Washington Support Office

National Park Service
U.S. Department of Interior

Yosemite National Park, CA

NPS National Transit Inventory and Performance Report, 2017

Cape Cod National Seashore, MA

NPS National Transit Inventory and Performance Report

Executive Summary

2017

Acadia National Park, ME

This is a summary of the 6th annual National Park Service Transit Inventory and Performance Report. This effort:

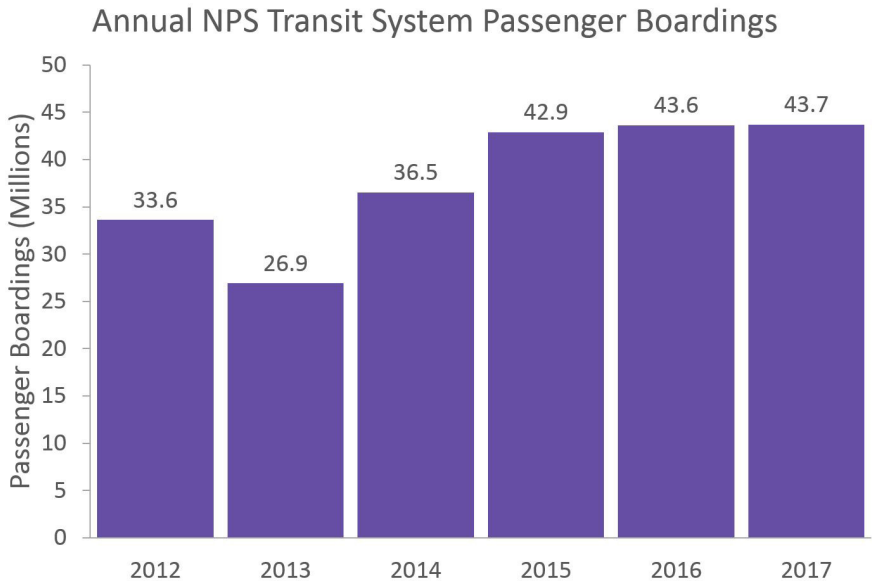
1. Identifies NPS transit systems across the country,
2. Tracks the operational performance (e.g. boardings) of each system, and
3. Inventories NPS and non-NPS owned transit vehicles and collects detailed vehicle information.

43.7 Million
Passenger Boardings

65 Parks
Represented

99 Transit Systems

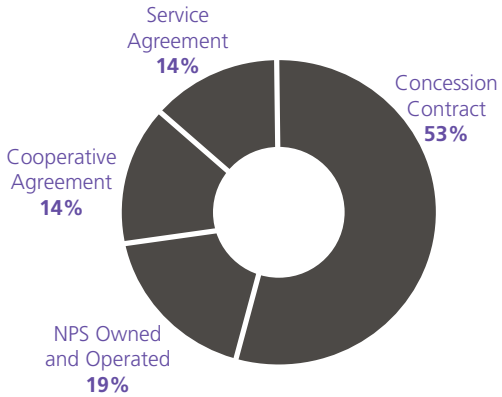
828 Vehicles



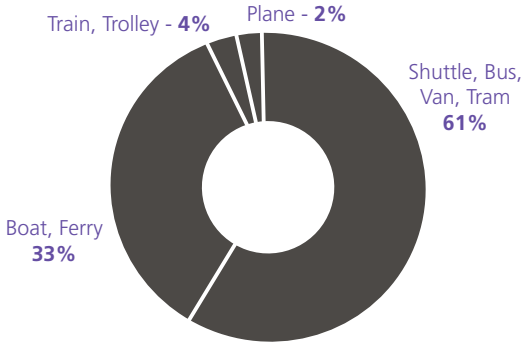
Of the 99 transit systems, the top ten transit systems account for the majority of passenger boardings. The top ten transit systems, in terms of passenger boardings, accounted for 84% of the 43.7 million passenger boardings in 2017. The systems with the highest boardings are located at Ellis Island/Statue of Liberty National Monuments, Grand Canyon National Park, Zion National Park, Yosemite National Park, and Alcatraz Island in Golden Gate National Recreation Area.

NPS transit systems are modest in size. The majority (80%) of transit systems have a fleet of 1 to 10 vehicles. Only one system has a fleet of greater than 40 vehicles (Denali National Park).

