources – The Federal Lands Transportation Program (FLTP, formerly known as the Federal Lands Highway Program), unlike other Title 23 federal aid highway programs, is jointly administered by the National Park Service and the FHWA Office of Federal Lands Highway. It was the most significant transportation funding source for the SER during FY06 through FY13. The FLTP constituted 69 percent (\$49.7 million) of the overall historic transportation investment made by the region and the funds were dedicated solely for transportation assets. As part of those FLTP funds, the region has received \$8.1 million per year in FLTP Category II funds, or 11 percent of the overall annual transportation investment. This is noteworthy because these funds are restricted to two congressionally authorized parkways: the Foothills Parkway at Great Smoky Mountains National Park and the Natchez Trace Parkway.

²⁰ Types of assets: paved roads, trails, road bridges, marina, unpaved roads, transit, other, parking, road tunnels, buildings and intelligent transportation systems (ITS).



The other FHWA programs²¹ contributed an additional 8 percent (\$5.7 million) of overall funding to the SER. Ninety-four percent of Title 23 funding was spent on infrastructure improvement (e.g., capital improvement and component renewal) projects.

It should be noted that the FHWA discretionary programs, such as the Scenic Byways, Transit in Parks Program (TRIP), and PLHD, were discontinued under Moving Ahead for Progress in the 21st Century (MAP-21), the successor bill to the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). The FLTP absorbed these previous sources and provides other avenues for funding activities going forward. For example, the following fund sources²² could potentially be accessed to replace some of the funding lost from those discontinued programs:

- ❶ Federal Lands Access Program (FLAP). FLAP provides funds for projects on federal lands access transportation facilities that are located on or adjacent to, or that provide access to Federal lands. Coordination with State DOTs and Metropolitan Planning Organizations is a must.
- ❷ Transportation Alternatives Program (TAP). TAP is a new program to provide for a variety of alternative transportation projects, including many that were previously eligible activities under separately funded programs, such as Transportation Enhancements and Recreational Trails. Federal land management agencies are eligible.
- ❸ Construction of Ferry Boats and Ferry Terminal Facilities. This program funds ferry boat and ferry terminal construction.

Title 54 Fund Sources – The Title 54 (formerly Title 16) program administered by NPS is divided between the non-fee and fee programs. Together, they provided 23 percent (\$16.4 million) of the historic transportation funding for the SER, and 75 percent (\$12.2 million) of Title 54 funding was used to support the O&M of the region’s transportation assets.

As shown in Figure 3-7, the primary Title 54 Non-Fee program includes:

- ❶ Operations of the National Park Service (ONPS) base funding
- ❷ Cyclic Maintenance
- ❸ Repair/Rehabilitation
- ❹ Emergency Storm and Flood Damage
- ❺ Line Item Construction.

Other NPS programs that have contributed a small portion (one percent or \$0.7 million per year) of that \$16.4 million annual total are comprised of, in no particular order: Equipment Replacement, Youth Conservation Corps, Environmental Management, Wildland Fire Management, National Recreation and Preservation, Cultural Resource Preservation, Natural Resource Damage Assessment Fund, Volunteers in Parks, Youth Intern Program and Youth Partnership Program.

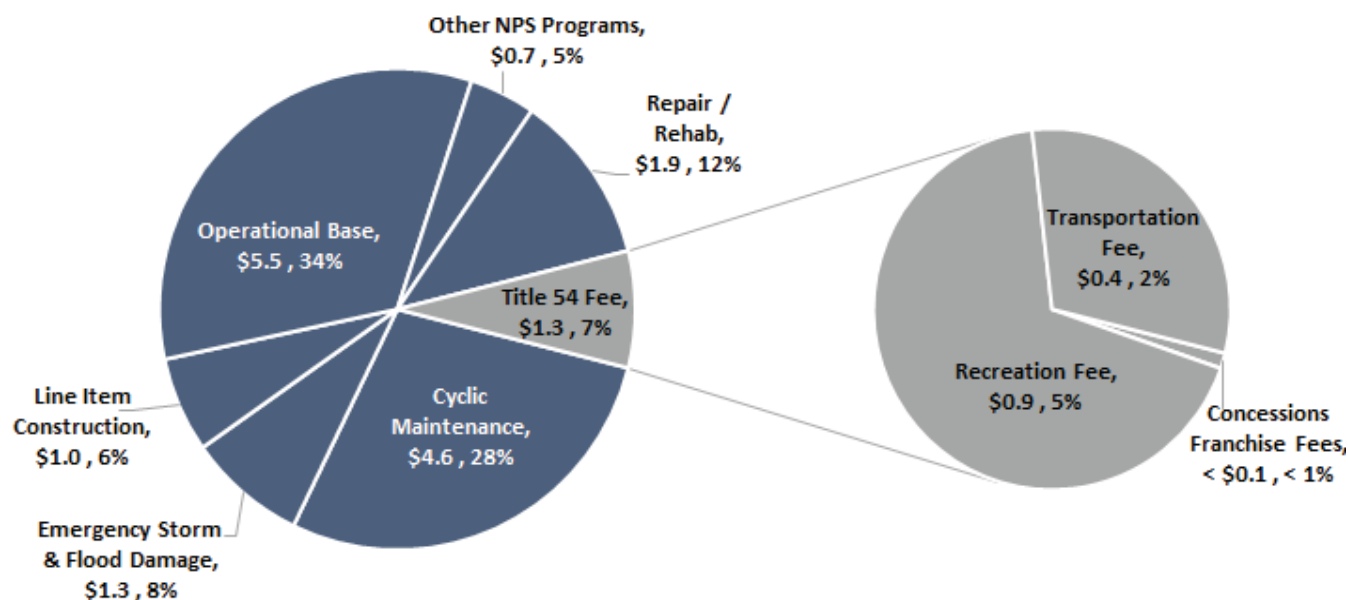
Title 54 Non-Fee represented 21 percent (\$15.1 million) of the region’s transportation funding. ONPS base was the largest Title 54 program for the SER and funded nearly 8 percent (\$5.5 million) of the total transportation investment. Combined, those other sources, including Cyclic Maintenance, Repair/Rehabilitation and Emergency Storm and Flood Damage, represent \$9.6 million or 13 of that 21 percent of total annual spending.

²¹ The other FHWA administered programs include Earmarks, Public Lands Highway Discretionary (PLHD), Other FHWA Programs, Scenic Byways and Emergency Relief for Federally Owned Roads (ERFO). The region received \$17 million in earmarks for the Foothills Parkway from 2006 through 2009. In addition, funds were earmarked for projects at BLRI (\$2.4 million for Rocky Knob Heritage Center and Blue Ridge Music Center), KEMO (\$3.0 million for land acquisition), and OCMU (\$6.2 million for walkways and bridges along river). No earmarks have been received beyond 2009.

²² For additional information on MAP-21 transportation programs, fact sheets are available on the FHWA website. See for reference: www.fhwa.dot.gov/map21/factsheets/, accessed on June 5, 2015.



Figure 3-7: SER Average Annual Title54 Program Transportation Funding, FYI 2006-2013 (in \$ millions)



Source: NPS Administrative Finance System

The NPS was authorized by the U.S. Congress to charge visitors fees to help fund the facilities that the visitors use. Three Title 54 Fee programs—recreation fees, transportation fees²³ and concessions franchise fees—constituted two percent (\$1.3 million) of the region’s historic transportation funding. Fee revenues are directly related to visitation levels and can be impacted by severe disruptions such as the FY13 short duration government shutdown and natural disasters such as Hurricane Katrina. The SER experienced fluctuation in its fee revenue during the last eight years. The smallest amount of fees collected occurred in 2008 (\$82 thousand) and the largest amount of fees collected occurred in 2011 (\$355 thousand).

Transit Operations –The transportation fee (\$0.4 million) was collected from three parks: Castillo De San Marcos National Monument, Cumberland Island National Seashore, and Kennesaw Mountain National Battlefield Park. As per the nature and intended benefit of the Transportation Fee program, all of the transportation fee was spent on O&M for transit system assets.

Other Fund Sources – The SER received one percent (\$1.0 million) of its funding for historic transportation investments from three sources outside of Title 23 and Title 54. The three sources include the Transit in the Parks (TRIP) program, donations and reimbursable agreements. The donations received were from private corporations, nonprofit organizations and individual donors. The reimbursable agreements involved other federal agencies and nonfederal agencies, such as state DOTs and local governments. Similar to the FHWA discretionary programs, the TRIP fund source was discontinued under MAP-21. Projects formerly funded under TRIP may now instead seek funds from the FLAP, which is funded by the FHWA Highway Trust Fund and are administered by the Federal Lands Highway Division Office, whose regional area of responsibility includes the state in question. Funds are distributed by formula among the 50 states, the District of Columbia, and Puerto Rico that contain federal lands managed by the NPS as well as the U.S. Forest Service, the U.S. Fish and Wildlife Service, the Bureau of Land Management, the U.S. Army Corps of Engineers, and other federal executive agencies.²⁴

²³ Similar to the FLTP funding, transportation fees are another funding source dedicated solely to transportation assets.

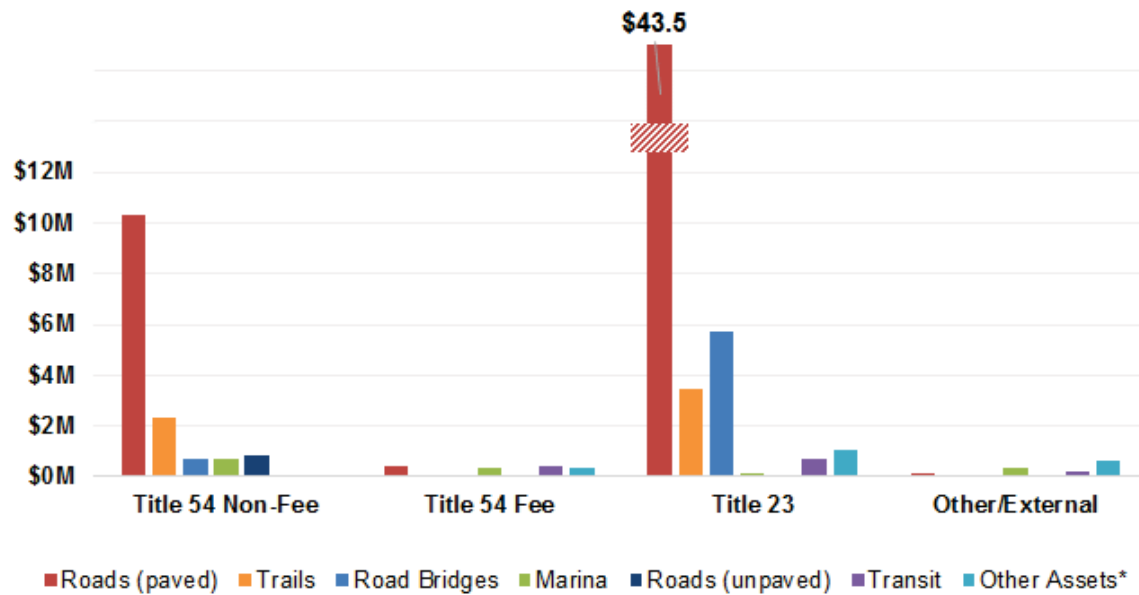
²⁴ For more information, see <http://www.fhwa.dot.gov/map21/factsheets/flap.cfm> (accessed on June 1, 2015).



OBLIGATIONS BY ASSET TYPE AND PROGRAM

The SER operates and maintains 11 different categories of transportation assets. Figure 3-8 shows that paved roads (76%) and road bridges (9%) received the vast majority of transportation investment during the period of FY06 through FY13. Paved roads received the largest amount of funding from any one fund source, which was FLTP funding in the amount of \$39.6 million (55 percent) of the region's annual historic investment for all asset types. Table 3-4 details the SER's funding sources by asset type.

Figure 3-8: SER Historic Average Annual Investments by Work Types, FY 2006-2013 (in \$ millions)



Source: NPS Administrative Finance System

Note: "Other" includes Parking, Road Tunnels, Buildings, ITS and other miscellaneous asset types

**Table 3-4: SER Transportation Funding by Funding Programs and Asset Type**

2006-2013 in \$ Millions*	Roads (paved)	Roads (unpaved)	Road Bridges	Trails	Marina	Transit	Other	Grand Total
Title 54	\$10.7	\$0.9	\$0.8	\$2.4	\$1.1	\$0.5	\$0.0	\$16.4
Title 54 Non-Fee	\$10.3	\$0.9	\$0.7	\$2.4	\$0.7	\$0.1	\$0.0	\$15.1
Operational Base	\$4.8	\$0.0	\$0.0	\$0.7	\$0.0	\$0.0		\$5.5
Cyclic Maintenance	\$2.4	\$0.5	\$0.3	\$1.2	\$0.2			\$4.6
Repair/Rehab	\$0.7	\$0.2	\$0.2	\$0.5	\$0.2			\$1.9
Emergency Storm & Flood Damage	\$0.9	\$0.1	\$0.0		\$0.3	\$0.0	\$0.0	\$1.3
Other NPS Programs	\$0.6	\$0.0	\$0.1		\$0.0			\$0.7
Line Item Construction	\$0.9		\$0.1		\$0.0		\$0.0	\$1.0
Title 54 Fee	\$0.4	\$0.0	\$0.1	\$0.0	\$0.4	\$0.4	\$0.0	\$1.3
Recreation Fee	\$0.4	\$0.0	\$0.1		\$0.3	\$0.0	\$0.0	\$0.9
Transportation Fee						\$0.4		\$0.4
Concessions Franchise Fees	\$0.0		\$0.0		\$0.0	\$0.0		\$0.0
Title 23	\$43.5		\$5.7	\$3.4	\$0.1	\$0.7	\$1.0	\$54.5
PRPP (FLTP)	\$39.6		\$5.4	\$3.4	\$0.1	\$0.7	\$0.4	\$49.7
Earmarks	\$2.5							\$2.5
Public Lands Highway - Discretionary	\$0.7							\$0.7
Other FHWA Programs	\$0.2		\$0.3			\$0.0	\$0.4	\$0.9
Scenic Byways	\$0.3						\$0.2	\$0.5
Emergency Relief for Federally Owned Roads	\$0.2		\$0.0					\$0.2
Other/External	\$0.1	\$0.0	\$0.0	\$0.0	\$0.4	\$0.2	\$0.3	\$1.0
FTA TRIP/ATPPL					\$0.4	\$0.2	\$0.2	\$0.8
Reimbursable Agreements	\$0.1	\$0.0				\$0.1	\$0.1	\$0.3
Grand Total	\$54.3	\$0.9	\$6.5	\$5.8	\$1.6	\$1.4	\$1.3	\$71.9
Percent of Total	76%	1%	9%	8%	2%	2%	2%	100%

Source: NPS Administrative Finance System

* \$0.0 represents values less than \$50,000, blank cells represent no funding

OBLIGATIONS BY LIFECYCLE STAGE

An asset lifecycle is captured in six stages: planning and administration, capital improvement, operations, preventive maintenance, recurring maintenance, component renewal, and disposition. A total cost of facility ownership (TCFO) approach to asset management includes all six lifecycle stages when considering whether or not to invest in constructing a new asset or rehabilitating an existing asset. The SER defines the six asset lifecycle stages as follows:

- **Planning and Administration (PL/Admin)** includes both planning and administrative costs used to identify challenges, needs and alternative solutions prior to implementing a solution.
- **Capital Improvement/New Construction (CI)** includes major new construction projects and investments where none previously existed to address a need.
- **Operations (FO)** includes activities that ensure the day-to-day operation of a transportation asset and system (e.g., plowing, transit operations, mowing).
- **Preventive Maintenance (PM)** includes maintenance tasks performed at least annually to keep an asset in working order (e.g., inspections, cleaning culverts, vegetation control).



- **Recurring Maintenance (RM)** includes maintenance tasks performed on a cycle of 1 to 10 years to improve deterioration that occurred over time (e.g., chip sealing, mill and overlays, restriping).
- **Component Renewal/Recapitalization (CR)** includes the planned replacement of a component or system that will reach the end of its useful life based on condition and lifecycle analysis within the facility's lifetime.
- **Disposition** includes the demolition (dismantling and removal) or surplussing of a deteriorated or otherwise unneeded asset, including necessary clean-up work, during the year in which the need occurred.

Table 3-5 identifies the funding sources used for each work type based on the historic funding analysis from FY2006 to FY2013. The table shows the many connections between fund sources and work types. The region maximizes the productivity of its annual obligations by strategically matching available fund sources to eligible project types.

Table 3-5: SER Transportation Funding (FY06 – FY13) Matrix by Asset Life Cycle Stage

Fund Source	PL	CI	OP	PM	RM	CR	Unassoc
Title 23 FHWA Cat I 3R & 4R	✓	✓			✓	✓	✓
Title 23 FHWA Cat II		✓					
Title 54 Non-Fee Operational Park Base			✓	✓	✓	✓	
Title 54 Non-Fee Cyclic Maintenance	✓	✓	✓	✓	✓	✓	
Title 23 Transportation Earmarks		✓					
Title 54 Non-Fee Repair/Rehab		✓	✓		✓	✓	
Title 54 Non-Fee Emergency Storm & Flood Damage			✓	✓	✓	✓	
Title 54 Recreation Fee 80%		✓	✓	✓	✓	✓	
Title 54 Non-Fee Line Item Construction	✓	✓			✓	✓	
Title 23 FHWA Cat III - ATP	✓	✓			✓	✓	✓
Other/External TRIP/ATPPL	✓	✓					
Title 23 Public Lands Highway - Discretionary		✓			✓		
Title 23 Scenic Byways	✓	✓	✓			✓	
Title 54 Non-Fee Other				✓	✓	✓	✓
Title 54 Recreation Fee 20% and Other Recreation Fee		✓		✓	✓	✓	✓
Title 54 Transportation Fee			✓				
Title 23 Other FHWA Programs	✓	✓			✓	✓	✓
Title 23 FHWA Emergency Relief for Federally Owned Roads					✓	✓	
Other/External Reimbursable Agreements and Donations	✓	✓	✓			✓	✓
Title 54 Concession Franchise Fee 80%		✓	✓	✓	✓	✓	

Source: NPS Administrative Finance System

Notes: PL = Planning / Administration; CI = Component Improvement; OP = Operations; PM = Preventive Maintenance; RM = Recurring Maintenance; CR = Component Renewal

The "unassoc" or unassociated lifecycle stage captures the unknown work types where transportation funding was invested.

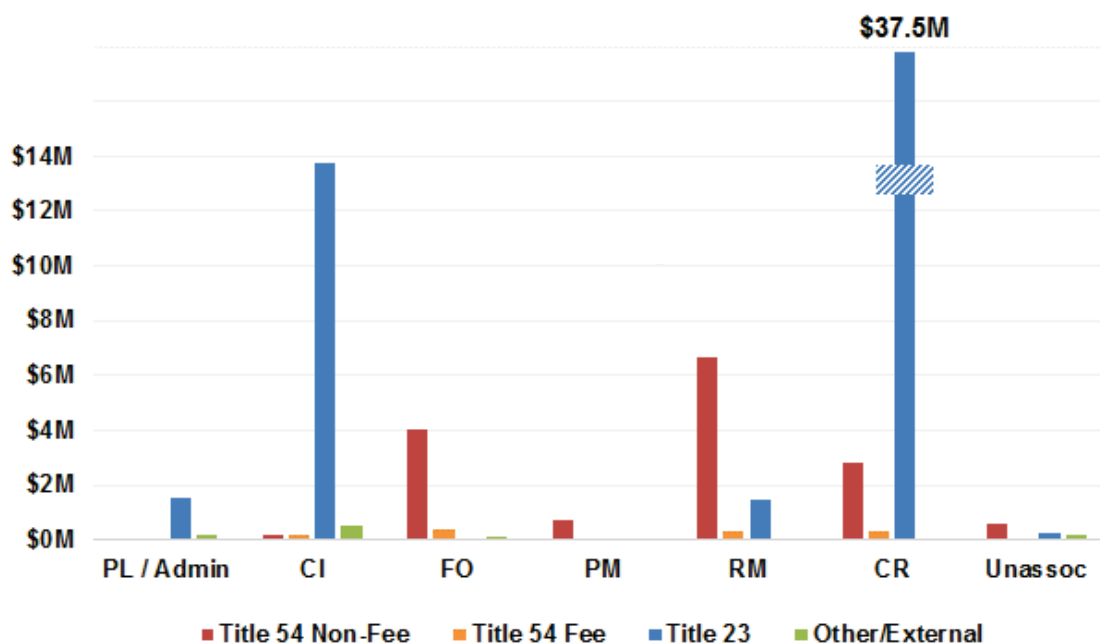


Figure 3-9 shows the amount of project and ONPS funding by funding authorization title dedicated to each asset lifecycle stage. Title 54 amounts include both project and ONPS base funding. Capital improvement, operations, recurring maintenance, and component renewal were the four work types receiving the largest amount of transportation investment, representing 95 percent (\$68.4 million) of total historic investment. Capital improvement and component renewal constituted 67 percent (\$55.3 million) of the total transportation investment, and the Title 23 program was the primary funding source for these expenditures.

Spending for O&M (FO, RM and PM combined) averaged \$13.8 million annually. But notably, minimal O&M spending has been directed to preventive maintenance: just \$0.8 million per year or six percent of the annual O&M spending (and a little more than one percent of all funding).

Title 54 has covered most of the regional spending on O&M: 88 percent or \$12.2 million of the \$13.8 million of annual O&M activities have been funded by Title 54 Fee and Non-Fee dollars over the past eight years (Table 3-6). Operational Park Base funding has been the primary Title 54 Non-Fee O&M spending source; it accounted for 40 percent or \$5.5 million of the \$13.8 million in annual O&M spending. And most of that, \$3.9 million, went directly to FO spending.

Figure 3-9: Average Annual Investments by Funding Program and Lifecycle Stages, FY 2006-2013 (in \$ millions)



Source: NPS Administrative Finance System



Table 3-6: Transportation Funding by Funding Programs and Work Type

2006-2013 in \$Millions	PL	CI	OP	PM	RM	CR	Unassoc	Grand Total
Title 54	\$0.0	\$0.4	\$4.5	\$0.8	\$7.0	\$3.1	\$0.6	\$16.4
Title 54 Non-Fee	\$0.0	\$0.2	\$4.1	\$0.8	\$6.6	\$2.8	\$0.6	\$15.1
Operational Base			\$3.9	\$0.6	\$1.0	\$0.0		\$5.5
Cyclic Maintenance	\$0.0	\$0.0	\$0.1	\$0.0	\$3.8	\$0.7		\$4.6
Repair/Rehab		\$0.2	\$0.1		\$0.9	\$0.8		\$1.9
Emergency Storm & Flood Damage	\$0.0	\$0.0	\$0.1	\$0.1	\$0.9	\$0.3		\$1.3
Other NPS Programs	\$0.0	\$0.0	\$0.0	\$0.0	\$0.1	\$0.0	\$0.6	\$0.7
Line Item Construction	\$0.0	\$0.0			\$0.0	\$1.0		\$1.0
Title 54 Fee	\$0.0	\$0.2	\$0.4	\$0.0	\$0.3	\$0.3		\$1.3
Recreation Fee		\$0.2	\$0.0	\$0.0	\$0.3	\$0.3		\$0.9
Transportation Fee			\$0.4					\$0.4
Concessions Franchise Fees	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0		\$0.0
Title 23	\$1.5	\$13.8	\$0.0	\$0.0	\$1.5	\$37.5	\$0.2	\$54.5
PRPP (FLTP)	\$0.7	\$10.6			\$0.9	\$37.5	\$0.0	\$49.7
Earmarks		\$2.5						\$2.5
Public Lands Highway - Discretionary		\$0.4			\$0.3			\$0.7
Other FHWA Programs	\$0.6	\$0.0	\$0.0	\$0.0	\$0.1	\$0.0	\$0.2	\$0.9
Scenic Byways	\$0.2	\$0.3	\$0.0			\$0.0		\$0.5
Emergency Relief for Federally Owned Roads					\$0.2	\$0.0		\$0.2
Other/External	\$0.2	\$0.6	\$0.1			\$0.0	\$0.2	\$1.0
FTA TRIP/ATPPL	\$0.2	\$0.6						\$0.8
Reimbursable Agreements		\$0.0	\$0.1			\$0.0	\$0.2	\$0.3
Grand Total	\$1.7	\$14.7	\$4.6	\$0.8	\$8.4	\$40.6	\$1.0	\$71.9
Percent of Total	2.4%	20.4%	6.4%	1.1%	11.7%	56.5%	1.4%	100.0%

Source: NPS Administrative Finance System

Notes: PL = Planning / Administration; CI = Component Improvement; OP = Operations; PM = Preventive Maintenance; RM = Recurring Maintenance; CR = Component Renewal
 Unassociated entries did not have sufficient data to be associated with a work type
 \$0.0 represents values less than \$50,000



4 Safety

Visitor and staff safety should be a top priority for the National Park Service. As such, SER has made safety a standalone goal in the LRTP process. The SER seeks to incorporate the 4 E's of safety—engineering, education, enforcement, and emergency response—in all aspects of its transportation system while remaining sensitive to the mission of the National Park Service and the unique needs of natural and historic resources. A lack of reliable safety data, however, has compromised the region's ability to effectively and efficiently assess safety conditions at its park units.