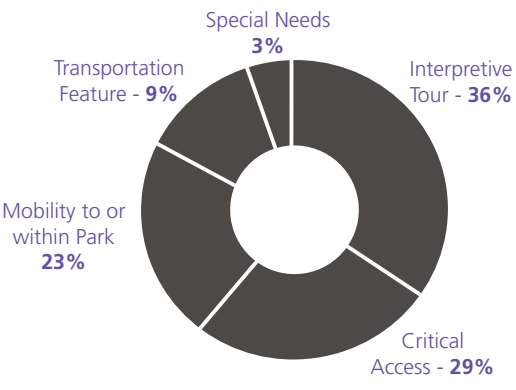
Business Model
(by # of transit systems)



Mode
(by # of transit systems)

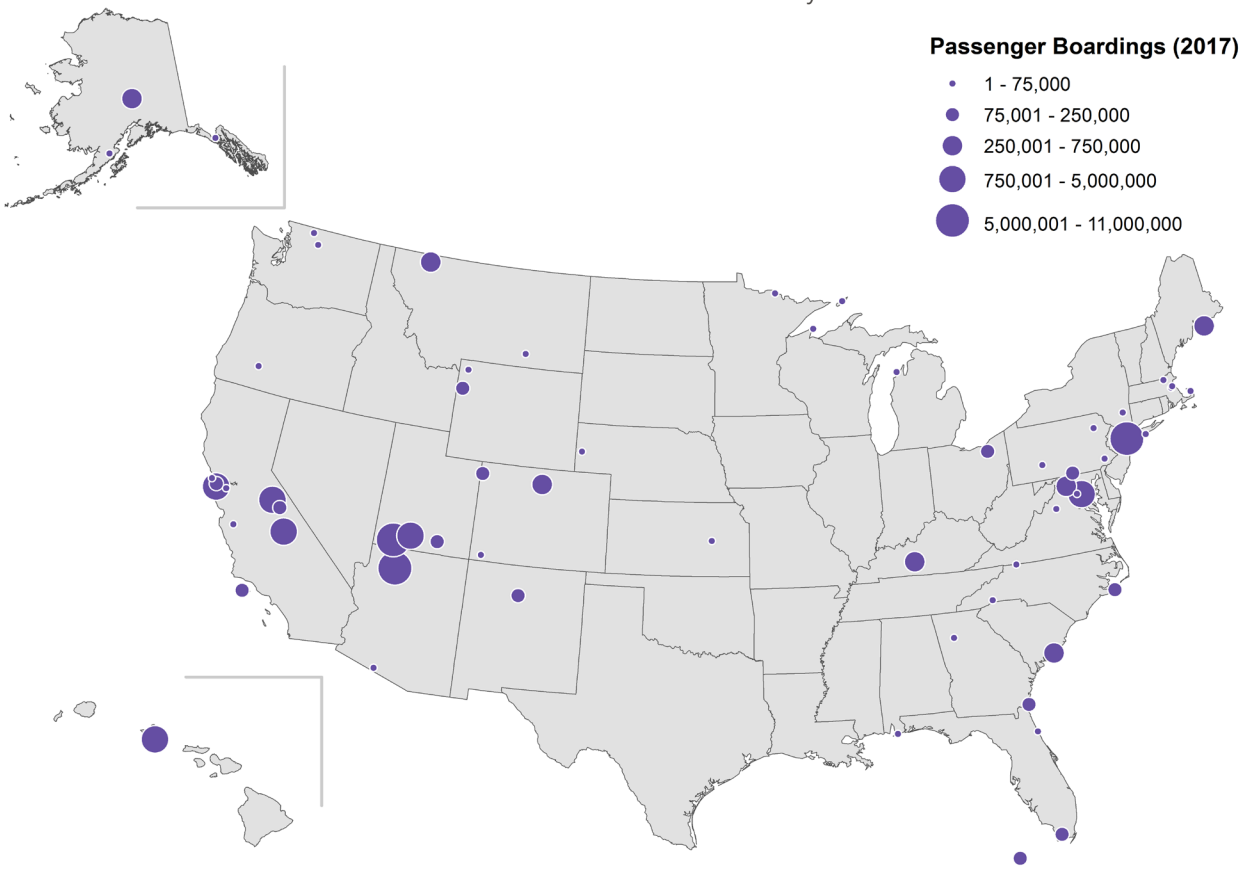


Purpose
(by # of transit systems)



A higher percentage of NPS-owned transit vehicles operate on alternative fuel compared to non-NPS transit vehicles. 62% of NPS-owned vehicles operate on alternative fuel, while 20% of non-NPS-owned vehicles operate on alternative fuel.

NPS Transit systems generally operate on a seasonal basis. Most transit systems (53%) operate three to six months of the year while approximately 31% of the NPS transit systems operate year-round. The remaining 16% of systems operate 2 months or 7 to 10 months of the year.



Performance Measures

Visitor Experience

The majority of the NPS-owned transit system vehicles are accessible for people with mobility impairments. A total of 65% NPS-owned vehicles are accessible to people with mobility impairments (e.g. require wheelchair lift).

Operations

NPS leverages the private sector to provide the majority of transit services. 81% of NPS transit systems are operated by a non-NPS entity under an agreement or contract. These systems account for almost 99% of passenger boardings service-wide. The remaining 19% of transit systems are owned and operated by NPS and account for the remaining 1% of passenger boardings.

Environmental Impact

NPS transit systems mitigate vehicle emissions. The net CO_2 emissions savings of the 675 transit vehicles evaluated (excludes planes, rail, snow coaches, and vehicles with incomplete data) was equivalent to removing 14.8 million personal vehicle trips, and 588 million passenger vehicle miles from the road.

Asset Management

NPS faces over $91 million in transit vehicle recapitalization needs in the next ten years. NPS-owned shuttle/bus/van/tram vehicles have an estimated $91 million in recapitalization needs between 2018 and 2028. Parks with estimated transit vehicle replacement costs over $1 million during the next ten years are: Acadia National Park, Glacier National Park, Grand Canyon National Park, Yellowstone National Park, Yosemite National Park, and Zion National Park.

Transit Inventory System Case Studies

The 2017 NPS Transit Inventory and Performance Report includes profiles of three parks with transit systems that promote regional connectivity to transit options outside park. The case studies span urban to rural settings, and highlight how this connectivity helps visitors both access and experience the parks in different ways. Regional connectivity options are important for people without a private vehicle or for those who would like to leave their private vehicle behind for their park visit. NPS partnerships are an important part of operating many of the NPS transit systems as well as making regional connectivity options possible.

Case Study #1

System: Cuyahoga Valley Scenic Railroad
Park: Cuyahoga Valley National Park
Location: Ohio

Case Study #2

System: D.C. Circulator
Park: National Mall and Memorial Parks
Location: Washington, D.C.

Case Study #3

System: Yosemite Transportation System
Park: Yosemite National Park
Location: California

Cuyahoga Valley National Park

Snapshot

System
Cuyahoga Valley Scenic Railroad (CVSR)

Agreement Type
Cooperative Agreement

Established
NPS partnership est. with CVSR in 1989

2017 Boardings
~213,500

Average Trips per Day
2 trips (Tues. - Thurs.) seasonal
3 trips (Fri. - Sat.) seasonal

2017 Fleet
4 trains (32 total cars)

Multimodal Options Facilitate Regional Connectivity

The Cuyahoga Valley Scenic Railroad (CVSR) is a non-profit organization providing excursion rail service through Cuyahoga Valley National Park (CUVA). CUVA established a cooperative agreement with CVSR in 1989 to operate the 26 mile rail route from Rockside Station, about 10 miles south of downtown Cleveland, OH, to Northside Station in Akron, OH.

The partnership between CUVA and CVSR provides visitors a unique opportunity to access and experience the park by rail. A basic excursion ticket allows visitors to enjoy a 3.5 hour roundtrip scenic train ride through the Cuyahoga Valley; deboard at any of the eight stations; explore the park, and catch a subsequent train the same day. The CVSR Train Tracker app provides information on station locations and when trains are arriving. The app also integrates the CUVA audio tour, which plays clips about the park and its history along different points of the ride.

The multiuse Ohio & Erie Canal Towpath Trail runs adjacent to the train, and CVSR's Bike Aboard! program gives visitors flexibility in how they experience the park by riding the train in one direction and biking or hiking back the other direction. The eventual extension of the Towpath Trail into downtown Cleveland will allow continuous bicycle access from downtown into the park. CUVA is one of the many regional partners involved in the planned extension of the multi-county Towpath Trail lead by Canalway Partners (a non-profit organization).