Crash Experience

More than 17,000 crashes—an average of 1,110 crashes per year—were reported to have occurred in SER park units from 1990–2005.²⁵ Nearly 80 percent of those crashes occurred at three park units: Blue Ridge Parkway, Great Smoky Mountains National Park, and Natchez Trace Parkway (Table 4-1). These parks also have the most lane miles of park roads (63 percent of total lane miles) and account for nearly half of the region's total visits. The 17,000 crashes in the SER represents approximately 16 percent of all reported crashes in the NPS system during that time period; the SER had the third highest number of crashes out of seven NPS regions.

Table 4-1: Crash Severity by SER Park Unit, 1990-2005

Park Unit	Fatality (% of SER Fatality)	Injury (% of SER Injury)	Property Damage Only (% of SER PDO)	Total Crashes (% of SER Total)
Natchez Trace Parkway	82 (35%)	2,013 (27%)	1,691 (17%)	3,786 (21%)
Blue Ridge Parkway	72 (31%)	2,615 (35%)	3,102 (31%)	5,789 (33%)
Great Smoky Mountains National Park	55 (23%)	2,017 (27%)	2,565 (26%)	4,637 (26%)
Chickamauga and Chattanooga National Military Park	7 (3%)	195 (3%)	522 (5%)	724 (4%)
Cape Hatteras National Seashore	5 (2%)	62 (1%)	253 (3%)	320 (2%)
Gulf Islands National Seashore	4 (2%)	97 (1%)	84 (1%)	185 (1%)
Mammoth Cave National Park	3 (1%)	117 (2%)	580 (6%)	700 (4%)
Cumberland Gap National Historical Park	3 (1%)	131 (2%)	223 (2%)	357 (2%)
Kennesaw Mountain National Battlefield Park	2 (1%)	96 (1%)	194 (2%)	292 (2%)
All Other Parks	3 (1%)	176 (2%)	802 (8%)	981 (6%)
SER Total	236	7,519	10,016	17,771

Source: National Park Service. Servicewide Traffic Accident Reporting System (STARS) database. 1990-2005.

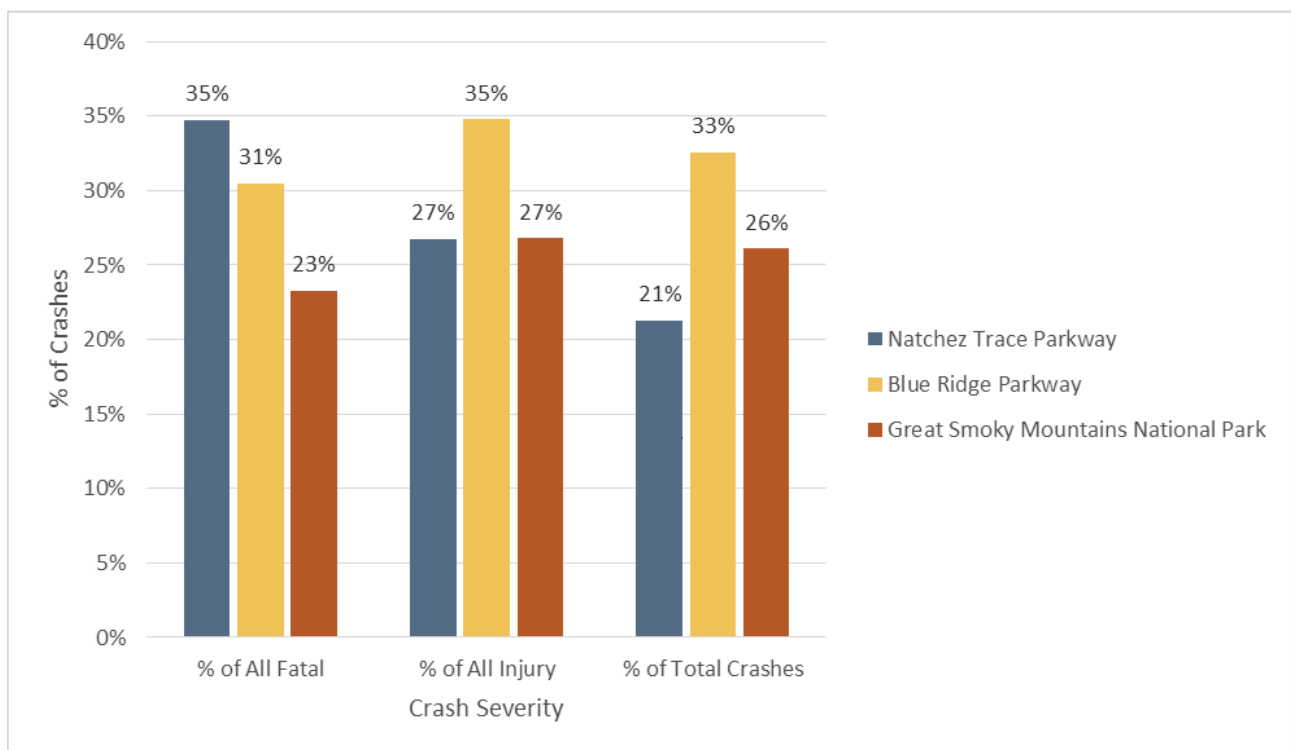
²⁵ National Park Service, Servicewide Traffic Accident Reporting System (STARS). Accessed April 2015. While more recent crash data are available for some individual park units, the STARS crash data for 1990-2005 represents the most complete available dataset for the SER, and is consistent with the dataset and timeframe used to analyze crash data in the National NPS LRTP and other regional LRTP efforts.



Natchez Trace Parkway, Blue Ridge Parkway, and Great Smoky Mountains National Park accounted for approximately 88 percent of both fatal crashes and injury crashes in the region (Figure 4-1). More than one-third of fatal crashes in the SER occurred in Natchez Trace Parkway during the time period from 1990 to 2005. The SER accounted for nearly 30 percent of all fatal crashes and 23 percent of all injury crashes in the NPS system during that time period.

It is important to note, however, that many park units in the SER have worked to address safety concerns in recent years, meaning that the safety conditions cited here may not be representative of the current conditions or trends. For example, Blue Ridge Parkway conducted a Road Safety Assessment (RSA) for a 57-mile segment of the motor road in 2012. The RSA assessed safety conditions and identified safety issues in the study area and developed options for countermeasures the park could implement to address those issues.

Figure 4-1: Crash Severity for Blue Ridge Parkway, Natchez Trace Parkway, and Great Smoky Mountains NP, 1990-2005

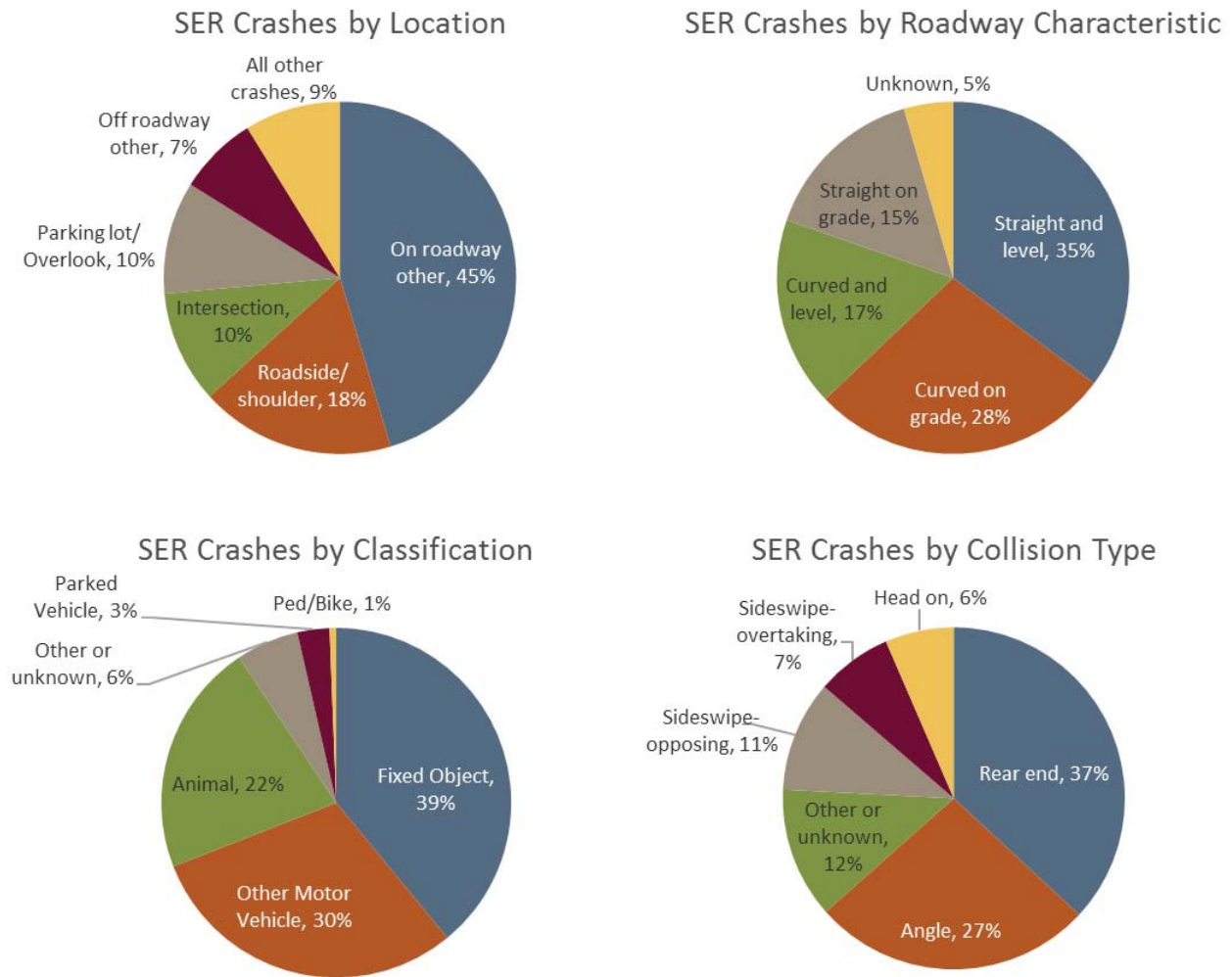


Source: National Park Service. Servicewide Traffic Accident Reporting System (STARS) database. 1990-2005.

Approximately 40 percent of SER crashes involved a motorized vehicle striking a fixed object. Nearly one-third of crashes involved multiple vehicles, and a majority of those multiple-vehicle crashes were either rear-end or angle crashes. Wildlife-Vehicle collisions made up 22 percent of all SER crashes, compared to 10 percent for the NPS systemwide. Figure 4-2 summarizes crash conditions for all SER crashes between 1990 and 2005.



Figure 4-2: SER Crash Conditions for All Crashes, 1990-2005

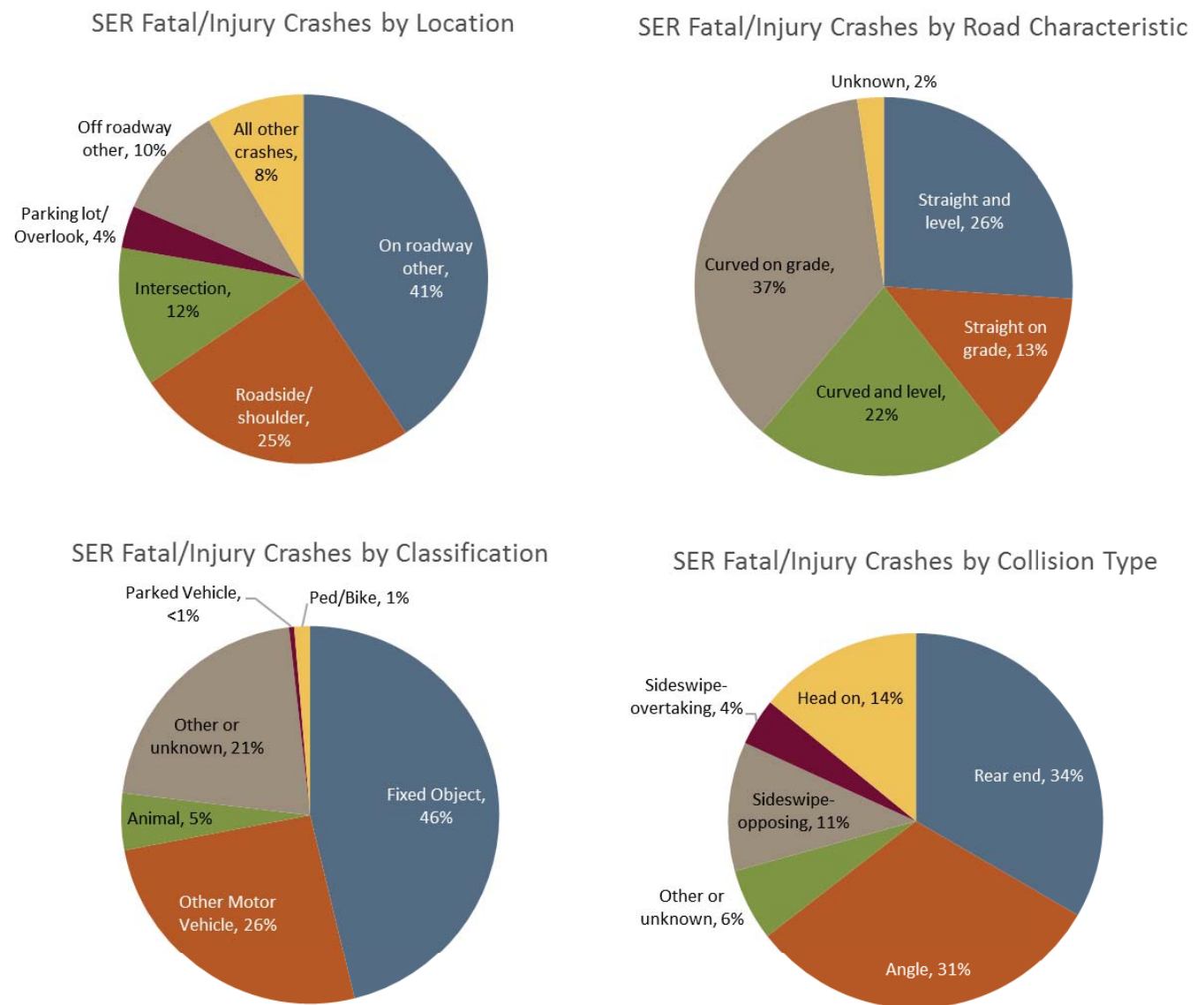


Source: National Park Service. Servicewide Traffic Accident Reporting System (STARS) database. 1990-2005.

Nearly half (48%) of all SER fatal and injury crashes involved a vehicle striking a fixed object, and more than a third (37%) occurred on roadway sections that featured both horizontal and vertical curves. Approximately 26 percent of SER fatal and injury crashes involved multiple vehicles; of those crashes involving multiple vehicles, 65 percent were either rear-end or angle crashes. Figure 4-3 summarizes crash conditions for SER fatal and injury crashes between 1990 and 2005.



Figure 4-3: SER Crash Conditions for Fatal and Injury Crashes, 1990-2005



Source: National Park Service. Servicewide Traffic Accident Reporting System (STARS) database. 1990-2005.

Multimodal Safety

Pedestrian and bicycle crashes accounted for less than one percent of all reported crashes in the SER between 1990 and 2005. There were a total of 346 reported pedestrian and bicycle crashes in the SER during that period. Blue Ridge Parkway (33%), Great Smoky Mountains National Park (25%), and Natchez Trace Parkway (14%) accounted for nearly three-quarters of all reported pedestrian and bicycle crashes in the region.

Intermodal conflicts were cited as an issue at each of the nine SER LRTP Focus Parks, with conflicts between vehicles and pedestrians/bicyclists of greatest concern. Marked crossings and informal crossings of roadways were most frequently cited as hotspots for intermodal conflicts; however, the highest degree of concern involved situations in which motor vehicles, pedestrians, and bicyclists occupy the same space. Most notable among these locations were Kennesaw Mountain Drive at Kennesaw Mountain National



Battlefield Park; the Blue Ridge Parkway motor road; and Big South Fork National River and Recreation Area roads that have been redesignated as multiuse trails but still carry low volumes of motorized vehicles. To a lesser degree, park staff also expressed concern over nonmotorized conflicts between pedestrians and bicyclists and between pedestrians and horses.

Water safety is another area of focus in the SER, particularly given the relatively large number of park units with water-based transportation systems and recreational activities. Fort Sumter National Monument is exploring ways to improve water safety by restricting private boat access and by changing the way in which park staff travel to the fort. Mammoth Cave National Park is actively working to reduce conflicts among ferry, canoe, and kayak traffic.

Safety Factors

Visitor safety should be paramount to park units in the SER and to the quality of visitor experiences. According to a survey of SER park superintendents conducted in fall 2014, one-quarter (24%) of park units within the region report that safety improvements are of the “Highest” priority level, while over half (56%) report that safety improvements are of “High” priority. The perceptions and importance of safety strategies within the region are discussed briefly below.

EDUCATION

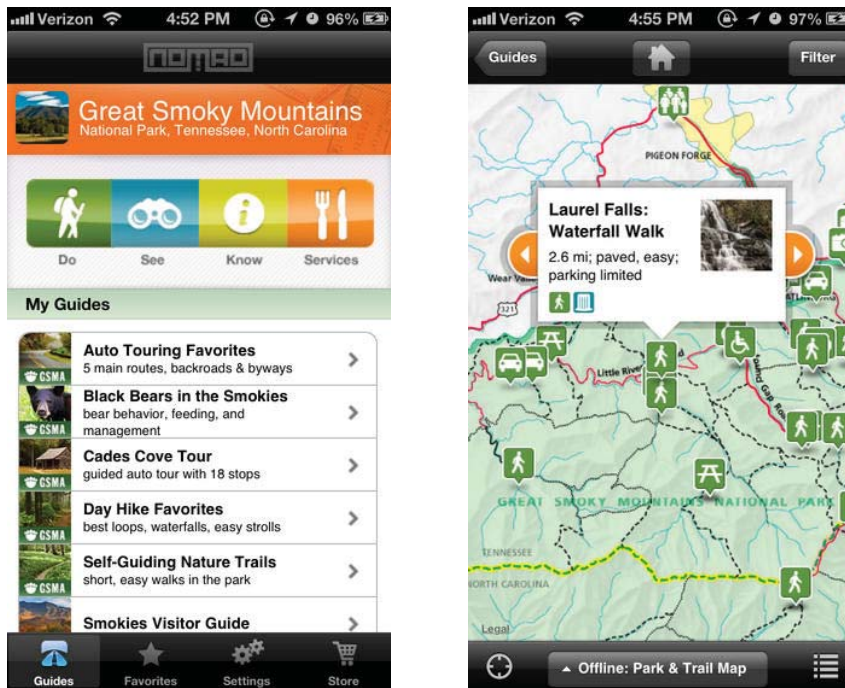
Park units provide safety measures within their boundaries through visitor education concerning various safety risks and requirements. There are multiple methods by which park units can educate visitors including information on their website; signage along roadways; and through interpretive and informational sessions. For example, Fort Sumter National Monument and Gulf Islands National Seashore (West Ship Island district) provide safety instructions to passengers aboard their ferries en route to the park unit.

Additionally, ITS components, such as highway advisory radios (HAR) and variable message signs (VMS), can be used to inform visitors of recent updates or changes that require their attention. In the survey, it was found that only 17 percent of park units felt that VMS should be given the Highest priority for funding. Very few park units in the region report having VMS (30%) or HAR (26%), and, generally speaking, park units feel that VMS and HAR are unimportant to visitors (65% to 70%).

New and innovative technologies are being used both outside and within NPS unit boundaries to inform the public about all sorts of issues. As an example, Great Smoky Mountains Association; a partner of Great Smoky Mountains National Park, has developed a smartphone app that includes information about on wayfinding, recreational activities, safety tips around wildlife, and congestion management (Figure 4-4).



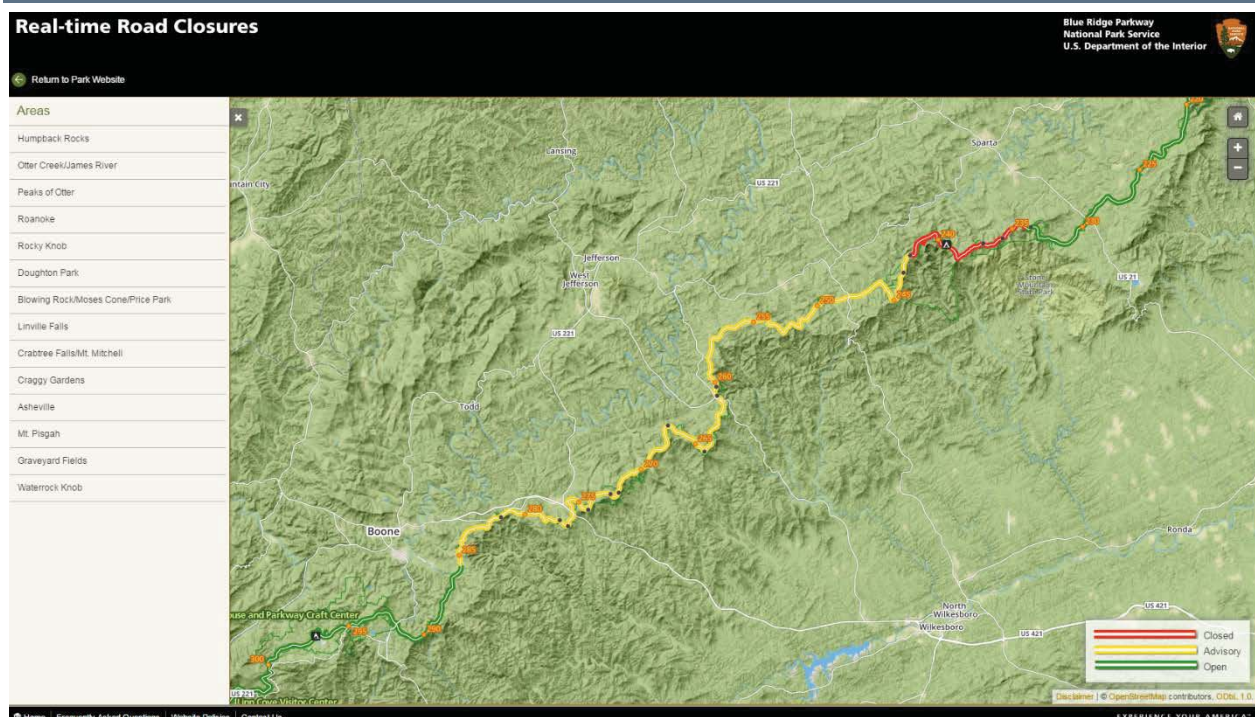
Figure 4-4: Great Smoky Mountains National Park Mobile App



Source: http://www.nomadmobileguides.com/examples_of_travel_apps/gsma/

Blue Ridge Parkway has developed a web application to notify the public of park closures, and employs digital interns to help update social media during weather events (Figure 4-5). Park Rangers have begun using photos to show roadway conditions and help the public understand why certain road segments are closed during periods of severe inclement weather.

Figure 4-5: Blue Ridge Parkway Real-time Road Closures Web Application



Source: www.nps.gov/maps/blri/road-closures/



ENGINEERING, ENFORCEMENT, AND EMERGENCY RESPONSE

In addition to educating visitors about safety guidelines and potential hazards, the NPS must engineer transportation infrastructure to be safe, enforce the rules and regulations, and provide adequate responses to emergencies as they arise.

For engineering, the NPS works closely with its own Denver Service Center, FHWA, and state DOTs to develop safety countermeasures in an attempt to reduce risks to both visitors and staff on NPS transportation facilities. Examples of such countermeasures in the SER include the installation of rumble strips, median barriers, lighting, and steel-back timber guardrail on the Blue Ridge Parkway; and installation of profile edge markings near bridge approaches on Natchez Trace Parkway.²⁶

For enforcement, NPS law enforcement rangers work closely with local and state law enforcement and other FLMA law enforcement personnel to ensure effective and consistent enforcement of federal, state, and local traffic regulations. Great Smoky Mountains National Park and Blue Ridge Parkway have partnered with local law enforcement agencies to establish sobriety checkpoints on and near NPS roadways. These actions have resulted in increased levels of enforcement and have helped raise public awareness of the risks and consequences of driving under the influence.

NPS staff partner with state and local police, fire, and emergency services to ensure timely emergency response. Fort Sumter National Monument maintains an agreement with the U.S. Coast Guard to provide airlift support in cases involving serious injury to visitors or staff at the fort, while Great Smoky Mountains National Park has an agreement with University of Tennessee Medical Center for emergency helicopter services.

UNIT-LEVEL SAFETY STUDIES

A number of SER park units have evaluated safety issues on specific segments or elements of their transportation networks in the past several years, including the aforementioned Road Safety Audit conducted by Blue Ridge Parkway in 2012. Other such recent activities have included:

- ❶ **Natchez Trace Parkway, Safety and Engineering Assessment (2014).** This assessment, conducted by FHWA-EFLHD, analyzed the impact of a new commercial development on the northern terminus of the Parkway at SR 100 in Davidson County, TN. Short-term recommendations included changes to signage and pavement markings, with a long-term recommendation to realign and relocate the ramp terminal.
- ❷ **Gulf Islands National Seashore, Davis Bayou Safety Study (2013).** This study, conducted by FHWA-EFLHD, assessed the need for pedestrian and bicycle accommodations in the Davis Bayou Area. The study found that, based on existing ped/bike volumes, traffic volumes, and traffic speeds, there is a need for additional ped/bike facilities in the area. The study recommended a number of short-term improvements that included additional signage and pavement markings, installation of speed tables, and guardrail upgrades, and laid out three longer-term improvements that included creation of a new multiuse path, bike lanes, and shoulder widening.
- ❸ **Blue Ridge Parkway, Road Safety Assessment (2012).** This assessment, conducted as part of an FHWA pilot to promote Road Safety Audits on federal and tribal lands, evaluated safety conditions along the full length of the parkway. The study found that the highest priority safety issues involved roadway condition and maintenance, motorcycle crashes, vehicle speeds, intersection crashes, and curve crashes. The assessment featured systemic countermeasures to be implemented throughout the park or within park districts, and to include both design treatments and educational outreach.

²⁶ National Park Service, Draft National Long Range Transportation Plan, 2014.



- **Chickamauga and Chattanooga National Military Park, Traffic and Safety Assessment (2012).** In conjunction with the planning and design of a resurfacing project for Lafayette Road, which provides the primary north-south access through the park, FHWA-EFLHD evaluated the feasibility of making pedestrian/bike improvements at the intersection of Lafayette Road and McFarland Gap/Reed's Bridge Road at the northern entrance to the park. FHWA-EFLHD evaluated the feasibility of installing a roundabout at the study intersection, bike lanes along Lafayette Road, and improved traffic circulation at the Visitor Center parking lot. The report recommended installation of a modern roundabout at the study intersection; installing a new shared use path to separate ped/bike traffic from vehicular traffic; and relocating the main Visitor Center driveway and reducing the driveway width and installing additional signage and pavement markings in the vicinity of the Visitor Center.
- **Virgin Islands National Park, North Shore Road Safety and Engineering Assessment (2011).** FHWA-EFLHD conducted a safety assessment of North Shore Road and other roadways, with a focus on candidate locations for guardrail installation, storm water runoff management, and paving needs. The report provided detailed recommendations for specific locations on park roads, including guardrail and barrier installation, signage, culvert cleaning, and new pavement surface and overlay, along with cost estimates for recommended improvements.
- **Everglades National Park, Main Park Road Passing Zone Study (2009).** This study evaluated existing passing zones along the Main Park Road, as well as the potential for safety mitigating measures along the study roadway. Based on analysis of existing traffic, speed, and crash data, and a field evaluation conducted by FHWA-EFLHD, the study recommended specific locations for establishing no passing zones. The study also recommended additional safety countermeasures along the Main Park Road, including installation or reconfiguration of rumble strips, striping, and signage along the roadway.
- **Vicksburg National Military Park, Main Entrance Safety Study (2008).** FHWA-EFLHD conducted a safety evaluation at the main entrance to the park and along the roadway entering the park. Based on an analysis of existing traffic, speed, and crash data, and a field evaluation, the report recommended a number of safety countermeasures, including increased parking capacity in the vicinity of the park entrance, geometric improvements, ped/bike improvements, and institution of alternative fee collection methods to reduce congestion.
- **Cumberland Gap National Historical Park, Road Safety Audit (2007).** This Road Safety Audit, which was led by FHWA-EFLHD staff, evaluated safety performance in the vicinity of the Cumberland Gap National Historical Park tunnels on the Tennessee side of the park. The RSA report recommended site-specific countermeasures that included additional warning signage and chevrons, installation of rumble strips, guardrail and barrier installation, shoulder widening, and geometric improvements.



SAFETY DATA

According to the survey of SER park superintendents, most units (74%) report that safety data are important to their unit, and the majority of respondents (67%) feel that the quality of their safety data is adequate. However, despite this finding, the adequacy of crash data appears to be a problem throughout the NPS, and has made it difficult to properly evaluate current safety conditions in the SER. The lack of recent and reliable region-wide crash data meant that the crash analysis for this Baseline Conditions Assessment report was only able to draw upon Servicewide Transportation Analysis and Reporting System (STARS) data from 1990 to 2005, rather than more recent crash data for the 2006-2014 time period. Given that Blue Ridge Parkway, Great Smoky Mountains National Park, and Natchez Trace Parkway account for 80 percent of all SER crashes and 88 percent of fatal and injury crashes suggests that initial efforts to improve safety data reporting could begin with a focus on these three park units.

During the Focus Park visits in fall 2014, multiple NPS staff members expressed their frustration with the Incident Management and Reporting System (IMARS), which replaced STARS as the Department of the Interior's primary traffic safety management system. This frustration with IMARS—due in part to technical glitches and in part to the level of effort required to enter data into the system—has led to inconsistent use of the system by law enforcement rangers and other NPS staff, thereby limiting the utility of available crash data. The WASO Traffic Safety Program is currently compiling recent (post-2005) crash data on a park-by-park basis, but a comprehensive database of region-wide crash data since 2005 does not exist at this time.



5 Visitor Experience, Access and Mobility

Transportation within national parks involves more than getting from point to point in the traditional concept of transportation planning. It also includes providing visitor access, mobility, and connectivity to the many unique cultural, historical, and natural features that are being managed by the National Park Service (NPS). Visitors' use of the transportation network itself is also often part of the visitor experience. In addition, public use of the transportation network within national parks by commuters and other non-visitors impacts an already complex visitor experience associated with travel to, from, and within park units. Understanding these experiences is important to knowing how best to invest in and manage the transportation system within the SER and in planning for future transportation enhancements within the region. As part of the LRTP process, the SER will need to continue to plan for and provide the highest quality visitor experiences.

Visitor Use and Characteristics

Visitor use data provide information on how many people are visiting SER park units, who those visitors are, and how they access the parks. The principal sources of such data are the NPS Public Use Statistics Office (PUSO) visitation data and NPS Visitor Services Project (VSP) visitor surveys.

The NPS PUSO collects information about visitor use in park units. PUSO data are available for 63 of the 66 units within the SER. These data include information about the number of visitors to a park unit in a specific month or year and number of recreation or non-recreation visitors. Additionally, the PUSO data may include information about visitor use at specific locations in the park, or specific activities (e.g., RV or tent camping).

The NPS VSP conducts visitor surveys at park units nationwide. In the past, a number of park units were surveyed each year, and all parks were expected to have such surveys completed on roughly a 10-year cycle; however, funding and resource limitations have slowed this schedule. These surveys are used to provide a view of visitor characteristics in SER park units. Survey questions asked at each park are typically unique to the park unit, although a subset of consistent questions is asked of every park to provide comparable results across all units. Of the 66 park units in the SER, 27 units have had a VSP study conducted and had data available for analysis. The most recent VSP study in the SER was conducted in 2013 and the oldest in 1991. This data set includes information about SER visitors such as visitor demographics, group size, activities visitors participated in specific to individual park units, and importance of different activities to the visitor experience.

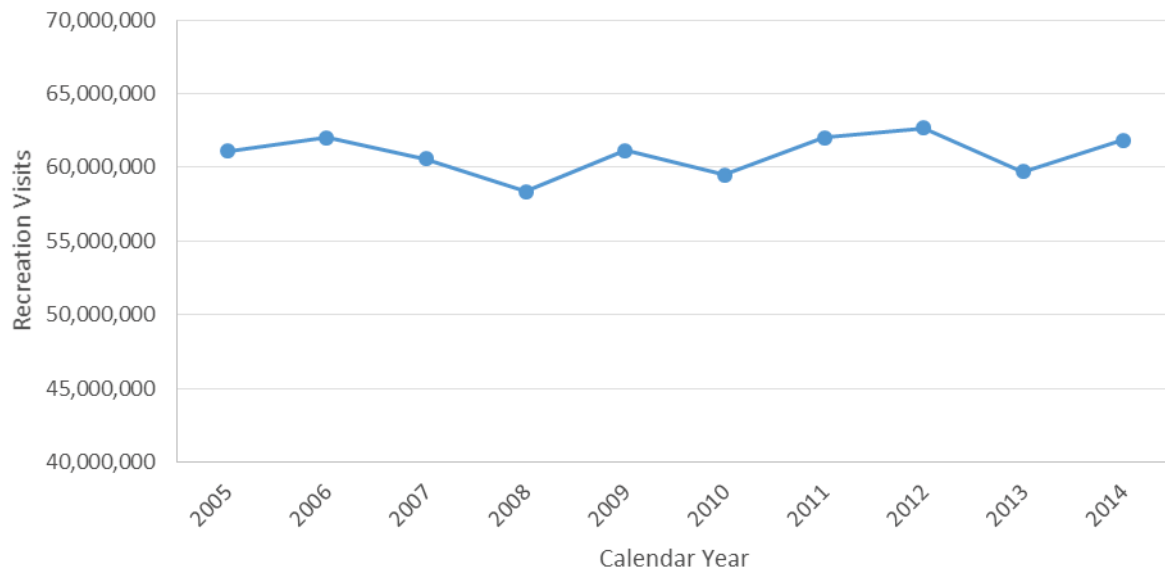
In addition to the available NPS datasets, the SER Superintendent Transportation Survey results were used to assess park manager perceptions of transportation network conditions, and the potential impact these have on visitor experiences within their park unit currently and looking ten years in to the future.



VISITATION

As reported by the NPS PUSO, the SER hosted approximately 62 million recreation visits during calendar year 2014. This was an increase from about 60 million visitors during 2013. During 2014, the SER accounted for about one-fifth of the total visitation experienced across all regions nationally. While visitation has remained relatively flat over the past 10 years, the region has experienced an average annual growth of approximately 1 percent per year since 2010. Figure 5-1 displays the total annual visitation data for the SER for the past 10 years from 2005 through 2014.

Figure 5-1: SER visitation (2005 – 2014)

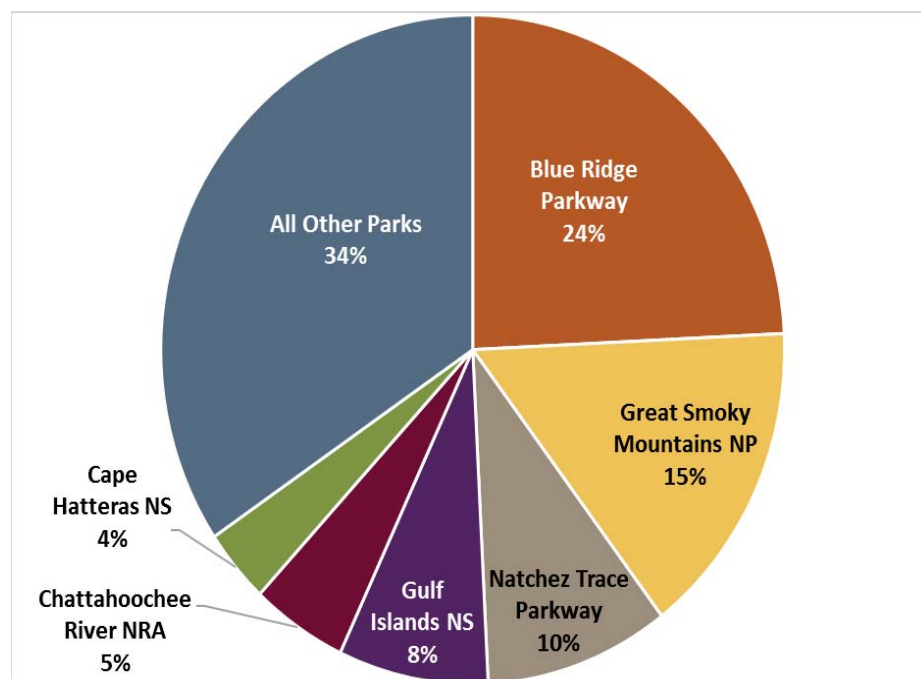


Source: National Park Service, Public Use Statistics Office. Annual Recreation Visitation by Park Unit. 2005-2014. Data: 63 park units.

Six park units (of the 63 with visitation data) make up close to two-thirds of the total visitation of the region (Figure 5-2). The Blue Ridge Parkway experiences close to one-quarter (24%) of the total number of recreation visits within the region. Great Smoky Mountains National Park (15%) and Natchez Trace Parkway (10%) also contribute substantial portions of the total visitation within the SER as well. The next three most frequently visited units were Gulf Islands National Seashore (8%), Chattahoochee River National Recreation Area (5%), and Cape Hatteras National Seashore (4%).



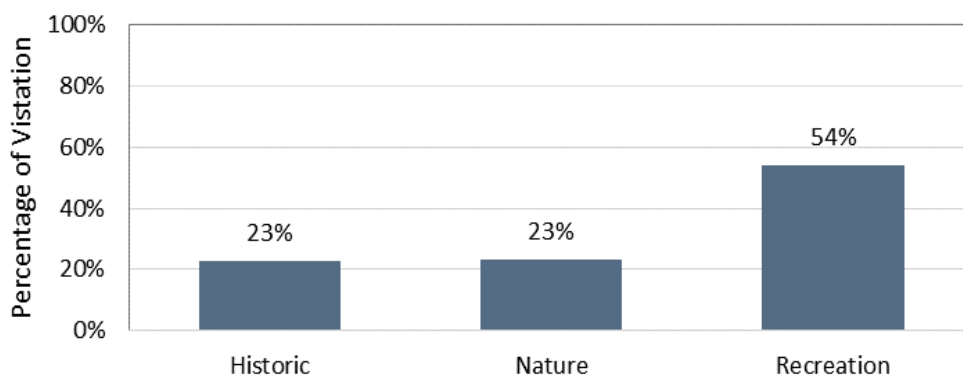
Figure 5-2: Proportion of SER visitation, by park unit



Source: National Park Service, Public Use Statistics Office. Annual Recreation Visitation by Park Unit. 2009-2014.

Each park unit tends to have a mission focused on one of three categories: historical or cultural content (e.g., Kennesaw Mountain National Battlefield Park); nature-based parks (e.g., Great Smoky Mountains National Park); or recreation-based park units (e.g., Big South Fork National River & Recreation Area). A potential fourth category of SER park units could be classified as parkways, which likely have slightly different visitor trip motivations and experiences; this category was not included in this analysis, as a small proportion of SER park units are classified as parkways. The park types influence the transportation patterns, requirements, and expectations that visitors will have when they visit the park unit. Visitation to park units within the region is most heavily concentrated at recreation-based park units, which account for over half (54%) of annual visitation to the region (Figure 5-3), yet account for only roughly 15 percent of the total number of park units within the region. By contrast, two-thirds (67%) of SER park units are historical or cultural-based, and 23 percent of region visitation occurs at these historical park units and nature-based park units.

Figure 5-3: Proportion of SER visitation, by park type

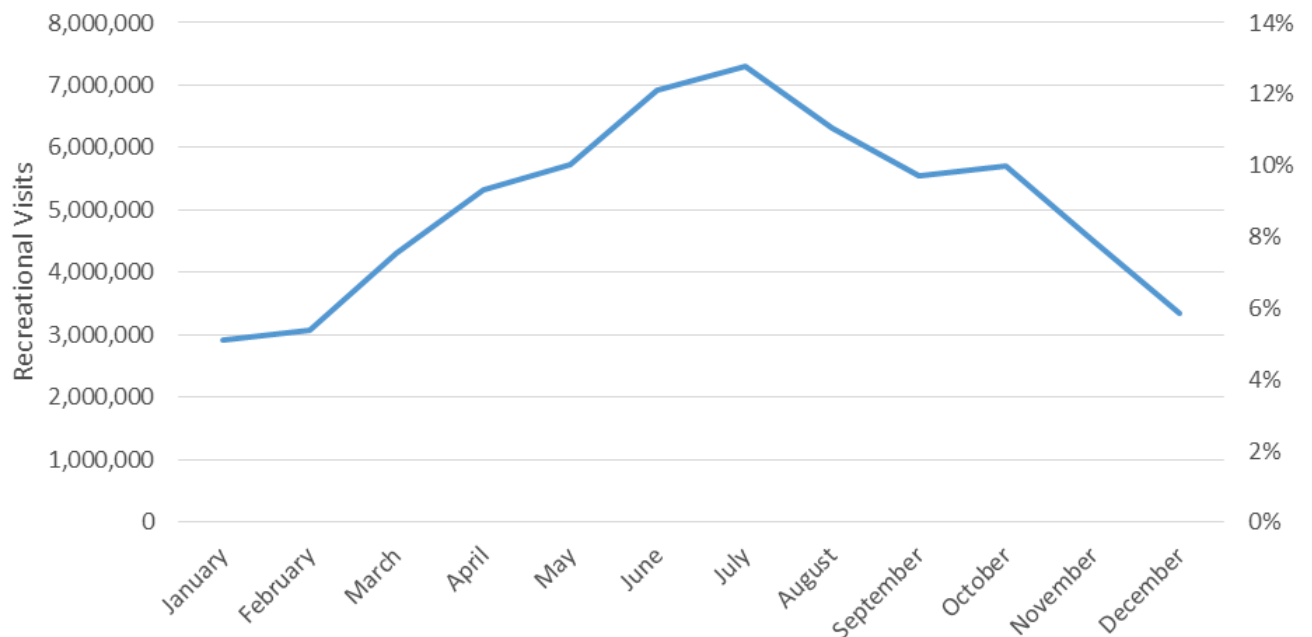


Source: National Park Service, Public Use Statistics Office. Annual Recreation Visitation by Park Unit. 2009-2014.



While overall annual visitation is a useful metric for understanding relative magnitude of visitation within the SER, seasonal patterns of use exist within the region. This information can be used to help plan for fluctuations in visitation throughout the year within the region. Figure 5-4 displays the monthly average of visitation across all park units within the region. As might be expected, the visitation peaks within the summer months (May to August) when approximately half of the total annual regional visitation takes place. Additionally, a bump in visitation occurs in October, coinciding with fall foliage season along the parkways within the SER.

Figure 5-4: SER monthly visitation

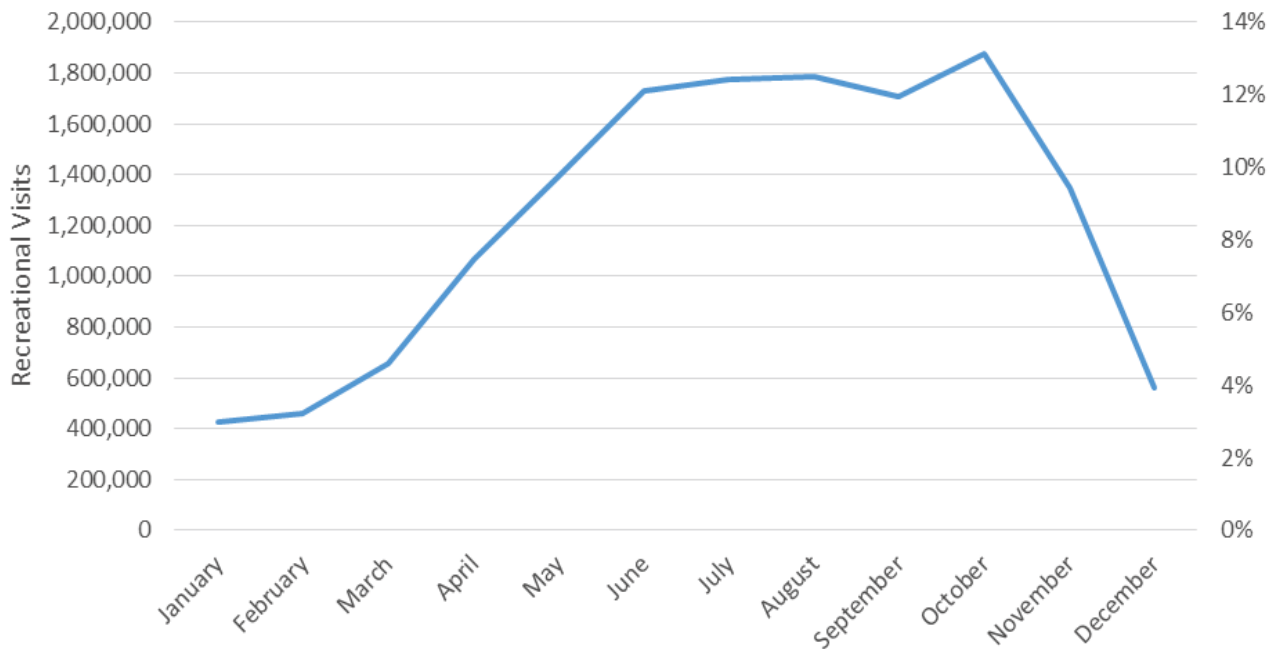


Source: National Park Service, Public Use Statistics Office. Annual Recreation Visitation by Park Unit. Averages for 2009-2014.

While the overall average monthly visitation experienced in the entire SER is concentrated mostly during the summer months, each park unit may experience its own seasonal pattern of visitation. For example, Figure 5-5 displays the average monthly visitation for the Blue Ridge Parkway, which experiences its peak monthly visitation of about 13 percent during October (the peak fall foliage season), but has relatively similar visitation of about 12 percent each month between the period of June through October. In contrast, Everglades National Park (Figure 5-6) experiences its peak visitation during the winter/early spring months between December and April. These unique patterns must be more explicitly considered when planning for transportation needs within the SER, as transportation needs throughout the year vary widely by park unit.

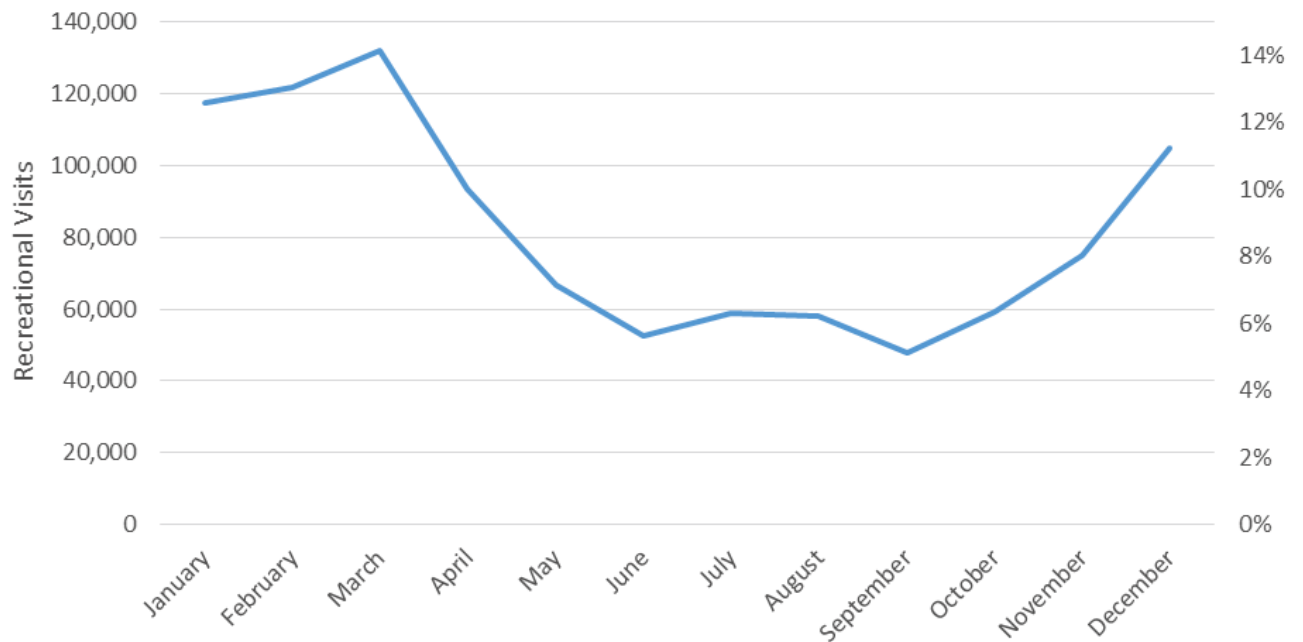


Figure 5-5: Blue Ridge Parkway monthly visitation



Source: National Park Service, Public Use Statistics Office. Annual Recreation Visitation by Park Unit. Averages for 2009-2014.

Figure 5-6: Everglades National Park monthly visitation



Source: National Park Service, Public Use Statistics Office. Annual Recreation Visitation by Park Unit. Averages for 2009-2014.