The CVSR's north-south orientation between Cleveland and Akron creates the opportunity to both connect and serve these two population centers. CVSR's northern most station, Rockside Station, is located at the northern tip of CUVA, and the Greater Cleveland RTA operates two bus routes that stop approximately 0.25 miles to 0.75 miles away from the station. The regional connectivity options are more accessible in downtown Akron where Northside Station is located. The Loop, a free bus service offered through CVSR's partnership with the Akron METRO RTA, has a two-fold benefit of helping connect people with CVSR and also bringing people into Akron. The Loop has operated for the past 10 years from June through October, Wednesday through Sunday, connecting Akron's Northside Station to key sites within the downtown such as the Akron Zoo, Art Museum, and the METRO RTA transit center. Northside Station can also be reached via other Akron METRO RTA routes that have stops with an approximately 0.5 mile walk.

National Mall and Memorial Parks

Snapshot

System
D.C. Circulator

Agreement Type
Cooperative Agreement

Established
2015

2017 Boardings
~360,000

Average Trips per Day
74 trips
(10 minute headways)

2017 Fleet
13 heavy-duty shuttles

NPS and DDOT Partnership Provides Access to National Mall Sites

The District Department of Transportation (DDOT) began operating the D.C. Circulator National Mall Route in 2015 under an agreement with the National Mall and Memorial Parks (NAMA) after several years of collaborative planning. This partnership highlights the benefits of working with a local transit agency; through this partnership, the NPS can focus on managing the park while ensuring visitors are provided exemplary transit service. NAMA is serviced by many private tour companies, but the park's agreement with DDOT is unique in that it allows visitors to use an affordable public transit service that is integrated into the local and regional transit network to visit the monuments and museums on the National Mall.

The D.C. Circulator National Mall route is one of six Circulator routes and consists of 15 stops. This route connects visitors directly to Union Station, a centrally located transportation hub which provides access to Metrorail, Amtrak, inter-city bus lines and additional transit connections. The route also connects to the Smithsonian-National Mall Metrorail stop centrally located on the National Mall. Passengers pay fares using a Washington Metro SmarTrip card. The trips costs only $1 for two hours of unlimited boardings, and provides an affordable and convenient service. The D.C. Circulator provides multimodal connectivity by equipping buses with bicycle racks, allowing visitors another car free option to access the National Mall. The D.C. Circulator connects to the Capital Bikeshare system, with nine stations located on the National Mall, including stations at the Lincoln and Jefferson Memorials, which are among the highest-used stations in the 400+ station regional bikeshare system. Additionally, NAMA was recently awarded the goDCgo Outstanding Partner Award for its commitment to implementing transportation demand management measures, including the D.C. Circulator system.

NAMA dedicates the revenue from their recently installed parking meters to fund a portion of the route's operation costs. In addition, NAMA allows the Circulator sole access to the bus facility located on Hains Point, reducing facility and travel time costs for the service. DDOT introduced 14 new electric buses to the D.C. Circulator fleet in 2018, which will be reflected in the 2018 Transit Inventory.

Yosemite National Park

Snapshot

System
Yosemite Transportation Services

Established
1970

Agreement Type
Concessions Contract
Cooperative Agreeement
Service Contract

2017 Boardings
~3.4 million

2017 Fleet
27 buses, plus partner owned equipment

Transit Connectivity in a Rural Environment

In 1970, Yosemite National Park (YOSE) implemented a free visitor shuttle system intended to reduce the number of vehicles on park roads while preserving the park's natural resources. Since then, increasing visitation remains a challenge for the park, and the number of visitors has doubled to an average 4.3 million annually, with a peak of 5.1 million in 2016. Currently, Yosemite owns 24 40-passenger, heavy-duty transit buses and three smaller shuttle buses, which are operated by the park concessioner for visitor transportation services. The concessioner also owns three 45-passenger motor coaches that are used to deliver other transportation services, such as seasonal ski and hiker shuttles, and commercial sightseeing tours in peak season.

There are currently seven transportation service routes operating within the park: three regularly-scheduled free routes and four fee-based seasonal routes. Transportation services are funded through the park's concessions contract, transportation fee revenue that is collected with entrance fees, and passenger fares.

Year-round free shuttle services are provided in east Yosemite Valley, where shuttles transport visitors to park facilities and attractions including lodges, trailheads, campgrounds, parking areas, and the visitor center. Additionally, free shuttles to El Capitan/west Yosemite Valley and to the Mariposa Grove of Giant Sequoias are operated during the peak season. Fee-for-service routes include summer access to trailheads in Tuolumne Meadows, and winter service to the Yosemite ski and snowboard area. A concessioner operates guided open-air tram tours of Yosemite Valley, and a motor coach "grand tour" that includes stops in Yosemite Valley, Glacier Point, Wawona and the Mariposa Grove. These services are offered most of the year (excluding winter) through a concessioner-operated reservation and ticketing system.

Since 2002, Yosemite has benefitted from participation in the Yosemite Area Regional Transportation System Authority (YARTS), a joint-powers authority consisting of local county governments. YARTS provides transit service to Yosemite from surrounding communities: from railway stations, airports, hotels, and other stops in Fresno, Mariposa, Merced, Mono, and Tuolumne Counties. YARTS offers connecting or "thruway" service on behalf of Amtrak and Greyhound, and sells tickets to national and international travelers through an online reservation and ticket service. YARTS also provides a convenient means of travel for local residents and park employees. One year-round route and three summertime routes connect local communities and the park. YARTS service continues to grow year by year, but currently serves only two percent of the park's annual visitation.

After nearly fifty years, Yosemite remains committed to improving and refining its transportation services while meeting the changing needs of visitors and protecting resources. Both in-park shuttles and transit services provide park visitors with options for exploring the park without driving a personal vehicle. The transit options in Yosemite and the surrounding areas reduce vehicle congestion while improving the visitor experience.

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Acronyms

The following acronyms are used in this report:

ACAD	Acadia National Park
ADAM	Adams National Historic Park
AKR	Alaska Region
ALCA	Alcatraz Island
ALPO	Allegheny Portage Railroad National Historic Site
APIS	Apostle Islands National Lakeshore
ATP	Alternative Transportation Program
ATSLAM	Alternative Transportation Systems Lifecycle Asset Management
BAND	Bandelier National Monument
BLRI	Blue Ridge Parkway
BOHA	Boston Harbor Islands National Recreation Area
BRCA	Bryce Canyon National Park
BUIS	Buck Island Reef National Monument
CACO	Cape Cod National Seashore
CALO	Cape Lookout National Seashore
CARL	Carl Sandburg Home National Historic Site
CASA	Castillo de San Marcos National Monument
CHIS	Channel Islands National Park
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CRLA	Crater Lake National Park
CUA	Commercial Use Agreement
CUIS	Cumberland Island National Seashore
CUVA	Cuyahoga Valley National Park
DENA	Denali National Park & Preserve
DEPO	Devils Postpile National Monument
DINO	Dinosaur National Monument
DRTO	Dry Tortugas National Park
EPA	Environmental Protection Agency
EISE	Eisenhower National Historic Site
ELIS	Ellis Island
ELRO	Eleanor Roosevelt National Historic Site
EPA	United States Environmental Protection Agency
EUON	Eugene O'Neill National Historic Site
EVER	Everglades National Park
FBMS	Financial and Business Management System
FIIS	Fire Island National Seashore
FOMA	Fort Matanzas National Monument
FOSU	Fort Sumter National Monument
GLAC	Glacier National Park
GLBA	Glacier Bay National Park & Preserve
GLCA	Glen Canyon National Recreation Area
GOGA	Golden Gate National Recreation Area
GUIS	Gulf Islands National Seashore
GRCA	Grand Canyon National Park
GRTE	Grand Teton National Park
HAFE	Harpers Ferry National Historic Park

HOFR	Home of Franklin D. Roosevelt National Historic Site
IMR	Intermountain Region
ISRO	Isle Royale National Park
JOFL	Johnstown Flood National Memorial
KATM	Katmai National Park & Preserve
KEMO	Kennesaw Mountain National Battlefield Park
LACH	Lake Chelan National Recreation Area
LIBI	Little Bighorn Battlefield National Monument
LOWE	Lowell National Historic Park
MACA	Mammoth Cave National Park
MEVE	Mesa Verde National Park
MOVES	Motor Vehicle Emissions Simulator (U.S. EPA)
MPG	Miles per gallon
MUWO	Muir Woods National Monument
MWR	Midwest Region
NAMA	National Mall and Memorial Parks
NCR	National Capital Region
NER	Northeast Region
NLRTP	National Long Range Transportation Plan
NOCA	North Cascades National Park
NOx	Oxides of Nitrogen
NPS	National Park Service
O_3	Ozone
ORPI	Organ Pipe Cactus National Monument
PINN	Pinnacles National Park
PIRO	Pictured Rocks National Lakeshore
PM	Particulate Matter
PORE	Point Reyes National Seashore
PWR	Pacific West Region
ROLA	Ross Lake National Recreation Area
ROMO	Rocky Mountain National Park
SAJU	San Juan National Historic Site
SCBL	Scotts Bluff National Monument
SEKI	Sequoia & Kings Canyon National Parks
SER	Southeast Region
SHEN	Shenandoah National Park
SLBE	Sleeping Bear Dunes National Lakeshore
SOCC	Sustainable Operations and Climate Change
STEA	Steamtown National Historic Site
STLI	Statue of Liberty National Monument
TAPR	Tall Grass Prairie National Preserve
TRIP	Transit in Parks Program
VALR	World War II Valor in the Pacific National Monument
VAMA	Vanderbilt Mansion National Historic Site
VAFO	Valley Forge National Historical Park
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound
VOYA	Voyageurs National Park
WOTR	Wolf Trap National Park for the Performing Arts
YELL	Yellowstone National Park
YOSE	Yosemite National Park
ZION	Zion National Park