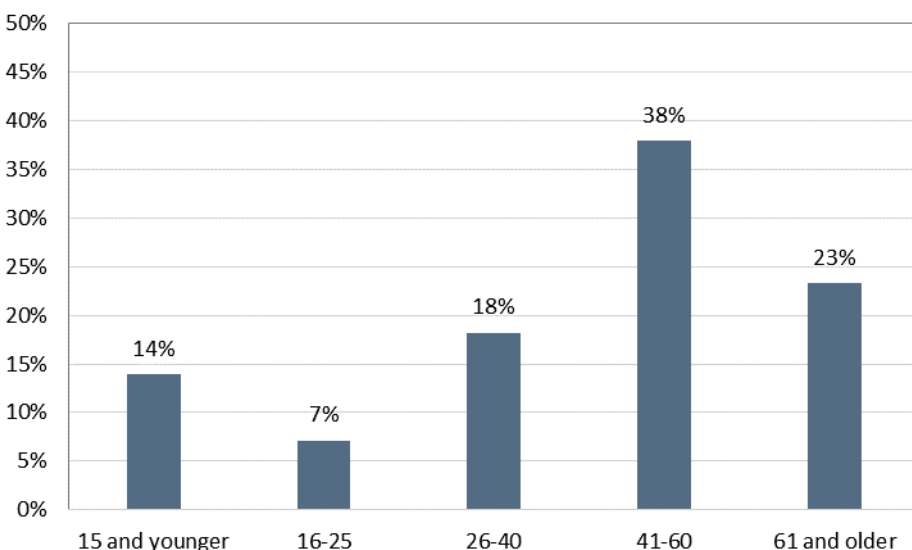


VISITOR CHARACTERISTICS

Visitor characteristics were derived from the NPS VSP and are specific to the SER. Visitor characteristics inform the LRTP development by providing some perspective on the transportation needs of visitors. For example, a park unit that hosts many out-of-state or non-local visitors should make sure to provide adequate pre-visit information and wayfinding to help inform these visitors about the park and how to move around the park. Additionally, a park that is a tourist destination should make plans to accommodate many groups arriving in individual vehicles by providing sufficient parking or incentivizing mode shifts. As with all regionally summarized data, the information presented provides a snapshot of visitors throughout the region; individual park units may exhibit different trends that are reflective of varying park missions, attraction types, geographic locations, and visitor motivations.

Age: Based on a review of past visitor survey data, the majority of visitors to SER park units (61%) are over the age of 40 with 23 percent age 61 or older (Figure 5-7). Similar age distributions are observed at other NPS park units across the country. This age demographic can influence how visitors interact with and use transportation getting to and within SER park units. Specifically, comfort with and familiarity with alternative modes of transportation and how visitors obtain information varies across age groups.

Figure 5-7: Age of visitors to SER park units

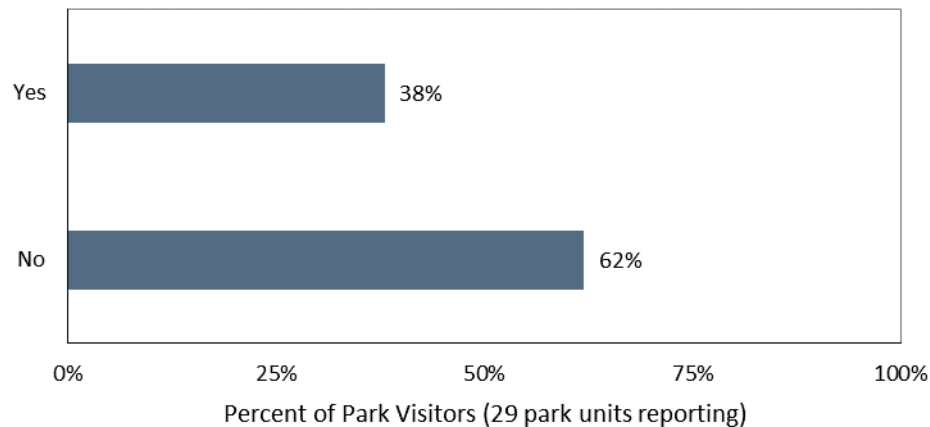


Source: University of Idaho Park Studies Unit, Visitor Services Project. SER park units 1991-2013. Compiled by RSG.



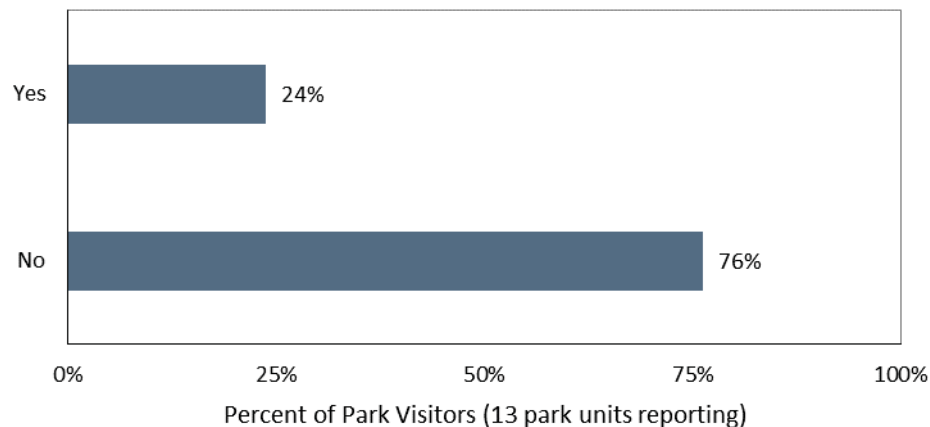
Visitor Origin: The majority of visitors to SER park units (62%) were not residents of the state within which the park was located (Figure 5-8). Similarly, only 24 percent of visitors reported that they lived within 35 miles of the park unit they were visiting (Figure 5-9). This indicates that a small proportion of visitors to SER park units would be considered “local” visitors, and most would be visitors who have traveled long distances to get to the park. Non-local visitors require additional information prior to their visit, and may be less familiar with transportation opportunities to get to and travel within the park unit.

Figure 5-8: Visitors who live within same state as SER park unit visited



Source: University of Idaho Park Studies Unit, Visitor Services Project. SER park units 1991-2013. Compiled by RSG.

Figure 5-9: Local visitors (live within 35 miles of the park unit)

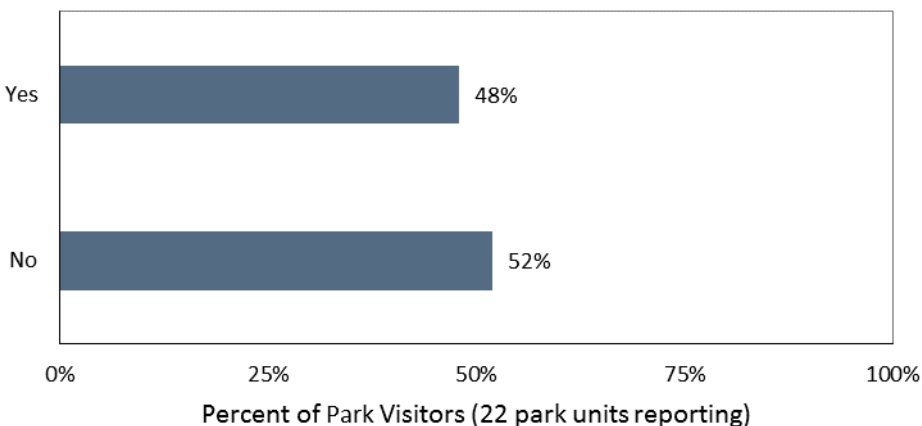


Source: University of Idaho Park Studies Unit, Visitor Services Project. SER park units 1991-2013. Compiled by RSG.



Primary Destination: Almost half (48%) of visitors to SER park units reported that the respective SER park unit was their primary destination on their trip; the remaining visitors likely had primary destinations near the park unit (Figure 5-10). Visitors who report that the SER park unit was not their primary destination may have learned about the park while visiting the area through wayfinding signage or local tourism partners.

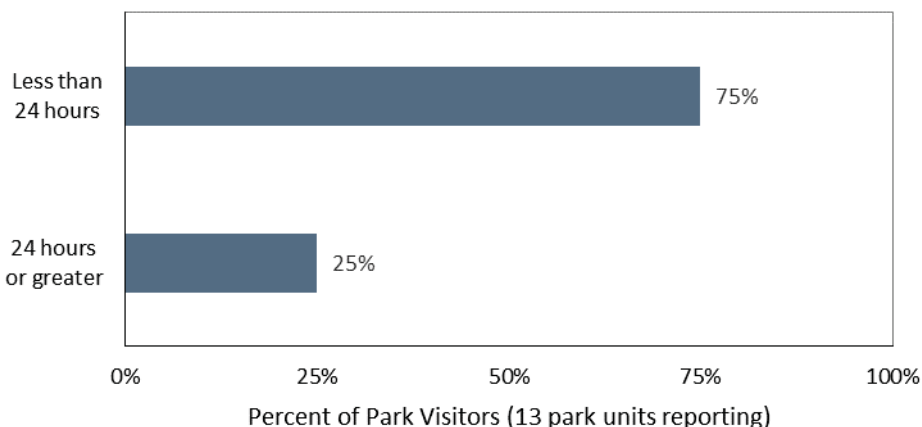
Figure 5-10: Visitors whose primary destination on their trip to the area was the SER park unit



Source: University of Idaho Park Studies Unit, Visitor Services Project. SER park units 1991-2013. Compiled by RSG.

Length of Stay: The vast majority of visitors (75%) to SER park units reported that they spend less than 24 hours in the park unit, and would be considered day users (Figure 5-11). This does not mean that these visitors did not stay overnight in the area surrounding the park unit (e.g., the gateway community), and does not detail how many times they may have entered the park unit on their visit. This information may be useful to park managers to understand how long visitors are staying in their parks.

Figure 5-11: Visitor length of stay at park unit

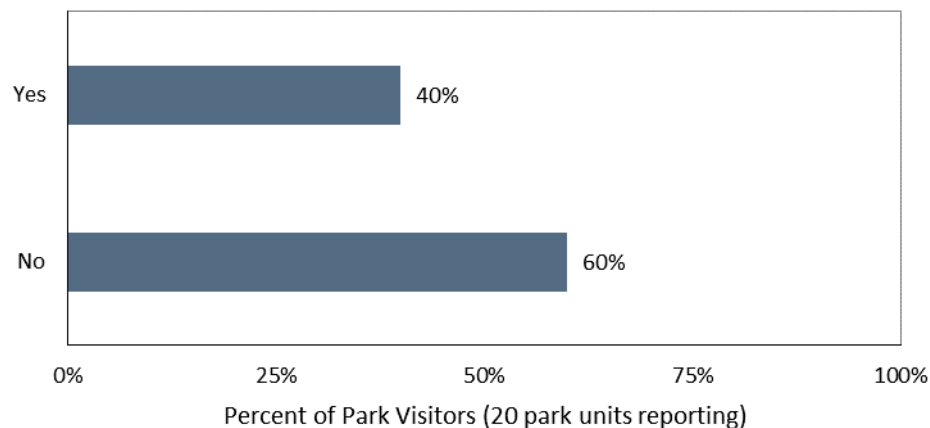


Source: University of Idaho Park Studies Unit, Visitor Services Project. SER park units 1991-2013. Compiled by RSG.



Return Visitors: Forty percent of visitors to SER parks reported being repeat visitors to the given unit (i.e., have visited the park prior to their current visit within the past 12 months); while the majority (60%) are first-time visitors to the park unit (Figure 5-12). Visitors who are considered first-time visitors will have different transportation and information requirements compared to visitors who visit more frequently.

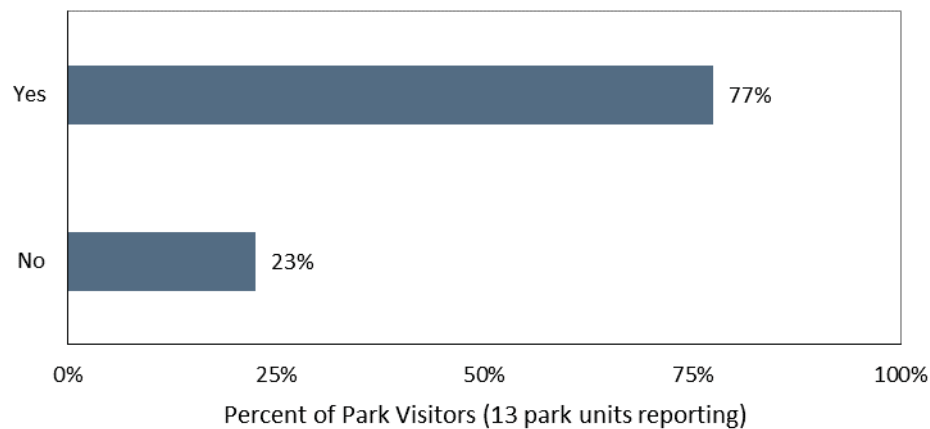
Figure 5-12: Visitors who have visited SER park unit within the past 12 months



Source: University of Idaho Park Studies Unit, Visitor Services Project. SER park units 1991-2013. Compiled by RSG.

Visitor Awareness of the National Park Service: Most visitors to SER park units (77%) were aware that the park unit they were visiting was being managed by the NPS (Figure 5-13). This is important to note in terms of understanding visitors' motivations for visiting the site, and can inform park unit decisions concerning how to communicate with visitors.

Figure 5-13: Visitor awareness of NPS management of park unit

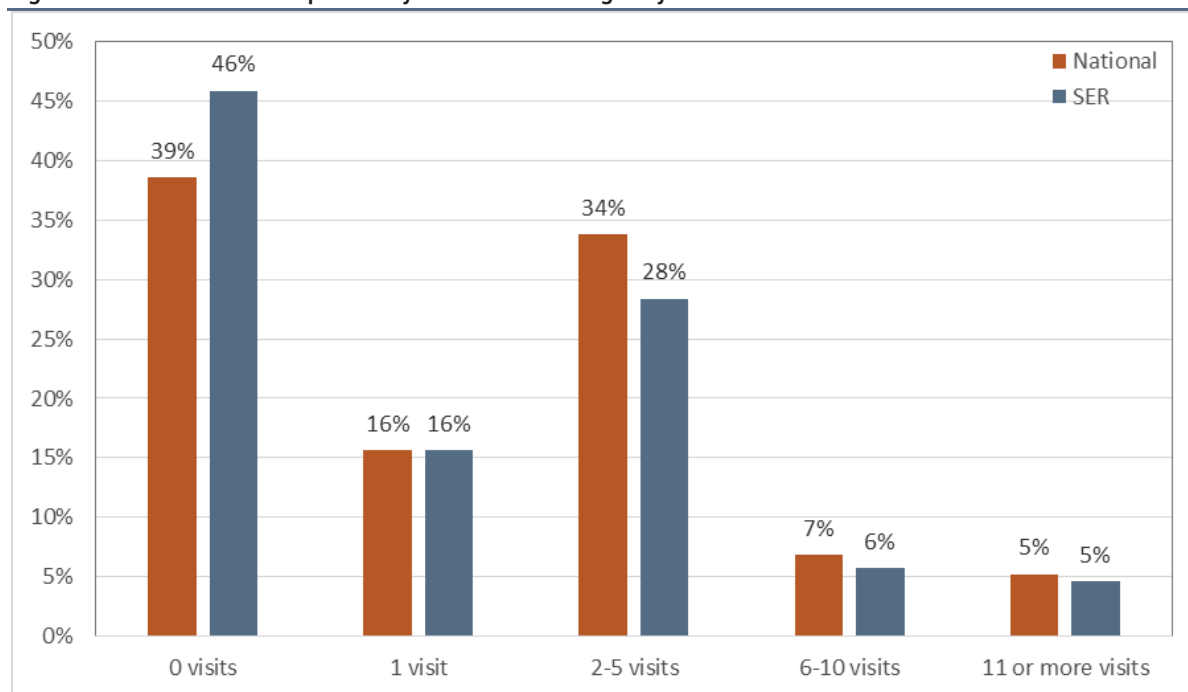


Source: University of Idaho Park Studies Unit, Visitor Services Project. SER park units 1991-2013. Compiled by RSG.



On a national level, the Comprehensive Survey of the American Public (CSAP)²⁷ was used to provide perspective on the general public's awareness and use of the NPS. Survey participants who resided within the SER had the lowest visitation rate compared to survey participants within all other NPS regions (Figure 5-14). Almost half (46%) of CSAP survey participants who reside in the SER reported that they had not visited a park unit within the past two years, compared to only 39 percent of participants for the entire survey sample (i.e., nationally). Additionally, 18 percent of CSAP survey participants who reside in the SER reported that they had never visited a unit managed by the NPS, compared to only 11 percent of participants for the entire survey sample.

Figure 5-14: Visits within the past two years to units managed by the NPS



Source: CSAP. 2008-2009.

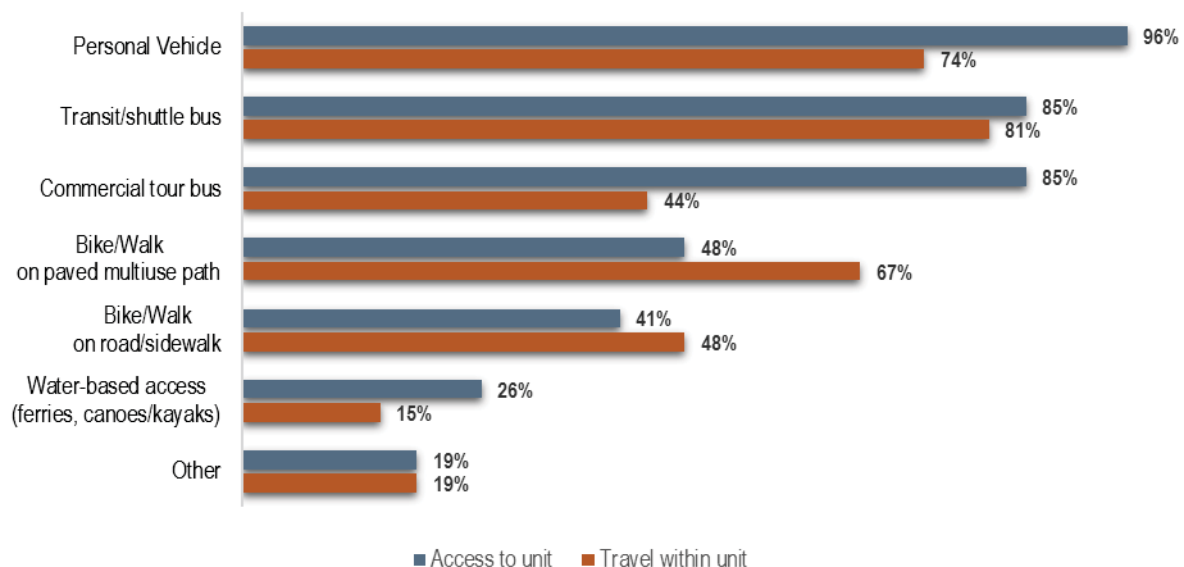
²⁷Taylor, P.A., B.D Grandjean, and B. Anatchkova, National Park Service comprehensive survey of the American public, 2008–2009: National Technical Report, National Park Service 2011.



Transportation Modes

Visitors may utilize various transportation modes to travel to a park unit and to travel within a park unit. These modes of transportation include visitors' personal vehicles (e.g., cars, motorcycles, and recreational vehicles), transit or shuttle buses, commercial tour buses, bicycling or walking, and water-based access (e.g., ferries, canoes/kayaks). Additionally, a small number of park units within the SER (examples being Dry Tortugas National Park and Buck Island Reef National Monument) can only be accessed via seaplanes. Within the SER Transportation Survey, superintendents were asked to indicate which modes of transportation visitors can use to access and travel within their unit. The results of the survey are summarized in Figure 5-15.

Figure 5-15: What modes of transportation can visitors use to access and travel within SER park units



Source: NPS SER LRTP Transportation Survey Results. RSG, February 2015.

While the information contained within Figure 5-15 does not refer to visitors' relative use of transportation modes to access or travel within SER park units, the information provides details about the proportion of SER park units where visitors can use various forms of transportation.

Visitors to SER park units can use their personal vehicles to access almost all of the park units within the region (96%).

Once visitors arrive, a number of park units within the SER (26%) do not allow visitors to travel within their park via personal vehicle. Examples of these are historic sites, where visitors park and access the site via foot (e.g., Carl Sandburg Home National Historic Site) and recreation-based sites, where visitors access the site via foot or water-based modes (e.g., Obed Wild and Scenic River).

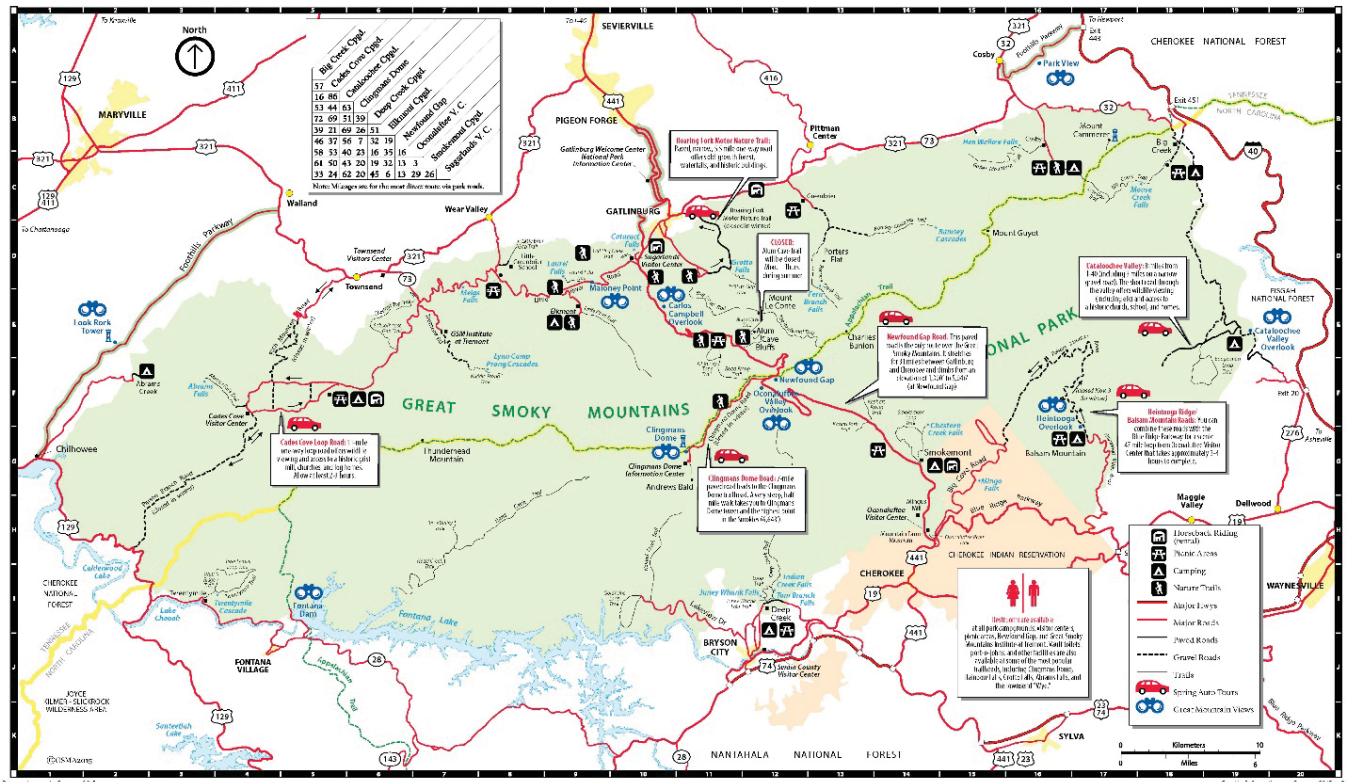
More common to the SER (compared to other regions), a number of park units exist in coastal areas where visitors can access and travel within these units via water-based access (e.g., ferries, canoes/kayaks, seaplanes). Visitors can access SER park units via water-based modes at over one-quarter (26%) of SER park units, while visitors can only travel within SER park units via water-based modes at 15 percent of SER park units.

While visitors can access SER park units via commercial tour bus at most (85%) of SER park units, visitors can only travel within SER park units via commercial tour bus at less than half (44%) of SER park units. Visitors are able to access SER park units via transit/shuttle bus at most (85%) SER park units and are able to travel within SER park units via transit/shuttle (81% of SER park units).



Many park units within the SER emphasize visitor experiences related to various modes of transportation. For example, Great Smoky Mountains National Park provides a quarterly guide newspaper including a map of the park with auto touring locations marked on the map (Figure 5-16). Additionally, within the Great Smoky Mountains National Park trip planner are articles and tips for visiting the park via various modes of transportation.

Figure 5-16: Map of Great Smoky Mountains National Park, including summer auto tour locations



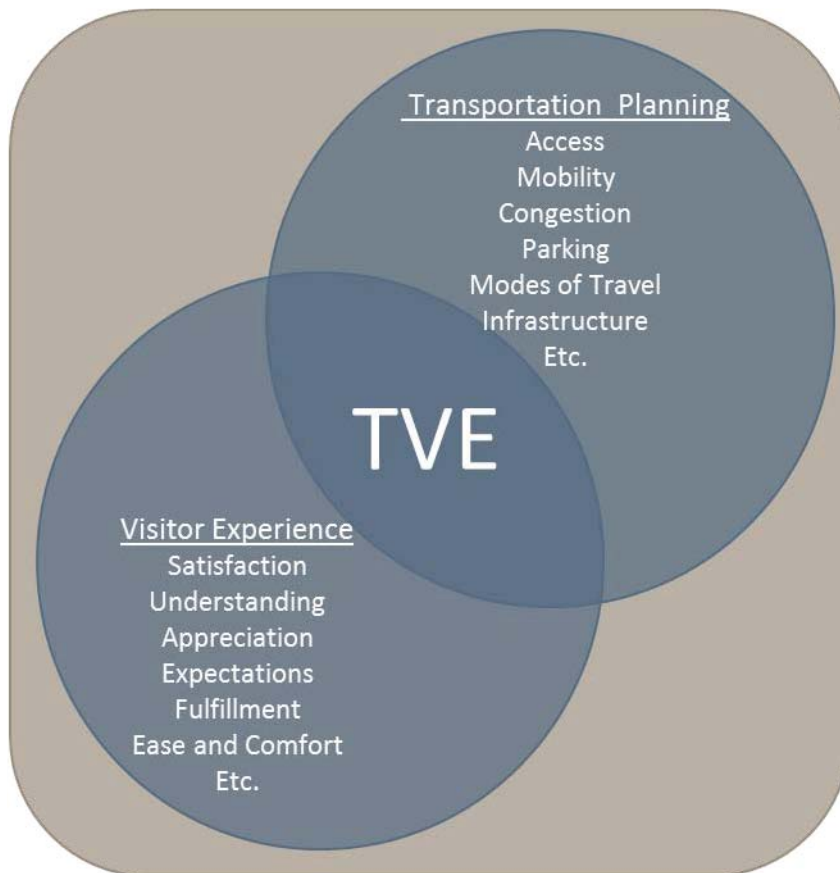
Source: NPS, Smokies Guide: The Official Newspaper of Great Smoky Mountains National Park, Summer 2015.
http://issuu.com/greatsmokymountainsassociation/docs/smokies_guide_summer_2015?e=8396499/13243525



Transportation-Related Visitor Experience

The NPS defines transportation-related visitor experience (TVE) as “the perceptions, feelings, and reactions a person has related to transportation before, during, and after a visit to a park unit.”²⁸ The TVE within national parks is the intersection between traditional transportation planning (e.g., access, mobility, congestion, etc.) and visitor experience metrics (e.g., satisfaction, understanding, expectations, etc.), as displayed in Figure 5-17. In planning for the potential impact transportation services and networks will have on the visitor experience, all of these transportation mechanisms and visitor experience metrics should be considered.

Figure 5-17: Transportation-related visitor experience



Source: National Park Service, Transportation-related Visitor Experience Planning: Concepts, Methodology, and Analysis at Park Units and Regional Level, 2014.

The TVE consists of understanding the impacts of the transportation system on the various phases of the visitor experience cycle, types of users, modes of transportation, and the factors of the TVE. Each of these elements are described in the following sections.

²⁸ National Park Service, Transportation-related Visitor Experience Planning: Concepts, Methodology, and Analysis at Park Units and Regional Level, 2014.



TYPES OF USERS

According to the NPS TVE framework, there are four national park visitor types to consider in transportation planning. These national park user types are based on residence proximity to the park unit. Brief definitions of the park user types are provided below:

- ❶ **Local visitors** are residents of the nearby communities who visit the park unit on a somewhat regular basis (or who have at least been to the park in recent times). These users are familiar with the transportation network surrounding and within the park unit. They need less information about wayfinding and may be familiar with park amenities and have expectations about park experiences based on previous visits. These visitors will expect an efficient transportation system to access and travel within the park.
- ❷ **Non-local visitors** are visitors to the park unit who do not live within the communities directly surrounding the unit. These users may have traveled great distances to get to the park unit and are often much less familiar with the transportation network surrounding and within the park unit. They often plan their trips well in advance and need additional information about the park unit in advance of their trip. Some of these visitors may be repeat visitors, although many may be first time visitors to the area and the park unit.
- ❸ **Local non-visitors** are residents of the communities surrounding the park unit, although do not visit the park unit on a regular basis for recreational purposes. These users are often familiar with the transportation network surrounding the park unit, although may not be familiar with the park unit itself. This user group also includes users who may use the park transportation infrastructure to commute to work (either within the park, or through the park). Many of the reasons these users do not visit national parks relate to costs associated with the travel (e.g., entrance fees, transportation costs).²⁹ While these costs are lower for local non-visitors, there are still costs (including time) associated with visiting a national park.
- ❹ **Non-local non-visitors** are non-users of park units who do not live within the communities directly surrounding the unit. These users are often thought of as “future visitors” or “potential visitors” to national parks.³⁰ These users include visitors who may need to travel large distances to get to a park unit, and may require multiple modes of transportation to get there. Additionally, they also may not visit a national park due to the costs associated with the travel, and potentially include larger item travel costs (e.g., airfare, hotels). Many users in this group cite distance from a park unit as one of the potential barriers to visiting. These users may still engage in the TVE for a national park within the SER, particularly in the “Travel Planning” phase of the visitor experience cycle.

When planning for the transportation network, and the potential impacts of this network on the TVE, each of these visitor and potential-visitor groups should be taken into consideration.

EXPERIENCES WITH TRANSPORTATION MODES

One of the largest impacts on the TVE is the mode of transportation that visitors use to access and travel within park units. Transportation mode is involved in most phases of the TVE. Visitors may experience multiple modes of transportation within a single visit. This could include taking their personal vehicle to access the park, and then transferring to a shuttle bus to travel within the park unit. Alternatively, visitors may take a commercial tour bus to the park, and then access specific sites via walking on multiuse paths. As visitors transition from one mode to another (either outside of or within a park unit), this transition provides opportunities for visitors to obtain necessary information about their trip, and provides

²⁹ Taylor, P.A., B.D Grandjean, and B. Anatchkova, National Park Service comprehensive survey of the American public, 2008–2009; National Technical Report, National Park Service 2011.

³⁰ National Park Service, Transportation-related Visitor Experience Planning: Concepts, Methodology, and Analysis at Park Units and Regional Level, 2014.



opportunities for SER park units to impact the TVE.

Each transportation mode has unique characteristics that influence the way in which visitors experience park units. These characteristics can have a large impact on visitors' overall experience within the park especially relating to their TVE. Unique TVE characteristics of various modes are described below.

- ❶ **Personal Automobile** – A personal automobile often provides visitors with flexibility, comfort, and familiarity. Thanks to navigation systems and GPS, it may also provide individualized directions on-demand. An automobile could also enable a visitor to reach more of a park unit in terms of time and distance than other modes. One major drawback to the experience is the filter caused by the windshield. Drivers and passengers cannot have a firsthand experience with park resources and are rarely permitted sufficient time at a location to interpret the experience. From an environmental standpoint, a large number of vehicles traveling long distances contributes to high visitor vehicle miles traveled and ultimately higher rates of vehicle fuel exhaust emissions to the air and the land.
- ❷ **Transit** – Transit could provide different experiences depending on how the service is being provided. A park unit provided transit service could be an opportunity to welcome, orientate, and educate visitors. Transit services also provide park units with the tools to better manage visitor travel. For example, visitation to a sensitive resource that could easily become disturbed due to over utilization can be controlled using transit services. A public transit service providing access to a park could reduce vehicle miles traveled by visitors and potentially reduce stress during traveling by removing driver frustration. In the case of a service such as a ferry, the transit ride could be viewed as another unique experience in itself. Alternatively, park units are forced to rely on external public or private partners to provide a safe and efficient means for visitors to access a unit and frequent and reliable service. Additionally, potential unintended consequences on the visitor experience could be expected depending on how visitors are delivered to park attraction sites (e.g., visitor crowding).
- ❸ **Active Transportation** – Modes of active transportation include walking, cycling, and canoeing/kayaking. These modes provide the greatest opportunity for visitors to have one-on-one experiences with resources in a park unit. They also provide the greatest freedom to move within a park unit. Beyond visitor experience, these modes have no impact on vehicle miles traveled and bring visitors the added health and social benefits of active transportation. Alternatively, visitors using these modes will face the biggest challenge in terms of visiting large expanses of a park unit due to slower travel speeds and a more physically demanding mode choice.

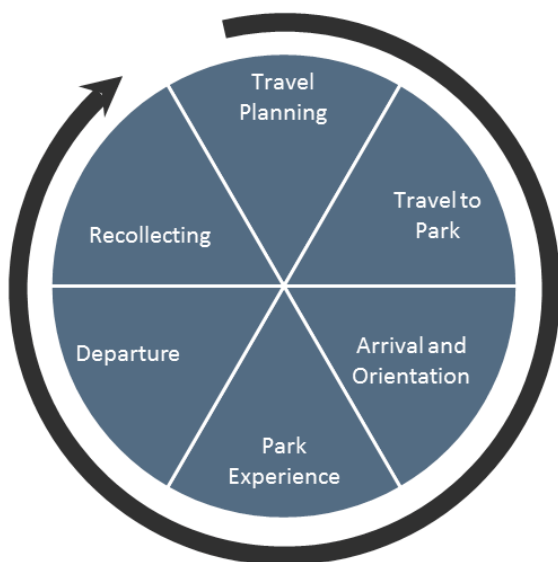
VISITOR EXPERIENCE CYCLE

Within the transportation-related visitor experience, similar to the traditional visitor experience, there is a cycle of phases³¹ of the TVE (Figure 5-18). For example, first, some visitors may plan for their trip to a park unit. Next, visitors travel (potentially using a number of modes of transportation) to the park, arrive, and get oriented to the park. Once oriented, they have their experience within the park, which also may involve multiple modes of transportation. Visitors then depart the park, travel back to their home, and ultimately may recollect on their experience within the park, and specifically about their TVE. While not all visitors will necessarily experience all of these phases of TVE, park units within the SER should plan for providing opportunities for quality visitor experiences within each phase.

³¹ Clawson, M. and J. Knetsch, *Economics of Outdoor Recreation*, Resources for the Future, John Hopkins Press, Baltimore, MD, 1966.



Figure 5-18: Major phases of the visitor experience cycle



Source: National Park Service, Transportation-related Visitor Experience Planning: Concepts, Methodology, and Analysis at Park Units and Regional Level, 2014.

Understanding the impact of the transportation network on each phase of the visitor experience will help regional and park staff understand how their existing infrastructure is meeting visitor needs, and can highlight opportunities for improvement within the transportation network. This can lead to improved visitor experiences with the transportation network, and within SER park units.

TRANSPORTATION-RELATED VISITOR EXPERIENCE FACTORS

The NPS has identified multiple factors that influence the TVE, by reviewing literature, research, and industry knowledge within the field. The NPS defines a TVE factor as “a general condition, service, or element that influences the quality of transportation-related visitor experience.”³² These factors are categorized into four groups that influence TVE: Communication and Wayfinding, Transportation Infrastructure, Operations, and Safety.

Communication & Wayfinding

- Pre-visit Information
- En-route Information
- On-site Information
- Interpretation
- Social Media
- Visitor Feedback

Transportation Infrastructure

- Gateways, corridors, and nodes
- Parking
- Transportation Facilities
- Transit Vehicles
- Infrastructure Condition

Operations

- Transit Operations
- Park Entry and Transportation Tickets
- Services
- Amenities
- Indirect Effects

Safety

- Education
- Enforcement
- Engineering
- Emergency Medical Service

³² National Park Service, Transportation-related Visitor Experience Planning: Concepts, Methodology, and Analysis at Park Units and Regional Level, 2014.



There is some overlap expected between various factors or across factor groups. For example, the communication and wayfinding factor groups may have lots of overlap in information sources. It should also be noted that not all park units in the SER will experience each factor. As one illustration, while all park units should provide some pre-visit information to visitors, many park units may not need to alter transit operations since they do not currently have transit services available, nor do they have a need for transit operations in the foreseeable future.

The following sections describe factors (by group) and the phases of the TVE cycle that are impacted, as detailed in *Visitor Experience: An overview for long range transportation planning*.³³

Communication and Wayfinding Factors

The communication and wayfinding factors are experienced in every phase of the visitor experience (i.e., travel planning through recollecting) and offer many opportunities to impact the TVE. Park units within the SER have many methods, modes, and ways to influence these TVE factors including the park unit's website, printed materials, visitor centers, and even smartphone applications (apps). Communication and wayfinding factors within the SER are described in the following sections.

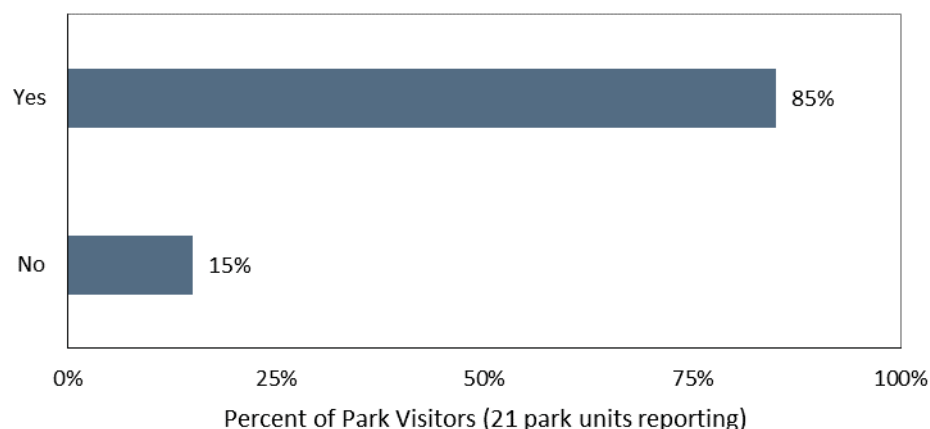
Pre-visit Information

Information provided to visitors prior to their arrival to a park unit is of highest importance, particularly for obtaining information to plan their travel to the park. Additionally, this information can help adjust visitor expectations for transportation conditions they may experience at the park. Almost all SER visitors (85%) obtained information about the park unit they were planning to visit prior to their visit (Figure 5-19). Interestingly, of CSAP participants (both visitors and non-visitors), half (50%) of participants reported not knowing much about the NPS, and almost half (44%) reported that the one most important thing the NPS could do to encourage them to visit was to “advertise, publicize, provide more information.”

Presumably, most of the respondents who reported this information were non-visitors to SER park units. Additionally, few visitors to SER park units consider themselves to be “locals” (only about 24% as shown on Figure 5-9), and most visitors to SER park units are from out of state (about 62% as shown on Figure 5-8). This indicates that SER park units should provide as much and of the highest quality pre-visit information to visitors, so visitors can be more prepared when they arrive to the park. Additionally, their expectations about their trip will be more appropriately metered, based on information they obtain prior to their visit. The American public will also be more aware of NPS park units and the opportunities to visit these park units through the proliferation of high quality pre-visit information.



³³ National Park Service, *Visitor Experience: An overview for long range transportation planning*, 2014.

**Figure 5-19: Visitors who obtained information about the park unit prior to their trip**

Source: University of Idaho Park Studies Unit, Visitor Services Project. SER park units 1991-2013. Compiled by RSG.

Pre-visit information should be a priority within the SER, as close to one-third (30%) of park units within the SER report that the lack of advance trip planning information at their park unit negatively impacts visitor experiences, and 64 percent report that transportation and trip planning information improvements were their “highest” or a “high” priority funding level.³⁴ Most, if not all, NPS units have a “Plan Your Visit” information section of their website, which provides information to visitors prior to their visit to the park. Within the NPS National LRTP process (currently being developed), the NPS has developed standards for park units’ “Plan Your Visit” page to “provide essential traveler information.”³⁵ This information includes a description of the transportation experience, driving directions, available alternative transportation, parking information, potential for congestion, travel distances and time to key sites, accessibility of transportation systems, and alternative fueling stations. This information is key to visitors’ pre-visit planning, and for quality visitor experiences within SER park units.

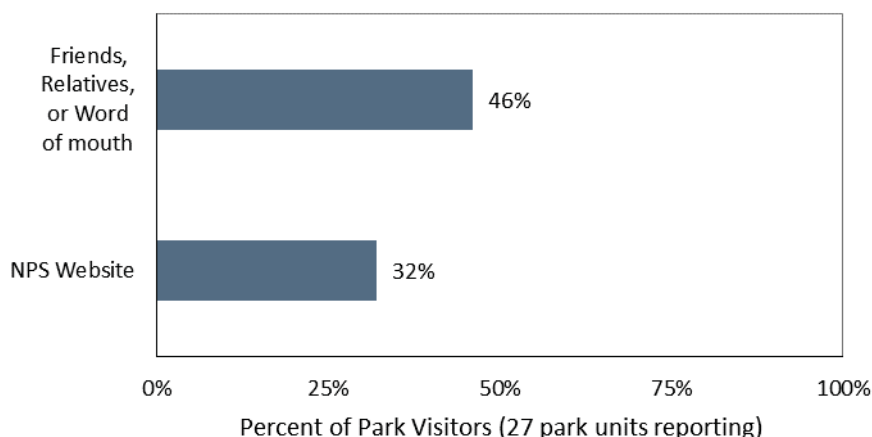
As shown in Figure 5-20, when asked which information sources they used, visitors to SER park units reported that they most often received pre-trip information from “friends, relatives, or by word of mouth” (46% of visitors). Additionally, close to one-third of visitors (32%) reported using the respective park unit’s website for pre-trip information. It should be noted that this percentage is likely higher now, as many of the VSP studies were administered when park units were first developing websites, and a few were administered when park units may not have had a website developed yet.

³⁴ NPS SER LRTP Transportation Survey Results, RSG, February 2015.

³⁵ National Park Service, Draft National Long Range Transportation Plan, 2014.



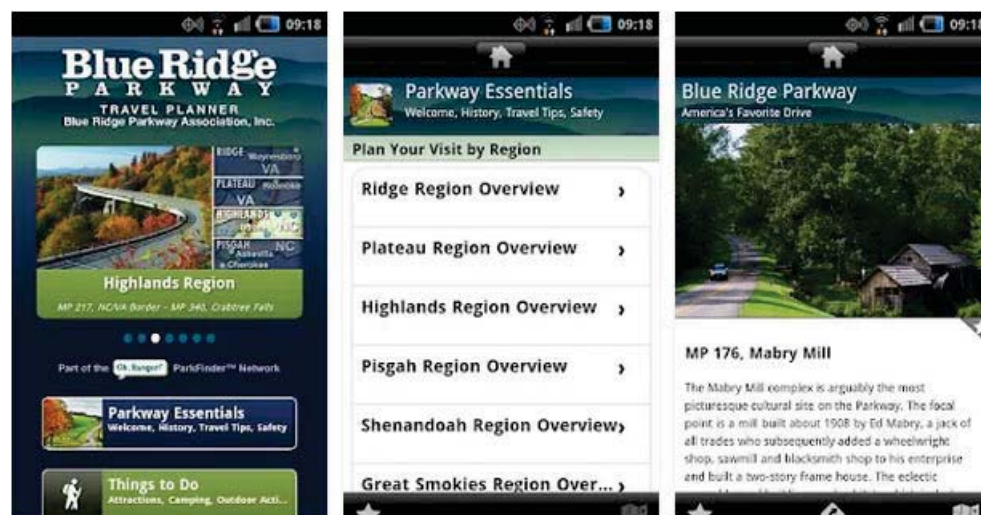
Figure 5-20: Sources of information that visitors used to plan their visit



Source: University of Idaho Park Studies Unit, Visitor Services Project. SER park units 1991-2013. Compiled by RSG.

Smartphone apps developed by partners or other third-party vendors are available for a number of parks in the SER, and provide visitors with information prior to their visit to the park. For example, the Blue Ridge Parkway Association offers a free app that provides information on trip planning, wayfinding, roadway conditions, and interpretation (Figure 5-21). The National Park Service Foundation offers a free Parks Near You app that provides wayfinding, weather, and real-time parks conditions for numerous parks in the SER. Swan Informatics offers a number of Android apps for SER parks—including Big Cypress National Park, Biscayne National Park, Dry Tortugas National Park, Everglades National Park, and Great Smoky Mountains National Park—for a price of \$1.49 each. The NPS seeks to promote apps developed by partner organizations to the greatest extent possible.

Figure 5-21: Blue Ridge Parkway Travel Planner mobile application



Source: Blue Ridge Parkway Association, www.blueridgeparkway.org



En-Route Information

Information provided to visitors en route to the park is crucial to visitor expectations about their visit, and also provides them the necessary information about how to get to the park. Within the SER, half (50%) of parks report that wayfinding difficulty leading to or within their unit negatively impacts visitors' experiences on peak days/times or most of the time. Additionally, while almost all (96%) of the park units within the SER report that static wayfinding or directional signs leading to their unit are important to visitors, a majority of survey respondents (59%) reported that wayfinding and directional signs are not adequate or were lacking all together.

In addition to wayfinding and static signs, various forms of intelligent transportation systems (ITS) can be used to provide up-to-date information about traffic, parking, and other useful information relevant to visitors' travel plans. Forms of ITS often used by park units include highway advisory radios (HAR), telephone information lines, and variable message signs (VMS). With more recent developments and an expanded use of smartphones by the American public, social media (Facebook, Twitter, etc.) and smartphone apps have been used to convey transportation information to drivers. Within the SER, almost all (85%) of park units report that social media is important to visitors and over half (58%) of park units report that a smartphone app is important to visitors. Close to three-quarters (72%) of park units report that their use of social media for transportation information is adequate, while only one-fifth (19%) of park units report having a smartphone app, with even less knowledge of whether or not the information being presented is adequate or not. Only one-third (35%) of SER park units report that a HAR is important to visitors, and very few (12%) report that VMS leading to their unit are important to visitors; it should be noted that very few park units report having either of these technologies leading to their unit (26% have a HAR and 8% have a VMS).

Close to two-thirds (62%) of park units within the SER report that wayfinding leading to their unit is of highest or of high priority for funding.

On-Site Information

Once visitors arrive to the park unit, information within the park is important for visitor orientation and on-site planning, as well as the overall experience within the park. Information obtained on-site can be as simple as a copy of the park map or park brochure, or as detailed as schedules/timetables for public transit within the park. Additionally, information about traffic and parking congestion within the park could be provided to visitors to help divert visitors from overly congested areas, and help manage visitors' expectations about congestion within the park.

Most park units within the SER report that their NPS printed materials (e.g., park maps and brochures) are adequate (96%) and that their static wayfinding or directional signs within their unit are adequate (74%). As expected, most park units (92% and 96% respectively) report that their printed materials and static wayfinding or directional signs within their unit are important to visitors for having transportation information available. Close to half (46%) of SER park units report that wayfinding difficulty leading to or within their unit negatively impacts visitors' experiences within their unit most of the time.





Interpretation

Interpretation within NPS units is critical for visitors' understanding and lasting impressions of the cultural, historical, and natural significance of NPS sites. Visitor centers have traditionally been the main places where visitors interact with interpretive exhibits and information within NPS units. Interpretation can be provided during visitors' use of the transportation system within the unit, specifically for scenic driving or using alternative modes of transportation (e.g., shuttle buses, tours, etc.). Many NPS units have developed audio recordings or even podcasts that can be played as visitors move through the park.

Mobile apps have been developed by a number of NPS units, and these apps include interpretation on unique features within the unit, as well as tours that can be accessed to help orient and educate visitors within the unit. For example, the park units within the St. Croix, U.S. Virgin Islands have developed an app that provides visitors with access to interpretive information about the historical, cultural, and natural resources within each park (Figure 5-22). The iTunes App Store does not list any apps developed by the NPS for SER parks, but there are several developed by partners and commercial companies. For example, National Geographic has developed a National Park App that includes trip planning information for the 20 most visited parks in the NPS system, which includes Everglades National Park and Great Smoky Mountains National Park. The Civil War Trust has a series of apps, including one for Vicksburg National Military Park, and both Chimani and NomadMobile Guides produce apps for Smoky Mountains National Park (Figure 5-23). Some of these app developers may charge a small fee (e.g., \$1.49) to download, although many apps are free to users.