Introduction

The sixth annual National Park Service (NPS) Transit Inventory and Performance Report communicates the service-wide outcomes and status of NPS transit systems (see Appendix A for acknowledgements). The 2012 inventory[1] was the first comprehensive listing of these systems since 1998, covering surface, waterborne, and air systems. The 2012 inventory established a working definition of NPS transit systems for the purpose of this document; helped NPS comply with 23 U.S Code 203(c),[2] which requires "a comprehensive national inventory of public Federal lands transportation facilities;" and, fulfilled other internal needs.

The 2017 inventory is meant to assist the NPS:

- Advance NPS transit performance measurement;
- Capture asset management and operational information not tracked in current NPS systems of record;
- Further the National Long Range Transportation Plan, Regional Long Range Transportation Plans, and the Capital Investment Strategy by providing key transit statistics, which can also be used to track progress towards goals;
- Integrate transit data with NPS systems of record, including asset management data in the Facility and Business Management System for NPS-owned vehicles;
- Comply with Executive Order 13693, which requires federal agencies to measure, manage, and reduce greenhouse gas emissions; and
- Communicate program information and projected vehicle (but not infrastructure) recapitalization needs.

Updates in the 2017 Inventory

Over the past six years, the Transit Inventory Report has furthered the development of transit performance measures. These measures align with the NPS Alternative Transportation Program (ATP) goal areas (see Appendix B). This year includes an update and expansion of the emissions analysis to include additional air pollutants, and park-by-park validation of NPS transit vehicle recapitalization needs.

Additionally, the three transit system profiles at the beginning of this report communicate the value of the transit systems in National Parks, and demonstrate how the NPS transit systems complement regional transportation options and connectivity, and enable visitors to reach those parks without a private vehicle.

[1] NPS National Transit Inventory, 2012, available at https://rosap.ntl.bts.gov/view/dot/10017.

[2] 23 U.S. Code 203 Federal lands transportation program: https://www.gpo.gov/fdsys/pkg/USCODE-2014-title23/pdf/USCODE-2014-title23-chap2-sec203.pdf.

Data Collection and Methodology

Each year, the NPS uses the same objective definition of NPS transit systems for the transit inventory to ensure consistent data collection across the nation and over time. Only units with systems that meet each of the following three criteria are included in this effort (see Appendix C for more information):

1. Moves people by motorized vehicle on a regularly scheduled service;[3]
2. Operates under one of the following business models: concessions contract; service contract; partner agreement including memorandum of understanding, memorandum of agreement, or cooperative agreement (commercial use agreements are not included); or NPS-owned and operated;[4] and
3. All routes and services at a given unit that are operated under the same business model by the same operator are considered a single NPS transit system.

The 2017 NPS Transit Inventory is limited to systems in which the NPS either has a direct financial stake or has committed resources to develop a formal contract or agreement.

The majority of systems tend to collect information on a calendar year cycle (January through December), therefore the following information was collected for the 2017 calendar year:

- Transit system name and description;
- Passenger boardings;
- Business model;
- System purpose;
- System type/mode;
- Vehicle information including fuel type, capacity, service miles, accessibility, and age (individual vehicle information for NPS-owned vehicles and system-level information for non-NPS vehicles);
- Vehicle information that is mandatory in the NPS's Financial and Business Management System (FBMS);
- Owner and operator type (NPS or non-NPS) and contact information;
- Operating schedule; and
- Participation of a local transit agency in the service.

For the 2017 inventory, 65 park units provided information primarily using an online form, or through email or phone. Some parks reported incomplete information because they do not track the requested service information or they could not provide the information before the end of the data collection period. All units responded except for two[5].

Appendix D includes a full list of surveyed transit systems by region.

[3] Services with a posted schedule that have standard operating seasons/days of week/hours. Services which do not operate on a fixed route, or exist for the sole purpose of providing access to persons with disabilities, are not included.