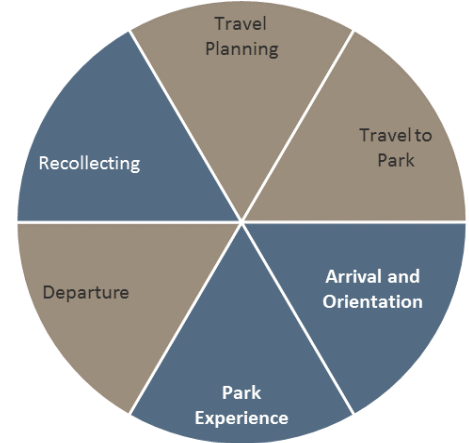
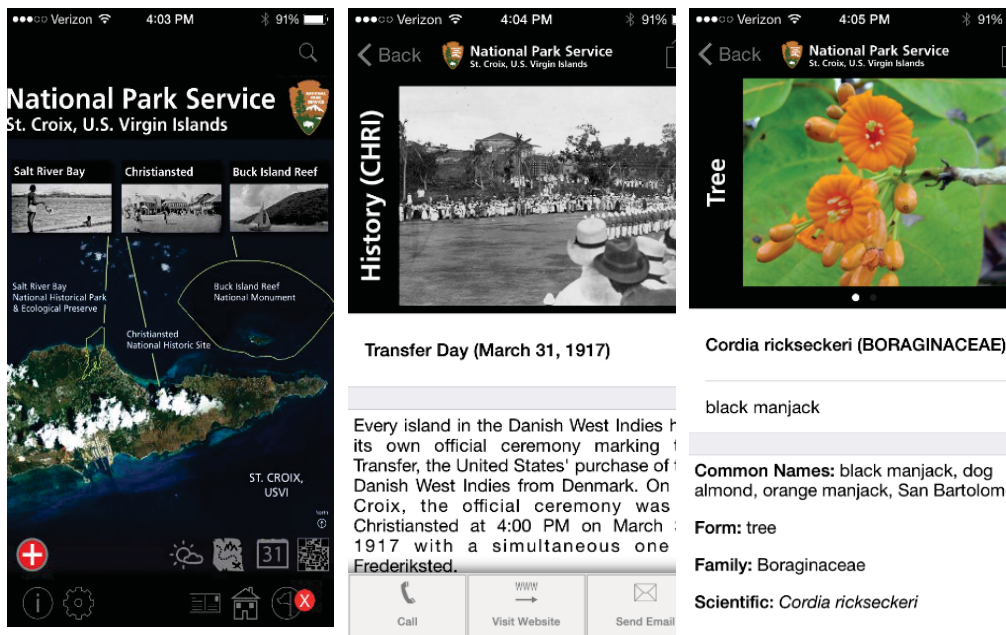


Figure 5-22: St. Croix, U.S. Virgin Islands mobile application, interpretive information

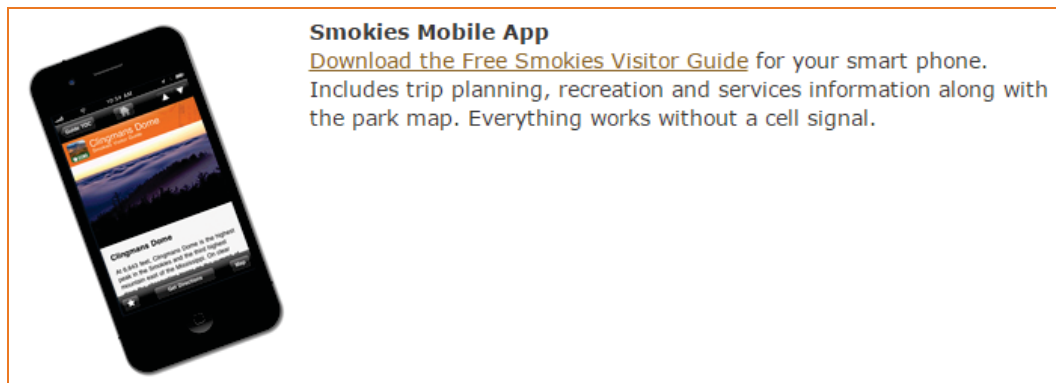


Source: <https://play.google.com/store/apps/details?id=com.nps.stcroix&hl=en>.



Almost every park unit (96%) within the SER Region feels that their visitor center is important to visitors for providing transportation information, although only three-quarters (78%) feel that their visitor center provides adequate transportation information. The majority (58%) of park units within the SER feel that a smartphone app is important to visitors, although few (19%) report that they have such an app, and only 15 percent report that this app provides adequate transportation information.

Figure 5-23: Great Smoky Mountains National Park mobile application link on their webpage

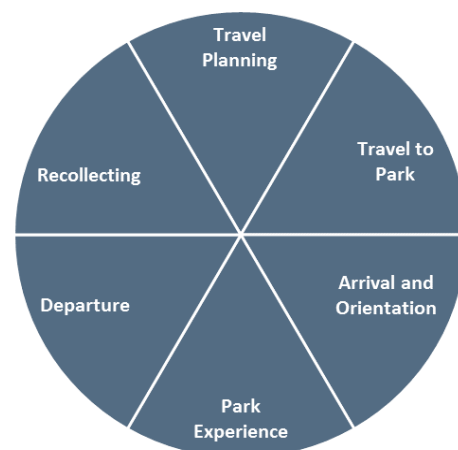


Source: Great Smoky Mountains National Park website, www.nps.gov/grsm/planyourvisit/

Social Media

Social media has been becoming an important part of the lives of most Americans, including visitors to units of the NPS. Social media includes venues such as Facebook, Twitter, YouTube, and many more. Additionally, the use of smartphones among Americans has been increasing along with their use of social media. According to the most recent Pew Research Center Internet Project Survey (2014),³⁶ social media usage among Americans has been increasing from year to year, while Facebook remains the most popular form of social media Americans use. Additionally, the Pew Research Center found that:

- 90 percent of Americans have a cell phone
- 58 percent of Americans have a smartphone³⁷



While social media usage and smartphone ownership is on the rise, differences remain between various demographic groups, especially in age. During 2014, for the first time, the majority (56%) of online users 65 years old and older reported using Facebook, compared to 87 percent of 18-29 year olds.³⁶ Similar differences are observed in smartphone ownership; while 83 percent of 18-29 year olds have a smartphone, only 19 percent of adults 65 and older have a smartphone.³⁷ These differences in social media and smartphone usage should be noted, as reported previously, the age of SER visitors tend to be older, with close to two-thirds (61%) of SER visitors over the age of 40, and one-quarter (23%) over the age of 60.

Social media is an important part of the NPS's mission. An *Interim Directors Order for Social Media* was released in 2011, which denotes the importance of the use of social media by the NPS for informing visitors about park resources and conditions (including transportation-related conditions). In particular, the

³⁶ Duggan, M., et al. Social Media Update 2014, Pew Research Center, 2015.

³⁷ Pew Research Center Internet Project Survey, January 9-12, 2014. N=1,006 adults. Accessed via: <http://www.pewinternet.org/data-trend/mobile/cell-phone-and-smartphone-ownership-demographics/>.



Directors Order states that “the effective use of social media in support of the National Park Service’s mission is an important skill set in the 21st century.” As of 2012, the NPS maintained over 240 Facebook pages, 210 Twitter feeds, 70 YouTube channels, and had posted over 36,000 photos on Flickr,³⁸ and likely are much higher today. While the use of social media has been used to engage visitors and provide interpretive information, social media can also be used to impact the TVE by providing transportation-related information during all phases of the TVE. These impacts could be to alter visitors’ expectations about the TVE, or to alter travel patterns to off-peak times or areas.

Transportation Infrastructure and Operations Factors

The quality of actual transportation infrastructure may be the most obvious place to look for understanding potential impacts of the transportation system on visitor experiences. The following sections identify some of the key components of transportation infrastructure and operational factors within the SER.

Accessibility

One of the biggest limitations to visitor enjoyment of park unit resources is the accessibility of park facilities, services, and programs to visitors. The NPS has developed a 5-year plan to address accessibility within the NPS, “All In! Accessibility in the National Park Service” (2014). The plan highlights the importance of accessibility for visitors to NPS units, and offers a strategy “aimed at welcoming all visitors and staff, creating a culture of inclusion, and making critical improvements to both new and existing programs, facilities, and services.”³⁹ Within the SER, one-quarter (25%) of visitors reported that at least one person in their group had a physical condition that made it hard to access or participate in park activities or services (Figure 5-24), representing a large proportion of visitors.



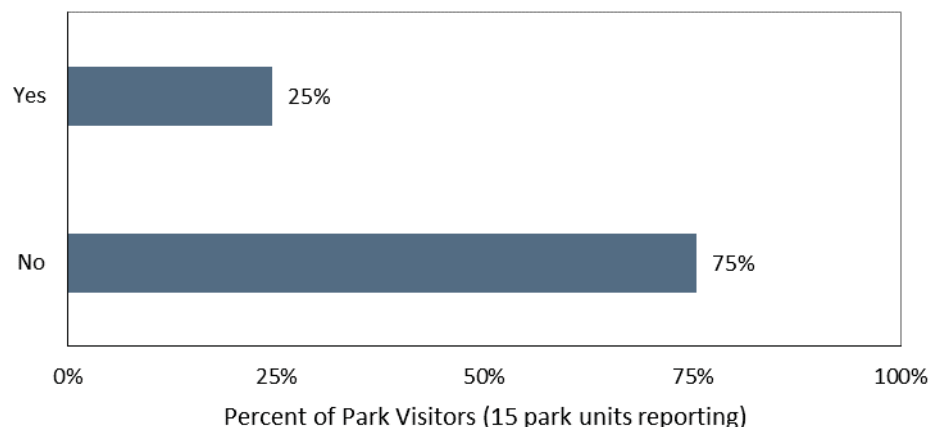
Close to half (48%) of SER park units report that accessibility barriers for people with disabilities within their unit negatively impacts visitors’ experiences on peak days and times or most of the time. Of the potential transportation improvements listed, accessibility for people with disabilities was reported to be the highest funding priority level of all improvements within the SER, with half (48%) of SER park units reporting accessibility improvements as the highest funding priority level, and half (48%) reporting these as high funding priority level. Additionally, SER park units report that, of the potential transportation improvements, the improvement that will most address visitors’ experiences would be transportation improvements to accessibility for people with disabilities (93% of park units). Of note, only one-quarter (26%) of SER park units report that they have already completed or are in the process of completing a Self-Evaluation and Transition Plan to address accessibility of their programs, policies, and practices. Park units within the SER see this as a need for improvement, and note that accessibility of park resources, services, and programs needs to be a funding priority within their region.

³⁸ National Park Service, Harpers Ferry Center, Social Media website. Accessed via: <http://www.nps.gov/hfc/products/digitalmedia/socialmedia/>.

³⁹ National Park Service, *All In! Accessibility in the National Park Service: 2015-2020*, August 2014.



Figure 5-24: Visitors who have a physical condition that made it difficult to access or participate in park activities or services

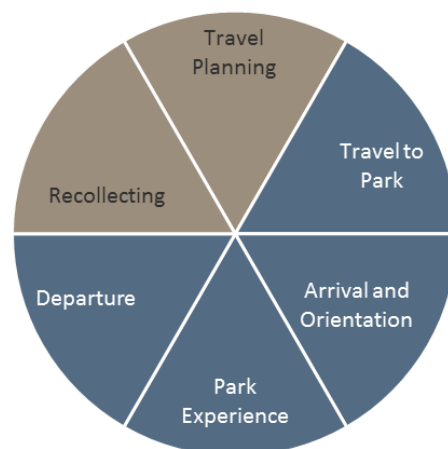


Source: NPS SER LRTP Transportation Survey Results. RSG, February 2015.

Automotive Infrastructure

Based on the SER Transportation Survey, the automotive infrastructure in park units within the SER varied widely in terms of the perceived condition.

- Dirt/gravel roadways and parking areas are reported to be in conditions that range from fair/poor to good/excellent.
- Over one-third (35%) of units report that all or most of their units' dirt/gravel roadways are in fair/poor condition.
- Paved roadways and parking areas are perceived to be in better condition than dirt/gravel roadways, with only 8 percent of SER park units reporting that all or most of their paved roadways or parking areas were in fair/poor condition.



When asked about funding priorities, close to half (46%) of park units within the SER report that road condition improvements (e.g., paving, striping, etc.) are of highest funding priority, and about 42 percent report that parking improvements are of highest funding priority. Additionally, over three-quarters (78%) of park units within the SER report that their expected visitation change within the next 10-years will increase the need for parking at popular attractions within their unit. This information can be used to assess conditions of automotive infrastructure, as well as understand funding priorities of park units within the SER related to automotive infrastructure.



Land and Water Transit Infrastructure

The majority of park units within the SER report that visitors used transit/shuttle buses to access (85% of SER park units) or travel within (81% of park units) their unit. Although the majority of SER park units report visitors use transit/shuttle to travel within their unit, fewer than one-fifth (19%) reported on the perceived condition of shuttle bus stops within their unit. This may indicate that most of these units do not have formally designated shuttle bus stops within their unit, even though visitors use transit within their unit. Of those that reported the condition of shuttle bus stops, almost half (40%) report that the shuttle stops within their unit are in fair/poor condition. Additionally, one-quarter (25%) of park units reported that the lack of shuttle service within their unit negatively impacts visitors' experiences; with over one-third (38%) reporting that the lack of shuttle route options within their unit negatively impacts visitors' experiences. Less than one-half (44%) of SER park units report that passenger crowding on shuttles/public transit/ferries negatively impacts visitors' experiences only on peak demand days or times, while 10 percent report that passenger congestion on transit negatively impacts visitors' experiences most of the time. Under one-half (42%) of SER park units report that the change in visitation over the next 10-years will increase the need for shuttle bus service within their unit, and just under one-quarter (22%) report that transit service improvements are of the highest funding priority in their unit.



Roughly one-quarter of park units within the SER report that visitors used water-based modes of transit to access (26% of SER park units) or travel within (15% of SER park units) their unit. Over one-third (38%) of park units within the SER with water-access facilities report that the perceived conditions of these facilities are in fair/poor condition; close to half (44%) of units report that conditions range from fair/poor to good/excellent condition. Over half (52%) of park units within the SER reported that the visitation change expected over the next 10-years will increase the need for water-based access/transportation. Over one-third (39%) of park units reported that water-access facility improvements are of the highest funding priority in their unit. Additionally, half (47%) of SER park units report that congestion at water-access points negatively impacts visitors' experiences on peak days and times.

Bicycle and Pedestrian Infrastructure

Close to half of all SER park units reported that visitors can bike or walk on either a paved multiuse path or on a road/sidewalk to access their unit (48% on multiuse path; 41% on road/sidewalk), or travel within their unit (67% on multiuse path; 48% on road/sidewalk). Very few (13%) of SER park units report that the condition of their multiuse paths/trails are in good/excellent condition; most park units (74%) report that the conditions of their multiuse paths/trails range from fair/poor to good/excellent. Only one-quarter (25%) of SER park units report that the condition of their bicycle facilities (e.g., bike racks/ lockers) are all in good/excellent condition; one-fifth (20%) reported that all such assets are in fair/poor condition.

One-third (32%) of SER park units report that bicycle-vehicle conflicts negatively impact visitors' experiences most of the time within their unit, while about one-quarter (23%) report that these conflicts negatively impact visitors' experiences only on peak days or times. Additionally, one-quarter (24%) of SER park units report that pedestrian-vehicle conflicts negatively impact visitors' experiences most of the time within their unit, while one-quarter (28%) report that these conflicts negatively impact visitors' experiences only on peak

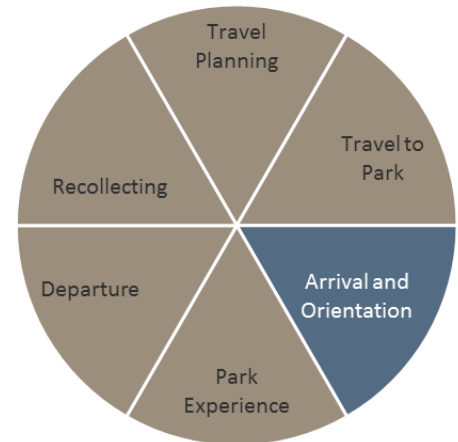




days or times. Close to two-thirds of SER park units report that they expect the visitation change over the next 10-years to increase the need for multiuse paths/trails leading to their unit (65%) and multiuse paths/trails within their unit (61%). One-third (38%) of park units within the SER report that multiuse path improvements within their unit are of highest funding priority.

Park Unit Entry

Over two-thirds (67%) of SER park units report that their entrance stations/booths are in good/excellent condition (it should be noted that only 22 percent of SER park units answered this question – noting that very few have formal entrance stations/booths). Fewer than half (42%) of SER park units report that their entrances/access points are all in good/excellent condition, while most (58%) report that the conditions of their access points range from fair/poor to good/excellent. One-third (33%) of SER park units report that the lack of a sense of arrival/visual indication of arrival to their unit negatively impacts visitors' experiences most of the time. Additionally, half (50%) of SER park units report that traffic congestion at entrance stations negatively impacts visitors' experiences on peak days/times within their unit.



In addition, many (52%) park units within the SER report that static wayfinding or directional signs leading to their unit are not adequate for providing transportation information to visitors, although almost all (96%) park units report that these signs are important to visitors to obtain information. These wayfinding/directional signs both leading to park units and within park units are important for visitors' sense of arrival to the park, and for orientation, wayfinding, and information gathering once visitors have arrived to the park.

Roadway Level of Service

Roadway level of service both leading to and within park units can potentially impact visitor experiences. Level of service of roadways is often measured using traffic congestion metrics (e.g., delays at intersections, flow along roadways), and can impact travel to and throughout the park units, and contribute to visitor frustration and dissatisfaction with the park's transportation system. Close to half (48%) of SER park units report that traffic congestion occurs on the roads leading to their unit either only on peak days or times, or most of the time. Additionally, just over half (52%) of SER park units report that traffic congestion occurs on roads within their unit either only on peak days or times, or most of the time.



While information about traffic counts at entrance stations/access points is important to understanding relative traffic patterns within park units (96% of SER park units report this as important), traffic counts on roadways within park units is equally as important (80% report as important) to understanding visitors' travel patterns and resulting level of service along park roadways. Only one-third (36%) of SER park units report that the traffic count data on roads within their unit is viewed as being acceptable, and over one-quarter (28%) have no easily accessible data on traffic counts on roads within their unit. Additionally, two-thirds (64%) of SER park units report that visitor travel patterns to and within their unit (e.g., GPS tracking, travel diary) is important for management of their unit, while only 12 percent of SER park units report that the visitor travel pattern data they have is acceptable.

While roadway level of service is the traditional metric for traffic and transportation studies along roads,



in the NPS setting, providing a quality visitor experience is inherent to the NPS mission, and includes visitors' use of park roadways. Specifically, park visitors use park roadways for more than getting from point "A" to point "B." Information about transportation-related visitor experience impacts was reported as being important to most (78%) of SER park units, although very few (11%) SER park units report having acceptable data on potential TVE impacts.

Parking Utilization and Turnover

In addition to roadway levels of service, parking lot utilization and turnover of these lots is important to visitors' experiences. Visitors may approach a full parking lot and be denied an opportunity to visit an area of a park that they want to visit, or may be forced to park in unendorsed areas which may negatively impact other visitors' experiences and/or impact natural resources within the park. Understanding of parking utilization and turnover rates is important to minimize potential negative impacts from parking infrastructure on visitors' experiences.

Close to two-thirds (64%) of SER park units report that parking congestion/shortages negatively impacts visitors' experiences within their unit on peak days or times or most of the time. Additionally, 60 percent of SER park units report that visitors parking in unendorsed areas negatively impacts visitors' experiences on peak days or times or most of the time. Finally, over three-quarters (78%) of park units within the SER report that their expected visitation change within the next 10-years will increase the need for parking at popular attractions within their unit. Just under half (42%) of SER park units report that parking improvements are of the highest funding priority within their unit.



Services

Transportation-related services provided to park visitors often include gasoline, groceries, restaurants, convenience stores, and lodging. These services can be provided by NPS or concessionaire run services within park boundaries, and by services located in gateway communities outside of park boundaries. While services within park unit boundaries may be easier to control, park units can develop relationships and partnerships with service providers outside their boundaries to help positively influence visitors' experiences.

As mentioned previously, most visitors to SER park units are from outside of the state within which the park unit is located (62%; Figure 5-8) and/or may consider themselves to be non-local (76%; Figure 5-9). These visitors may require services en-route to the park unit or on their return trip, in addition to services needed during a visit. Also, one-quarter (25%) of visitors to SER park units visit the park for more than one-day on their trip (Figure 5-12) and require some form of lodging and other services within or near the park.



One potential adverse effect of services being provided in gateway communities adjacent to park units is the creation of increased development pressure on park resources. Almost all park units (88%) report that increased commercial or residential development adjacent to their park unit is a problem for them, and over one-quarter (28% for commercial development; 31% for residential development) felt that these external pressures are a significant problem for their unit. These issues need to be taken into consideration when planning for the long range transportation system within the SER. On the positive side, over half (52%) of SER park units report having a transportation-related partnership with another organization,



with one-third (30%) having a partnership with local governments, and one-fifth (19%) having a partnership with the local chapter of commerce/business improvement district. These, along with other partnerships, will help in the future development of services provided to park unit visitors within the SER.

Transit Operations

While providing reliable, timely transit service is important, additional metrics should be studied to understand the impact the transit service has on the TVE. Specifically, crowding at shuttle stops and onboard buses/ferries can lead to potential negative impacts on visitors' experiences, and may limit visitors' ability to fully enjoy the park unit (e.g., viewing scenery out a bus window).

As reported previously, the majority (85% to access; 81% to travel within) of park units within the SER report that visitors used transit/shuttle buses to access or travel within their unit. Just under one-half (44%) of SER park units report that passenger crowding on shuttles/public transit/ferries negatively impacts visitors' experiences on peak days or times while one-tenth (11%) report that passenger congestion negatively impacts visitors' experiences most of the time. In addition, close to one-half (42%) of SER park units report that the change in visitation over the next 10-years will increase the need for shuttle bus service within their unit, and just under one-quarter (22%) report that transit service improvements are of the highest funding priority in their unit.



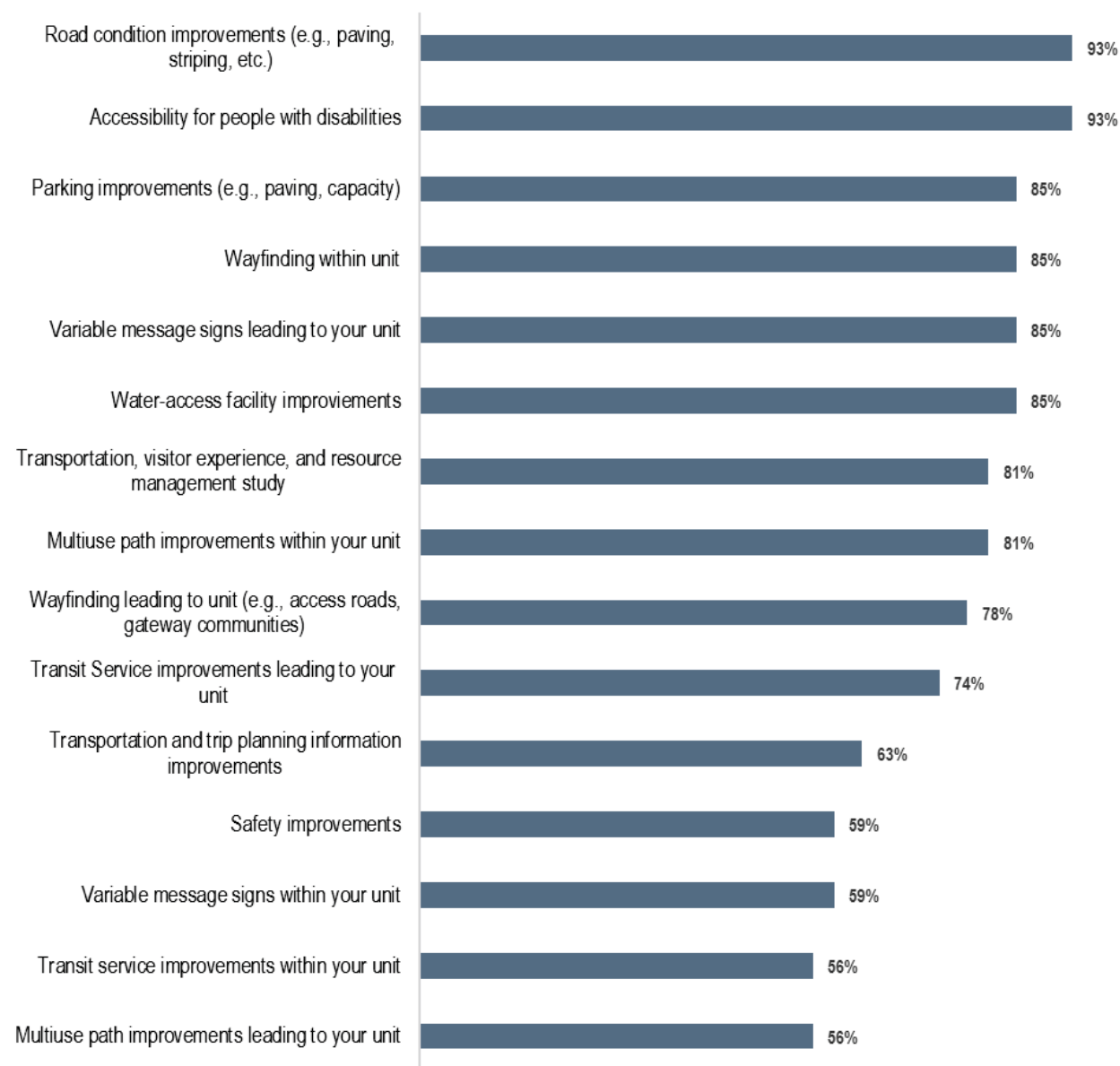
Safety Factors

Safety factors within the SER are discussed within the preceding Safety chapter of this report.

SER Visitor Experiences

The SER Transportation Survey was used to identify transportation-related needs that could enhance visitor experiences. The transportation infrastructure and network within the SER is important to all aspects of the visitor experience at these units. Over three-quarters (78%) of SER park units report that TVE impacts are important to the visitor experience within their unit, while over two-thirds (69%) report that transportation-related resource impacts are important to the visitor experience. While this is the case, only one-third (33%) of SER park units have data on TVE impacts, and very few (11%) feel that these data are acceptable. Similar proportions (38%) of SER park units have data on transportation-related resource impacts, and one-quarter (23%) feel that these data are acceptable. The majority (56%) of park units, as reported within the SER Transportation Survey, rank performing a transportation, visitor experience, and resource management study as the highest or of high funding priority level; over one-quarter (28%) of SER park units feel that this study would be their highest funding priority for transportation improvements. Additionally, just over half (52%) of SER park units feel that their unit's expected visitation change in the next 10 years will increase the need to limit use to protect resources and visitors' experience.

When asked about what needs various transportation improvements would address (Figure 5-25) the majority of SER park units (over 50%) feel that every transportation improvement listed would address a visitor experience need within their unit. Of the 15 improvements listed, three-quarters or more of SER park units feel that nine of these improvements would address a visitor experience need within their unit. This indicates the relative importance of the transportation infrastructure and network on the visitor experience within every SER park unit.

**Figure 5-25: Transportation improvement to address visitor experience needs**

Source: NPS SER LRTP Transportation Survey Results. RSG, February 2015.

These survey results emphasize the need at the park unit level for sufficient roadway improvement and maintenance funding and the importance of providing accessible infrastructure to meet the needs of visitors with disabilities. Beyond these basic needs, noted by almost all units surveyed, a need for sufficient parking capacity, wayfinding both internal and external to park units, and water access were noted as important needs.

Collectively, the scope of needs presented in Figure 5-25 can be used as a baseline for developing a larger strategy to improve TVEs in the SER through the development of a long range transportation plan.



Intelligent Transportation Systems

Intelligent transportation systems (ITS) are an important component of a transportation network, and lead to more informed, understanding, and satisfied visitors within national parks. Intelligent transportation systems are defined by the USDOT as:

The application of advanced information and communications technology to surface transportation in order to achieve enhanced safety and mobility while reducing the environmental impact of transportation. ITS are a set of tools that facilitate a connected, integrated, and automated transportation system that is information-intensive to better serve the interests of the users and be responsive to the needs of travelers and system operators.⁴⁰

ITS components can include technologies that transfer information about travel, traffic, and parking patterns, incident occurrence and emergency management, access/entry management, public transportation usage, as well as other transportation-related information. ITS components will impact every phase of the TVE, and can be used in a number of the factor categories (as described previously) to aid in trip planning, travel to, from, and within park units, and to better utilize parking infrastructure and more equally disperse recreational use of park units (both spatially and temporally).

ITS have been used in a number of parks within the NPS, including many within the SER. Specifically, as of 2011, 10 park units within the SER had at least one ITS component in use, and seven additional park units were then in the planning or design phase or had identified the need for ITS specific components.⁴¹ Several SER LRTP Focus Parks use ITS to provide visitors with up-to-date information: Blue Ridge Parkway has developed a web application to alert visitors to weather-related road closures; Great Smoky Mountains National Park and Kennesaw Mountain National Battlefield Park use VMS to inform visitors of congestion or road closures; and Gulf Islands National Seashore facilitates online ferry ticket sales through a link to the vendor's website.

Figure 5-26 displays the current status (as of 2011) of ITS components within the SER as identified within the Volpe study. The Volpe ITS study identified eight park units within the SER that are in need of specific ITS components. These park units include:

- ❶ Blue Ridge Parkway (focus park)
- ❷ Cape Hatteras National Seashore
- ❸ Canaveral National Seashore
- ❹ Jean Lafitte National Historical Park & Preserve
- ❺ Kings Mountain National Military Park
- ❻ Martin Luther King, Jr. National Historic Site
- ❼ Natchez Trace Parkway
- ❽ Virgin Islands National Park

It should be noted that the Volpe study reported that ITS needs cannot be identified within a park unit until the park unit has performed an ITS Needs Assessment. More park units will go through the ITS Needs Assessment process, and ITS components will further develop and include additional technologies and park units.

⁴⁰ US Department of Transportation, Intelligent Transportation Systems (ITS) Joint Program Office, ITS Strategic Plan: 2015-2019, 2015.

⁴¹ Volpe: The National Transportation Systems Center, Intelligent Transportation Systems in the National Parks Systems and Other Federal Public Lands – 2011 Update, 2011.


Figure 5-26: ITS inventory within the SER (Volpe, 2011)⁴²

ITS in NPS & Public Lands – 2011 Inventory Update																			
	Travel & Traffic Management							Incident Management				Entry Mgt		Public Transportation Mgt				Other	
Public Lands Unit	1) Dynamic Message Signs (portable and permanent)	2) 511 System integration	3) Highway Advisory Radio	4) Trip Planning tools (innovative)	5) Loop Detectors / Traffic Counters	6) Integrated Traffic Monitoring Systems	7) Parking Management / Availability	8) Automated Road Weather Information System	9) Road Surveillance	10) Work Zone Management	11) Incident Management System	12) Automated Entry System	13) Automated Fee / Fare Payment	14) In-Vehicle Electronic Information	15) Vehicle Tracking System	16) Automated Passenger Counters	17) Operations & Fleet Management	18) Coordination with Other Agencies	19) ITS Needs Assessment / ITS Architecture (year)
Blue Ridge Parkway*		○		●														●	
Cape Hatteras NS	●					○	○		○									●	●
Canaveral NS						○	○		○										
Carl Sandburg Home NHS*							●					●							
Chattahoochee River NRA													●						
Chickamauga & Chattanooga NMP					●								●						
Cumberland Gap NP	●		●	●	●	●			●		●								
Cumberland Island NS		●																	
Everglades NP					●														
Great Smoky Mountains NP*	●	●	●	●	●					●								●	●
Gulf Islands NS*	●				●		●				●								
Jean Lafitte NHP & Pres					○	○			○										
Kings Mountain NMP					○	○			○										
Martin Luther King Jr. NHS					○	○			○										
Mammoth Cave NP	●				●														
Natchez Trace Parkway				●	●	○			○		●							●	'08
Virgin Islands NP	○																		

Source: Volpe: The National Transportation Systems Center, Intelligent Transportation Systems in the National Parks and Federal Public Lands - 2011 Update, September 2011.

Legend:

* Focus Park

● Essentially Complete or Complete

● Implementation Planning or Design

○ Identified Need or System Plan

Note: Activity is based on input from FLMA representatives or FLMA-sponsored documents

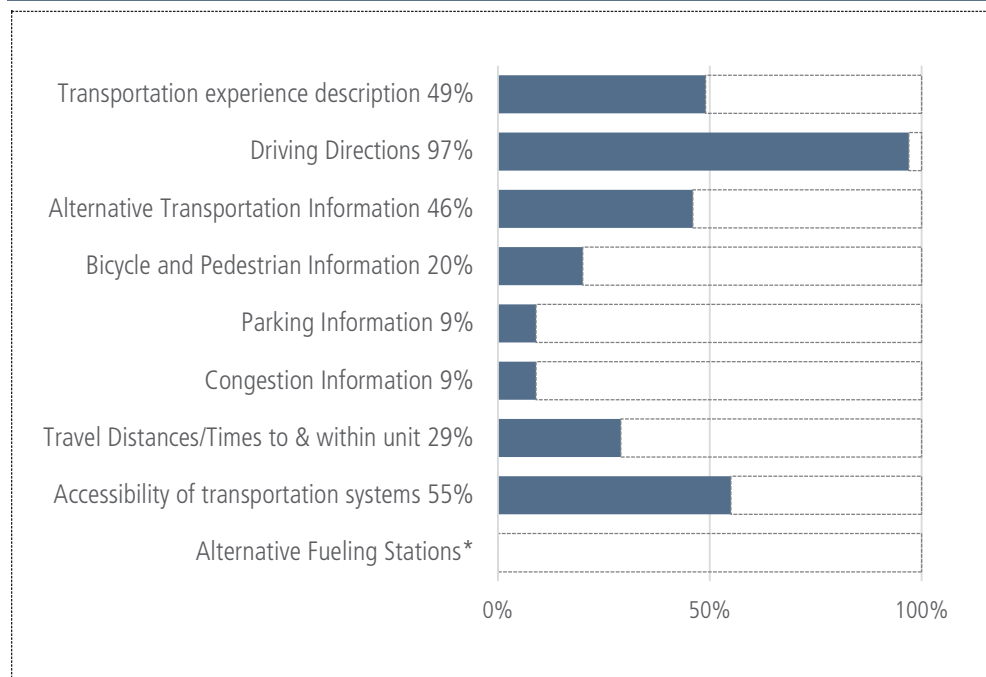
⁴² Volpe: The National Transportation Systems Center, Intelligent Transportation Systems in the National Parks Systems and Other Federal Public Lands – 2011 Update, 2011.



****UPDATED DATA AS OF SEPTEMBER 2016 ****

As people continue to rely more heavily on digital content and information, the National Park Service has prioritized enhancing website content to include nine key traveler information elements (Figure 5-27). Parks in the Southeast Region are continuing work on updating their websites to include all nine elements, and to make those sites useful for mobile devices.

Figure 5-27: SER Park Unit Websites, Information Provided (2014)



* No data are currently available on alternative fueling stations.



6 Resource Protection

The SER is home to many unique natural and cultural resources; its parks share a common mission to conserve these resources for the enjoyment of current and future generations. The transportation systems in and around these parks play an important role in that mission—they provide visitor access to and mobility within the parks, and some of the transportation assets are important cultural assets themselves. Transportation strategies also can be used to protect sensitive resources. On the other hand, these transportation systems may directly or indirectly threaten or damage sensitive resources and ecosystems in or near NPS units. The achievement of this balance is an ongoing challenge. This chapter highlights key transportation resources in the region, ways in which the transportation system may be in conflict with the region’s natural and cultural resources, and existing initiatives to protect, safeguard, and enhance those resources.

Historic Transportation Assets

Many of the transportation assets in the SER are historic and culturally significant. In some cases, these assets play a central role in the park experience, such as in the case of the Blue Ridge Parkway and Natchez Trace Parkway. Other elements of the transportation network may be deemed historic either in their own right or by association with an historic roadway.

Within the SER, 32 percent of the current replacement value is attributable to historic transportation assets, i.e., those that contain some historical or cultural value worthy of historic preservation. This figure includes 31 percent of all roadway assets, 29 percent of parking assets, 61 percent of bridge and tunnel assets, and eight percent of nonmotorized assets. In total, there are 1,567 historic assets catalogued with a total current replacement value (CRV) of over \$2.8 billion, as shown in Table 6-1.

There is a significant backlog of maintenance on the historic transportation assets in the SER (\$550 million), with the majority of that (over \$460 million) on historic roadways. The average facility condition index (FCI) for historic roadway and parking assets are 0.30 and 0.29, respectively, which translates to “Poor” condition. The bridge/tunnel and nonmotorized FCI values are 0.06 and 0.04, respectively, which is considered “Good” condition.

**Table 6-1: SER Historic Transportation Assets, by Asset Type**

Asset Type	Number of Assets	Current Replacement Value	Deferred Maintenance	Facility Condition Index	Asset Priority Index
Roads	430	\$1,525,330,896	\$459,783,742	0.30 – Poor	81
Parking	487	\$97,136,039	\$28,433,621	0.29 – Poor	82
Bridge/Tunnel	596	\$1,103,466,888	\$61,675,021	0.06 – Good	100
Nonmotorized	43	\$18,872,955	\$758,120	0.04 – Good	81
Water	11	\$24,385,172	\$46,367	<0.01 – Good	63
Total	1,567	\$2,769,191,950	\$550,696,871	0.20 – Poor	88

Source: SER asset inventory derived from National NPS Transportation Asset Inventory. Data date: October 1, 2014.

A total of 198 transportation assets in the SER are on the National Park Service's List of Classified Structures (LCS). All assets on the LCS are considered historic, although not all historic assets are on the LCS. Characteristics of SER transportation assets listed in the LCS are summarized in Table 6-2.

Table 6-2: SER Transportation Assets on List of Classified Structures (LCS)

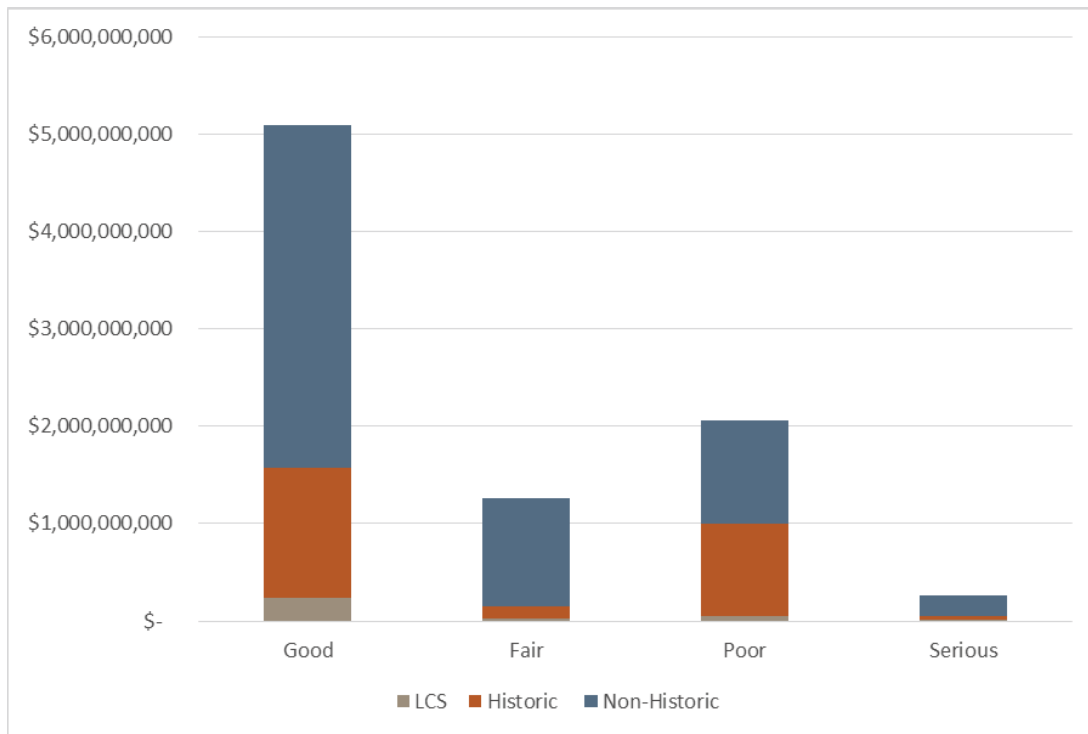
Asset Type	Number of Assets	Current Replacement Value	Deferred Maintenance	Facility Condition Index	Asset Priority Index
Roads	53	\$157,220,796	\$28,310,500	0.18 – Poor	77
Parking	90	\$22,180,691	\$5,646,877	0.25 – Poor	93
Bridge/Tunnel	46	\$122,734,674	\$8,328,370	0.07 – Good	99
Nonmotorized	5	\$3,073,309	\$7,930	<0.00 – Good	77
Water	4	\$20,907,089	\$4,589	<0.00 – Good	68
Total	198	\$326,116,559	\$42,298,266	0.13 – Fair	89

Source: SER asset inventory derived from National NPS Transportation Asset Inventory. Data date: October 1, 2014.

Figure 6-1 and Figure 6-2 compare the types and conditions of historic and non-historic assets across asset conditions and asset types using CRV. Figure 6-1 shows that the condition of historic assets is mixed between 'good' and 'poor' condition, although listed classified structures are typically in 'good' condition. In terms of asset type, the majority of assets are roadway assets followed by bridge/tunnel assets.

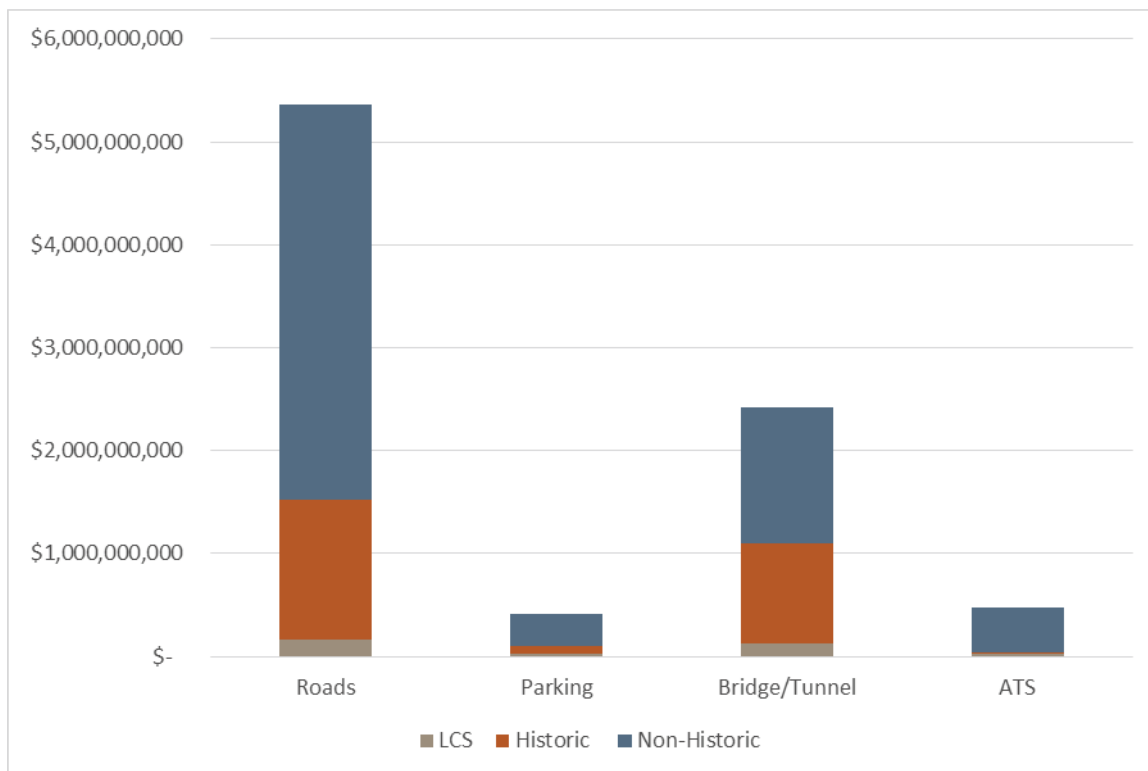


Figure 6-1: Current Replacement Value of Historic Assets by Condition



Source: SER asset inventory derived from National NPS Transportation Asset Inventory. Data date: October 1, 2014.

Figure 6-2: Current Replacement Value of Historic Assets by Asset Type



Source: SER asset inventory derived from National NPS Transportation Asset Inventory. Data date: October 1, 2014.

Table 6-3 shows the distribution of the historic assets among the primary park units. Two park units



contain some 82 percent of all historic transportation asset locations within the region: Blue Ridge Parkway and Natchez Trace Parkway.

The Natchez Trace Parkway is a 444-mile linear park, containing a two-lane road linking Natchez, Mississippi, and Nashville, Tennessee, by way of Alabama. The parkway follows the route of an historic Native American foot trail. The parkway has many trails leading to historic sites, parking areas, and has several major bridge assets. The Blue Ridge Parkway is similar to the Natchez Trace Parkway in that it is a linear park. The Blue Ridge Parkway is 469 miles long, and connects Great Smoky Mountains National Park in North Carolina with Shenandoah National Park (not part of the SER—administered by the NPS Northeast Region) in Virginia. The Blue Ridge Parkway contains many parking areas and nonmotorized trails along the length of its route. It also contains 26 tunnels and several major bridge structures, the most known being the scenic Lynn Cove Viaduct around the base of Grandfather Mountain in North Carolina.

Within Great Smoky Mountains National Park, Newfound Gap Road and Cades Cove Loop Road are visible and well-traveled historic roadway assets. Newfound Gap Road is the main north-south road traversing Great Smoky Mountains National Park. This roadway is 33 miles long and connects Gatlinburg, Tennessee, to Cherokee, North Carolina. It contains two visitor centers, accesses many scenic points of interest, and passes through Newfound Gap at the NC/TN state line. Cades Cove Loop Road is another historic transportation asset within Great Smoky Mountains National Park. It is an 11-mile one-way loop road through an historic valley. It is one of the main attractions within the park, and provides access to scenic vistas, historic sites, and wildlife viewing. This roadway can also be frequently congested, and is reserved for bicycle and pedestrian traffic for two mornings each week from May to September.

Table 6-3: SER Historic Transportation Assets, by Park Unit

Asset Type	Blue Ridge Parkway	Natchez Trace Parkway	Great Smoky Mountains NP	Other Units
Roads (miles)	522	503	74	121
Parking (square feet)	2,949,713	2,130,503	15,304	439,325
Bridges/Tunnels (each)	104	484	3	5
Nonmotorized (linear feet)	61,180	14,105	21,558	59,962
Nonmotorized bridge/tunnel (each)	5	1	5	4
Water (each)	2	-	-	9

Source: SER asset inventory derived from National NPS Transportation Asset Inventory. Data date: October 1, 2014.



Air Quality and Greenhouse Gas Emissions

Emissions from motor vehicles and other nearby pollution sources can have direct and indirect impacts on parks. Those parks with substantial amounts of congestion on park roadways, those that are adjacent to large metropolitan areas, and those located proximate to coal-fired power plants are most likely to have poor air quality. This can affect the quality of the visitor experience, especially for sensitive populations, and may negatively impact natural and cultural resources within the parks. Motor vehicles are also the primary source of greenhouse gas emissions within the parks. While the carbon dioxide and related greenhouse gas emissions have limited short-term impacts, they contribute to the long-term warming of the earth's atmosphere. The warming atmosphere, in turn, has implications for the resources the parks seek to protect. As a result of these long-term impacts and the desire of the NPS to be a good environmental steward, the reduction of pollutants and greenhouse gas emissions is an important part of resource protection within the SER.

The Environmental Protection Agency (EPA) has identified a number of gases, or criteria pollutants, which can negatively impact human health. For each of these pollutants, the EPA has used its authority under the Clean Air Act to enact National Ambient Air Quality Standards (NAAQS). These standards indicate the maximum allowable levels of each pollutant within the outdoor air. Areas with measured pollutants regularly in excess of the maximum allowable levels may be designated as “non-attainment” areas. If the non-attainment area subsequently reaches attainment status, meaning it is in compliance with the NAAQS, and the state has developed a plan for ensuring the long-term improvement and maintenance of air quality, the area is then designated as an air quality “maintenance” area. Maintenance areas are not as critical as non-attainment areas, since the former meets the EPA’s NAAQS, but maintenance areas are known to be sensitive locations potentially at risk of reverting back to non-attainment status.

Table 6-4 shows the counties with SER park units designated as air quality non-attainment or maintenance areas. Five park units are located within non-attainment areas: Great Smoky Mountains National Park, Chattahoochee River National Recreation Area, Kennesaw Mountain National Battlefield Park, Martin Luther King Jr. National Historic Site, and Chickamauga and Chattanooga National Military Park. Four of the six non-attainment areas containing park units are located in and around Atlanta, Georgia, and contain three of the five parks (Chattahoochee River National Recreation Area, Kennesaw Mountain National Battlefield Park, and Martin Luther King Jr. National Historic Site). The remaining two non-attainment areas are Blount County, TN, which contains a portion of Great Smoky Mountains National Park and Hamilton County, Tennessee, which contains a portion of Chickamauga and Chattanooga National Military Park. Two of the parks located within non-attainment areas are SER LRTP Focus Parks: Great Smoky Mountains National Park and Kennesaw Mountain National Battlefield Park. Most parks do not have direct control over the air quality controls affecting the park. Therefore, they must coordinate with local jurisdictions and agencies, typically a metropolitan planning organization (MPO) in order to develop air quality attainment plans.

A further 18 maintenance areas contain SER park units. Six of the maintenance areas include portions of two park units (Great Smoky Mountains National Park and Chickamauga and Chattanooga National Military Park) that are also part of non-attainment areas. The remaining 12 maintenance areas contain all or portions of 11 distinct park units. These maintenance areas are not considered as high risk as the non-attainment areas, since the areas are currently meeting air quality standards and following their air quality plans; however they must be actively monitored to avoid reverting to non-attainment.