[4] For the purposes of the NPS transit inventories, no distinction is drawn between memorandum of understanding, memorandum of agreement, and cooperative agreement. All are recorded as "cooperative agreement."

[5] Picture Rocks National Lakeshore (PIRO) did not provide data for its ferry service and San Juan National Historic Site (SAJU) did not provide data for its tram service, which operated up until Hurricane Maria.

Inventory Results

Detailed findings of the 2017 inventory are presented in the following sections:

- Inventory Base-Data
- System Characteristics
- Passenger Boardings
- Vehicle Data
- Performance Measures

Inventory Base-Data

Table 1 summarizes the differences in key results of the NPS Transit Inventory and Performance Report from 2012 through 2017.

Table 1: NPS transit systems changes between 2012 and 2017 inventories
Source: 2012 – 2017 NPS Transit Inventory data

Key Findings	2012	2013	2014	2015	2016[6]	2017
Number of Systems	147	131	121	127	100	99
Number of Parks Represented	68	66	63	64	64	65
Passenger Boardings	33.6 million	26.9 million	36.5 million	42.9 million	43.6 million	43.7 million
Excluding 10 highest ridership systems	6.1 million	5.9 million	5.6 million	7.2 million	7.0 million	7.0 million
Number of Vehicles	890	927	982	1,022	843	828
NPS-Owned	323	278	274	275	278	268
Non-NPS	567	651	708	747	565	560
Systems operated by Local Transit Agency	12	12	12	13	13	13

One system was added to the inventory in 2017, Bandelier National Monument (BAND) Shuttle, and two systems, which did not operate in 2017, were removed. The systems removed include Yellowstone National Park (YELL) Snow Coaches and Fire Island National Seashore (FIIS) Watch Hill Ferry. Accounting for these changes, there is a total of 99 systems in the 2017 inventory.

There were approximately 110,000 more total boardings in 2017 compared to 2016, representing a 0.3 percent increase in passenger boardings. The Zion National Park (ZION) Canyon Shuttle experienced the largest increase of 8.5 percent (512,000 boardings), and the Grand Canyon National Park (GRCA) South Rim Shuttle boardings increased by 5.7 percent, or 417,500 boardings.

Two systems (PIRO and SAJU) did not provide updated 2017 inventory data. These system are excluded from any operations-related information presented (e.g. passenger boardings, service miles), but are included in general inventory data, since the vehicle type, system purpose, and business model did not change.

[6] The list of systems in 2016 were re-evaluated to ensure that all of the systems met the definition of transit used for the report. As a result, 28 systems included in 2015 were removed from the 2016 report, contributing to the overall reduction in the number of systems between 2015 and 2016.

System Characteristics

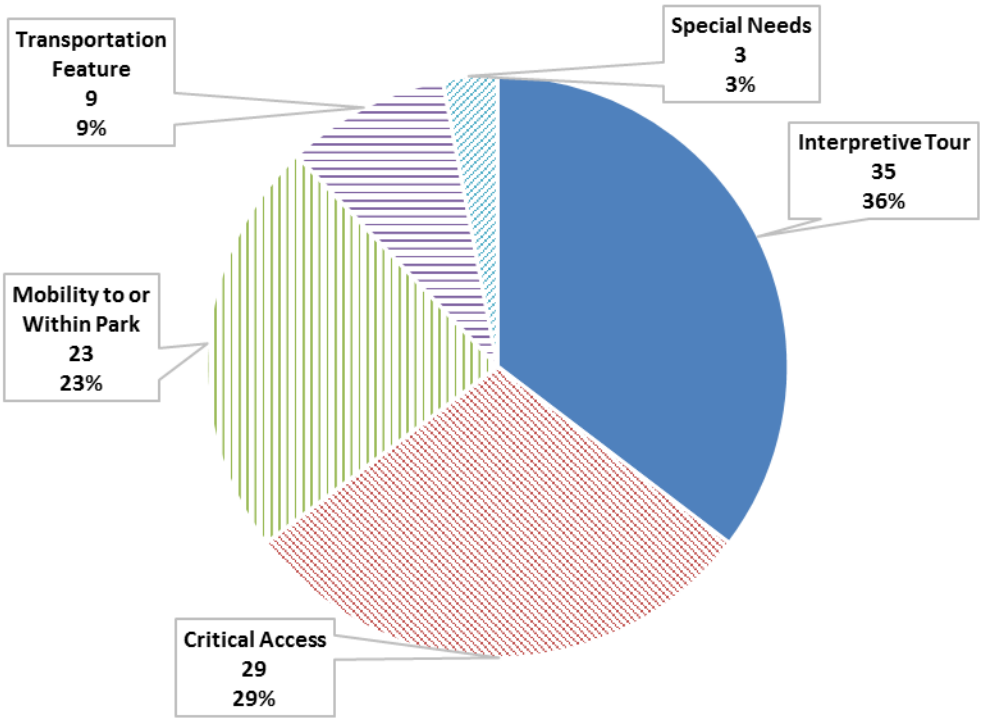
The 2017 inventory identified 99 discrete transit systems throughout 65 of the total 417 NPS units. Figure 1, Figure 2, and Figure 3 place these systems in the context of primary system purpose, mode, and business model. Results for system characteristics in 2017 are similar to the results reported in 2016.