**Table 6-4: List of Non-Attainment and Maintenance Areas Containing SER park units**

Affected Park Units	County	MSA	Status	Pollutant(s)
Big Cypress NP	Miami-Dade, FL	Miami-Fort Lauderdale-West Palm Beach, FL	Maintenance	1 Hour Ozone
Biscayne NP	Miami-Dade, FL	Miami-Fort Lauderdale-West Palm Beach, FL	Maintenance	1 Hour Ozone
Blue Ridge Parkway	Haywood, NC	Asheville, NC	Maintenance	8 Hour Ozone
Chattahoochee River NRA	Cobb, GA	Atlanta-Sandy Springs-Roswell, GA	Non-Attainment	PM-2.5 (Moderate) 8 Hour Ozone (Marginal)
Chattahoochee River NRA	Forsyth, GA	Atlanta-Sandy Springs-Roswell, GA	Non-Attainment	PM-2.5 (Moderate) 8 Hour Ozone (Marginal)
Chattahoochee River NRA	Fulton, GA	Atlanta-Sandy Springs-Roswell, GA	Non-Attainment	PM-2.5 (Moderate) 8 Hour Ozone (Marginal)
Chattahoochee River NRA	Gwinnett, GA	Atlanta-Sandy Springs-Roswell, GA	Non-Attainment	PM-2.5 (Moderate) 8 Hour Ozone (Marginal)
Chickamauga & Chattanooga NMP	Catoosa, GA	Chattanooga, TN-GA	Maintenance	PM-2.5
Chickamauga & Chattanooga NMP	Hamilton, TN	Chattanooga, TN-GA	Non-Attainment	PM-2.5 (Moderate)
Chickamauga & Chattanooga NMP	Walker, GA	Chattanooga, TN-GA	Maintenance	PM-2.5
Cowpens NB	Cherokee, SC	n/a	Maintenance	1 Hour Ozone
Everglades NP	Miami-Dade, FL	Miami-Fort Lauderdale-West Palm Beach, FL	Maintenance	1 Hour Ozone
Great Smoky Mountains NP	Blount, TN	Knoxville, TN	Non-Attainment	PM-2.5 (Moderate) 8 Hour Ozone (Marginal)
Great Smoky Mountains NP	Cocke, TN	n/a	Maintenance	8 Hour Ozone
Great Smoky Mountains NP	Haywood, NC	Asheville, NC	Maintenance	8 Hour Ozone
Great Smoky Mountains NP	Sevier, TN	n/a	Maintenance	8 Hour Ozone
Great Smoky Mountains NP	Swain, NC	n/a	Maintenance	8 Hour Ozone
Guilford Courthouse NMP	Guilford, NC	Greensboro-High Point, NC	Maintenance	1 Hour Ozone PM-2.5
Jean Lafitte NHP & Pres	Jefferson, LA	New Orleans-Metairie, LA	Maintenance	1 Hour Ozone
Jean Lafitte NHP & Pres	St. Charles, LA	New Orleans-Metairie, LA	Maintenance	1 Hour Ozone
Kennesaw Mountain NBP	Cobb, GA	Atlanta-Sandy Springs-Roswell, GA	Non-Attainment	PM-2.5 (Moderate) 8 Hour Ozone (Marginal)
Kings Mountain NMP	Cherokee, SC	n/a	Maintenance	1 Hour Ozone
Mammoth Cave NP	Edmonson, KY	Bowling Green, KY	Maintenance	1 Hour Ozone
Martin Luther King Jr. NHS	Fulton, GA	Atlanta-Sandy Springs-Roswell, GA	Non-Attainment	PM-2.5 (Moderate) 8 Hour Ozone (Marginal)
Natchez Trace Parkway	Colbert, AL	Florence-Muscle Shoals, AL	Maintenance	Sulfur Dioxide
Natchez Trace Parkway	Davidson, TN	Nashville-Davidson-Murfreesboro-Franklin, TN	Maintenance	1 Hour Ozone
Natchez Trace Parkway	Lauderdale, AL	Florence-Muscle Shoals, AL	Maintenance	Sulfur Dioxide
Natchez Trace Parkway	Williamson, TN	Nashville-Davidson-Murfreesboro-Franklin, TN	Maintenance	1 Hour Ozone Lead
Ocmulgee NM	Bibb, GA	Macon, GA	Maintenance	PM-2.5 8 Hour Ozone
Stones River NB	Rutherford, TN	Nashville-Davidson-Murfreesboro-Franklin, TN	Maintenance	1 Hour Ozone

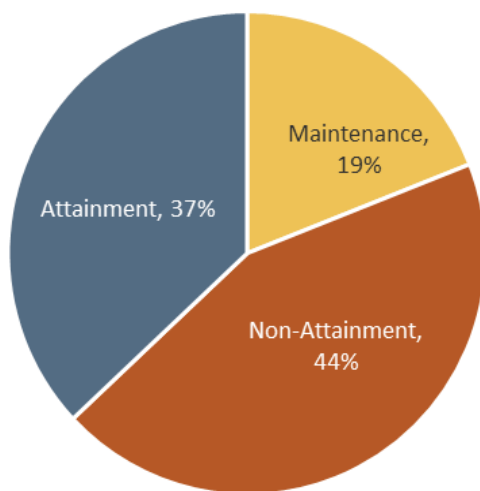
Source: U.S. Environmental Protection Agency, *The Green Book for Nonattainment Areas for Criteria Pollutants*, As of January 30, 2015.

A high proportion of the SER's park visitors are to park units located in areas with poor air quality (see



Figure 6-3). Park units with the most visitors also happen to be those located near major population centers where there are a large number of potential visitors and air quality issues. Almost 44 percent of the region's visitors are visiting the five park units in non-attainment areas (this statistic includes parks located partially in non-attainment and partially within a maintenance area). Two parks, Great Smoky Mountains National Park and Kennesaw Mountain National Battlefield Park, account for the bulk of these visits, with 22 percent and 17 percent of the SER's visitors, respectively. Two additional units, Chickamauga and Chattanooga National Military Park and Chattahoochee River National Recreation Area, account for slightly over five percent of the remainder, with Martin Luther King Jr. National Historic Site covering the remaining half percent. An additional 19 percent of park visits in the SER are to parks located in maintenance areas, predominantly to two park units, Natchez Trace Parkway and Guilford Courthouse National Military Park, with 11 percent and four percent of the region's park visitation, respectively. The remainder of park visits in maintenance areas comprise visits to nine additional units.

Figure 6-3: Distribution of SER Visitors by Air Quality



Source: National Park Service, Public Use Statistics Office; and U.S. Environmental Protection Agency, The Green Book for Nonattainment Areas for Criteria Pollutants, As of January 30, 2015.

Areas designated as non-attainment or maintenance areas for ozone, particulate matter, or carbon monoxide may be eligible for Congestion Mitigation and Air Quality (CMAQ) funding for projects that provide air quality benefits. This program is administered jointly by the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) with funds apportioned to states based on the level of non-attainment with NAAQS. The program supports surface transportation enhancements that reduce congestion and/or improve air quality, such as transit service within National Parks.

National park system units wishing to make use of CMAQ funds for transit service or other congestion improvement measures must coordinate through the applicable state DOT which is charged with administering the CMAQ program within each state. Funds can be used for new transit service, system or service expansion, new transit vehicles, or fare subsidies.⁴³

⁴³ National Park Service, CMAQ and NPS: Exploring the Applicability of the Congestion Mitigation and Air Quality Improvement Program to NPS Transit, 2014.

****UPDATED DATA AS OF SEPTEMBER 2016 ****

The National Park Service Air Resources Division tracks air quality for park units nationally. The 2013 *Air Quality in National Parks* report uses the following measures to characterize air quality in a park unit:

- Visibility – how well and far visitors can see
- Ozone – impacts human health and vegetation
- Sulfur and nitrogen deposition – impacts ecosystem health through soils and waters

Table 6-5 shows that 56 park units in the Southeast Region were reviewed as a part of this study. No Southeast Region park that was reviewed received the rating “Indicator is in Good Condition” for any of the measures evaluated.

Table 6-5: Southeast Region Air Quality Condition

	Warrants Significant Concern	Warrants Moderate Concern	Indicator is in Good Condition
Visibility	55	1	0
Ozone	21	34	0
Wet Nitrogen Deposition	48	8	0
Wet Sulfur Deposition	55	1	0

Source: National Park Service, *Air Quality in National Parks*, 2013.

Note: No Ozone indicator was reported for Virgin Islands National Park.

Transportation-Related Resource Impacts

The context-sensitive relationship between transportation and the protection of resources is vital to successful stewardship of SER parks. Transportation and its interface with the natural environment must be understood and carefully managed to meet the intent of the NPS dual mission. While access and visitor enjoyment must be supported, so must be the resources, whether cultural or natural.

Unintended transportation impacts on resources could add up to significant threats over time when considered cumulatively. In the SER the type and extent of resource impacts related to transportation can vary greatly from park to park. Resource threats include reduction in and damage to threatened and endangered species and their habitat, wildlife/vehicle crashes, declining visual resources (scenic vistas and cultural landscapes), inclement weather damage (storm water runoff, drainage, flash flooding), declining vegetation species, noise pollution, and reduction in night/dark skies.

SER park units face a number of challenges in meeting their missions related to preservation and interpretation. For many parks, a major challenge is the sustained increase in visitation and use over the past few decades, which one SER park staff member termed “visitors loving the parks to death.” For those park units whose primary mission is to preserve and interpret natural, cultural, and historical assets, heavy use of the parks’ transportation infrastructure poses threats to the parks’ ability to meet that mission.

Several parks in the region, particularly those in urban and suburban locations, experience relatively high levels of non-recreational visitation, and in many cases those levels are increasing. Non-recreational visitation, which often involves commuter traffic passing through a park unit, can have significant negative impacts on natural resources and air quality, in addition to negative impacts to visitor experience and transportation assets.

SER park units seek to strike a balance between providing safe and adequate access to natural, cultural and historical offerings while also preserving and maintaining these assets for future enjoyment and appreciation. Doing so can entail difficult tradeoffs—for instance, building a comfort station improves visitor experience but tends to induce additional usage, which can have negative resource impacts.



Encroachment from surrounding development places further pressure on park resources. Increased trail usage can lead to degradation of the trail itself, increased runoff, and impacts to nearby natural and historical resources. This issue is particularly acute for urban and suburban park units that are seeing increasing levels of recreational uses, such as Kennesaw Mountain National Battlefield Park. For park units that preserve cultural landscapes as part of their mission, development pressures can impact critical viewsheds. Informal parking on roadsides and informal trail access points are additional sources of resource degradation at SER park units.

The impacts of the transportation system on water resources can be significant as well. Surface transportation impacts include modification to surface water flow and groundwater flow, degradation of water quality, degradation or loss of wetlands, and impact on aquatic organisms. Water-based transportation impact resources through changes to habitat, introduction of invasive species, and degradation of water quality.⁴⁴ Eight park units in the SER have water-based transportation systems, although the impacts of those systems on water resources have not been fully evaluated or documented.

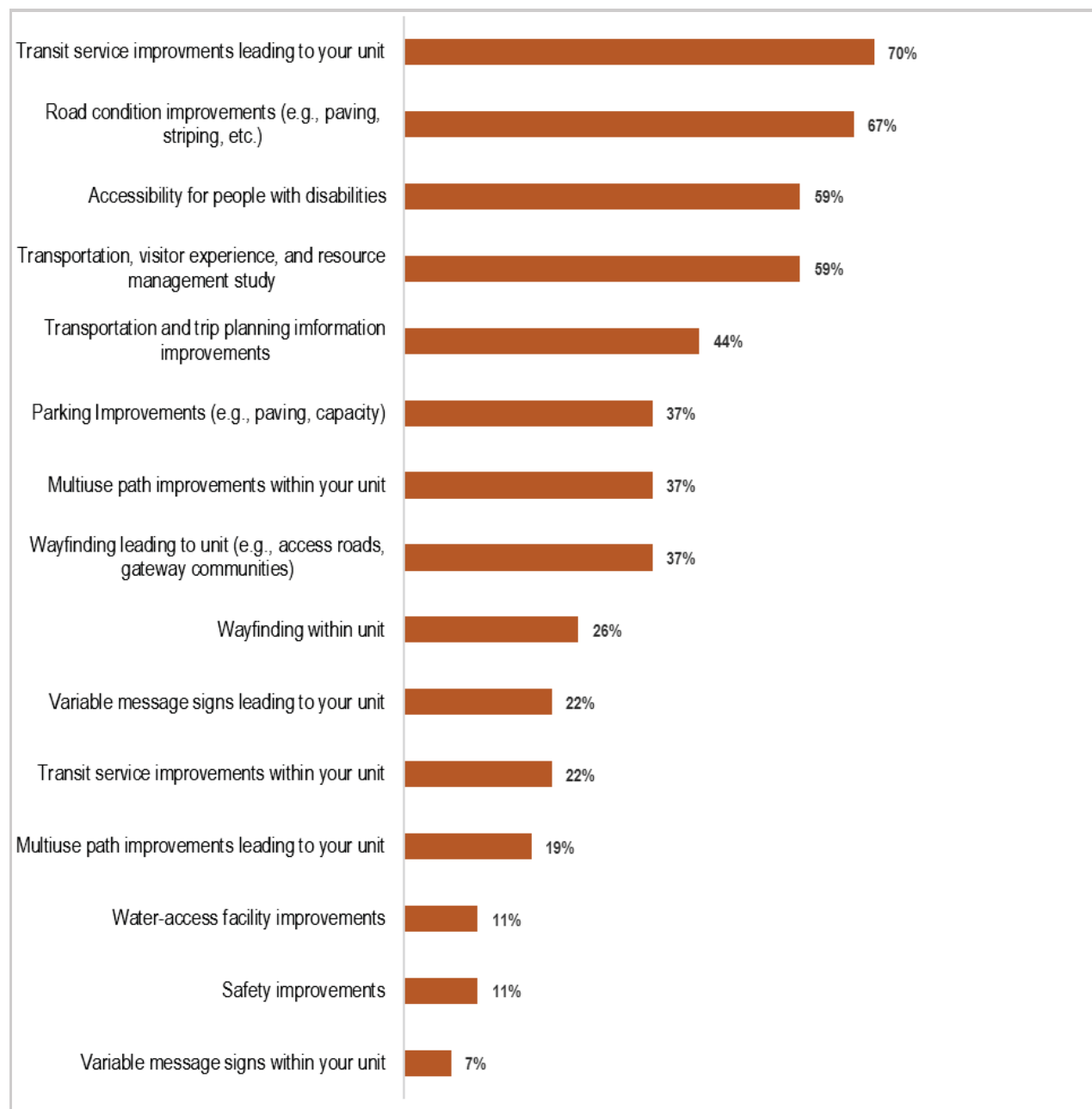
A number of SER LRTP Focus Parks reported that erosion was a significant issue affecting both their transportation facilities and water quality. In many cases, this erosion was due to a lack of maintenance of culverts and roadside drains and ditches.

According to the SER Transportation Survey results, over two-thirds (69%) of respondents report that transportation-related resource impacts are important to the visitor experience.⁴⁵ Only one-third (38%) of respondents report to have data on transportation-related resource impacts, and one-quarter (23%) feel that these data are acceptable for their needs. The majority (56%) rank performing a transportation, visitor experience, and resource management study as the highest or of high funding priority level; over one-quarter (28%) feel that this study would be their highest funding priority for transportation improvements. Additionally, just over half (52%) feel that their unit's expected visitation change in the next 10 years will increase the need to limit use to protect resources and visitors' experience.

Figure 6-4 displays SER park unit responses to the question of how specific transportation improvements would address resource protection needs within their park. The most commonly reported transportation improvements that SER park units feel will address a resource protection need are transit service improvements leading to their unit (cited by 70% of respondents) and road condition improvements (67%). Additionally, a majority report that transportation improvements for accessibility for people with disabilities will meet a resource protection need (59%), and the same majority report that a transportation, visitor experience, and resource management study will also meet a resource protection need.

⁴⁴ National Park Service, Draft National Long Range Transportation Plan, 2014.

⁴⁵ NPS SER LRTP Transportation Survey Results. RSG, February 2015.

**Figure 6-4: Survey Results - Whether a particular transportation improvement addresses a resource protection need**

Source: NPS SER LRTP Transportation Survey Results. RSG, February 2015.

As of July 2015, the NPS was finalizing the Natural and Cultural Resource Stewardship Guidance Decision Support Tool (RSGT), which provides a means to enhance the consideration of natural and cultural resources in the planning process. It draws on approved NPS data; ensures that baseline natural and cultural goals, objectives and strategies are considered in a consistent manner; and represents a holistic picture at the park, regional or national scale. The tool was not available for use during the early phases of this planning process, but may be useful in developing meaningful and measurable implementation strategies in later planning phases. In future iterations of the SER LRTP, the RSGT may be able to provide needed documentation of at-risk resources by assessing which resources are likely to be affected by transportation infrastructure and transportation improvements.

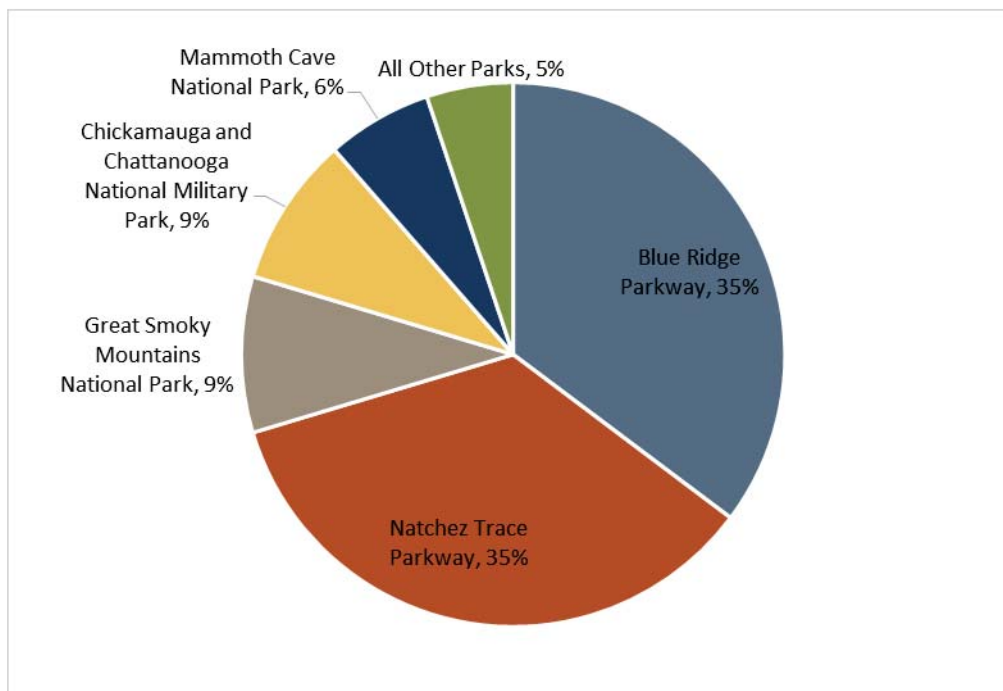


Wildlife-Vehicle Crashes

Wildlife-vehicle crashes represent a relatively straightforward measure of the impact of the transportation system on park resources and have been shown to have a significant impact on wildlife populations within the national park system.⁴⁶

There were more than 3,400 reported wildlife-vehicle collisions in the SER between 1990 and 2005, representing 22 percent of all motor vehicle crashes in that time period. This far exceeds the proportion of wildlife-vehicle collisions across the whole NPS system (10% of all collisions).⁴⁷ Approximately 70 percent of those collisions occurred along the region's two parkways—Blue Ridge Parkway and Natchez Trace Parkway—which had roughly equal numbers of wildlife-vehicle collisions (Figure 6-5). Another three parks—Great Smoky Mountains National Park, Chickamauga and Chattanooga National Military Park, and Mammoth Cave National Park—accounted for a quarter of all wildlife-vehicle crashes. The remaining 61 parks in the region accounted for only five percent of all wildlife-vehicle crashes.

Figure 6-5: SER Wildlife-Vehicle Crashes, 1990-2005



Source: National Park Service. Servicewide Traffic Accident Reporting System (STARS) database. 1990-2005.

⁴⁶ National Long Range Transportation Plan, National Park Service (in development).

⁴⁷ National Long Range Transportation Plan, National Park Service (in development).



According to a review of threatened and endangered species, there are 21 species for which road mortality is a major threat to the species' survival.⁴⁸ Of those 21 species, nine can be found within geographic footprints occupied by SER parks (see Table 6-6).

Table 6-6: Threatened and Endangered Species in the SER at risk of road mortality

Park Unit	Endangered and Threatened Species
Big Cypress National Preserve	American crocodile, Florida panther, eastern indigo snake, gopher tortoise, Audubon's crested caracara, Florida scrub-jay
Blue Ridge Parkway	Bog turtle
Canaveral National Seashore	Florida scrub-jay
Everglades National Park	American crocodile, Florida panther, eastern indigo snake, gopher tortoise, Audubon's crested caracara, Florida scrub-jay
Fort Sumter National Monument	Frosted flatwoods salamander
Great Smoky Mountains National Park	Bog turtle
Gulf Islands National Seashore	Alabama red-bellied turtle, gopher tortoise, reticulated flatwoods salamander

Sources: Huijser, M.P. et al, "Wildlife-Vehicle Collision Reduction Study: Report to Congress," 2005; NPS; USFWS.

UNESCO World Heritage Sites and Biosphere Reserves

The United Nations Educational, Scientific, and Cultural Organization (UNESCO) is a United Nations agency whose purpose is to promote education, science, and culture as a means to achieving its charter missions of promoting justice, peace, and human rights. UNESCO has designated some places of extraordinary cultural significance as World Heritage Sites. In addition, UNESCO has also designated Biosphere Reserves, which are internationally recognized protected natural areas.

UNESCO World Heritage Sites include both natural and manmade treasures, such as lakes, deserts, mountains, forests, monuments, or cities. These places have outstanding cultural or natural importance to the common heritage of humanity, which UNESCO deems worthy of preservation.

Sites are selected from a list nominated by the United States' United Nations delegation, and generally must be of outstanding universal value and meet one of the four "Natural Criteria":

- Contains superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance
- Is an outstanding example representing major stages of Earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features
- Is an outstanding example representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems, and communities of plants and animals
- Contains the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation

⁴⁸Huijser, M.P. et al, "Wildlife-Vehicle Collision Reduction Study: Report to Congress," No. FHWA-HRT-08-034, 2008.



Of 22 UNESCO World Heritage Sites within the U.S., three are NPS units in the SER, including two focus parks:

- Everglades National Park
- Great Smoky Mountains National Park (SER LRTP Focus Park)
- Mammoth Cave National Park (SER LRTP Focus Park)

Their designation supports and celebrates the worldwide recognition of the importance of these three park units. Maintenance of this designation involves monitoring and participation in a six-year periodic reporting cycle, performed on a regional basis (all U.S. and Canadian UNESCO World Heritage Sites submit a single North American report). Reporting involves extensive data collection in order to respond to a questionnaire that covers the impact of transportation systems and the built environment, tourism and recreational activities, and climate-change-related factors on preservation efforts. The World Heritage Committee can decide to remove a site from the World Heritage List if it determines that a site has deteriorated to the point that it has “irretrievably lost” the characteristics that led to its inclusion on the List.⁴⁹

UNESCO Biosphere Reserves are internationally protected natural areas meant to promote a balanced relationship between nature and humans. These locations assist in ensuring sustainability by:

- Developing a worldwide network of places to be used as demonstration areas and learning sites with the goal of maintaining and developing ecological and cultural diversity, and securing the ecosystem
- Developing and integrating knowledge and science to advance the understanding of interactions between people and the natural environment
- Building global capacity for the management of complex socio-ecological systems, particularly through encouraging greater dialogue at the science-policy interface; environmental education; and outreach to the wider community

Five SER parks have been designated UNESCO Biosphere Reserves (which includes two units that are also World Heritage Sites):

- Everglades National Park
- Dry Tortugas National Park
- Mammoth Cave National Park (SER LRTP Focus Park)
- Congaree National Park
- Virgin Islands National Park

Maintenance of the Biosphere Reserve designation involves each site participating in a 10-year review and reporting cycle. In addition to displaying a commitment to sustainable development and biological diversity conservation, sites must report on the impact of development pressures, the built environment, and tourism and recreation on the state and performance of the Biosphere Reserve. Sites deemed to not have met the general criteria for biosphere designation as established by UNESCO may be withdrawn by the World Network of Biosphere Reserves.⁵⁰

⁴⁹ UNESCO World Heritage Convention, <http://whc.unesco.org/>.

⁵⁰ UNESCO Man and the Biosphere Programme, <http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/>.



7 Next Steps

This Baseline Conditions Assessment report is the first in a series of interim deliverables that will inform the development of the SER LRTP. Subsequent interim deliverables will include:

- The **Future Conditions Assessment**, which will detail the financial resources; asset conditions; macro trends; and financial, operational and maintenance, environmental, and management challenges that the SER can reasonably expect to encounter over the next 20 years.
- The **Needs Assessment**, which will assess the Future Conditions against the Baseline Conditions to identify the anticipated gap in available resources—or needs—for the region’s transportation system.
- A **Strategies Analysis**, which will examine a range of investment strategies for the SER transportation system. The Funding and Financial Analysis Technical Report will document this process, along with the identified preferred investment strategy for the SER LRTP.