System Purpose & Mode

There are five purposes identified for transit systems and unit staff identified which one was the primary purpose for each system. System purposes are depicted in Figure 1 and described below:

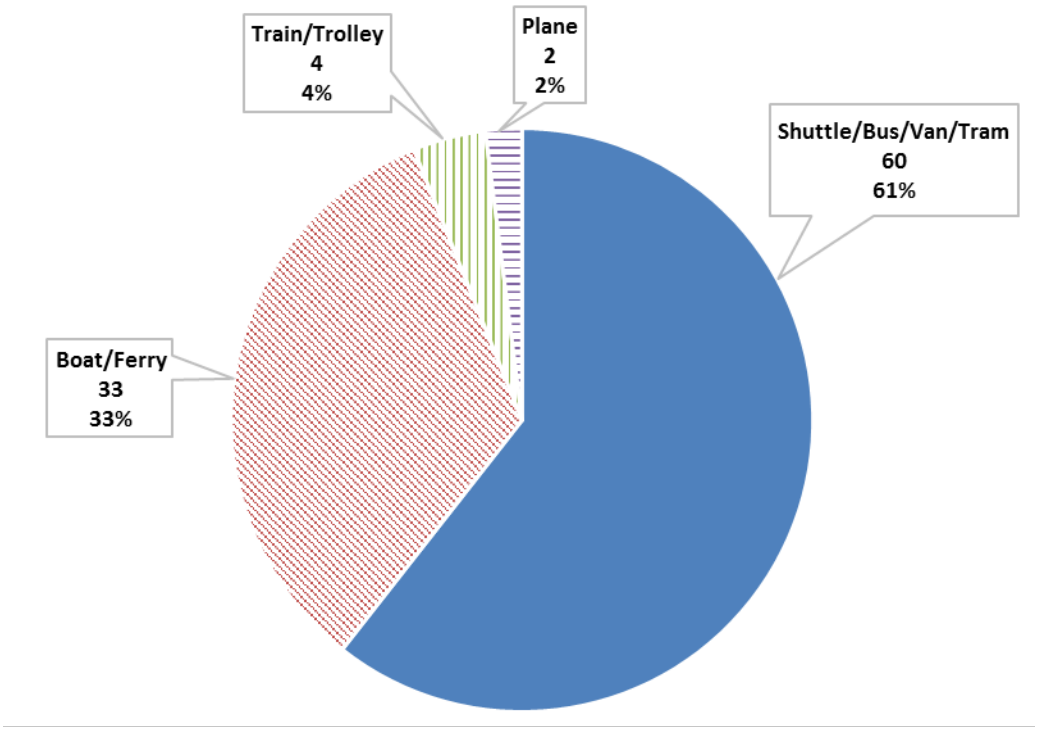
- 35 systems are guided **interpretive tours;**
- 29 systems provide **critical access** to an NPS unit or site that is not readily accessible to the public due to geographic constraints, park resource management decisions, or parking lot congestion;
- 23 systems provide **mobility to or within a park** as a supplement to private automobile access;
- 9 systems are considered a **transportation feature** (a primary attraction of the park unit); and
- 3 systems are primarily designed to meet the accessibility needs of visitors with **special needs.**

Figure 1: Systems by primary purpose
(N=99 systems)
Source: 2017 NPS Transit Inventory data



The majority of the transit systems are shuttle/bus/van/tram systems (61 percent), followed by boat/ferry (33 percent), train/trolley (4 percent), and plane (2 percent) (see Figure 2).

Figure 2: Systems by mode
(N=99 systems)
Source: 2017 NPS Transit Inventory data

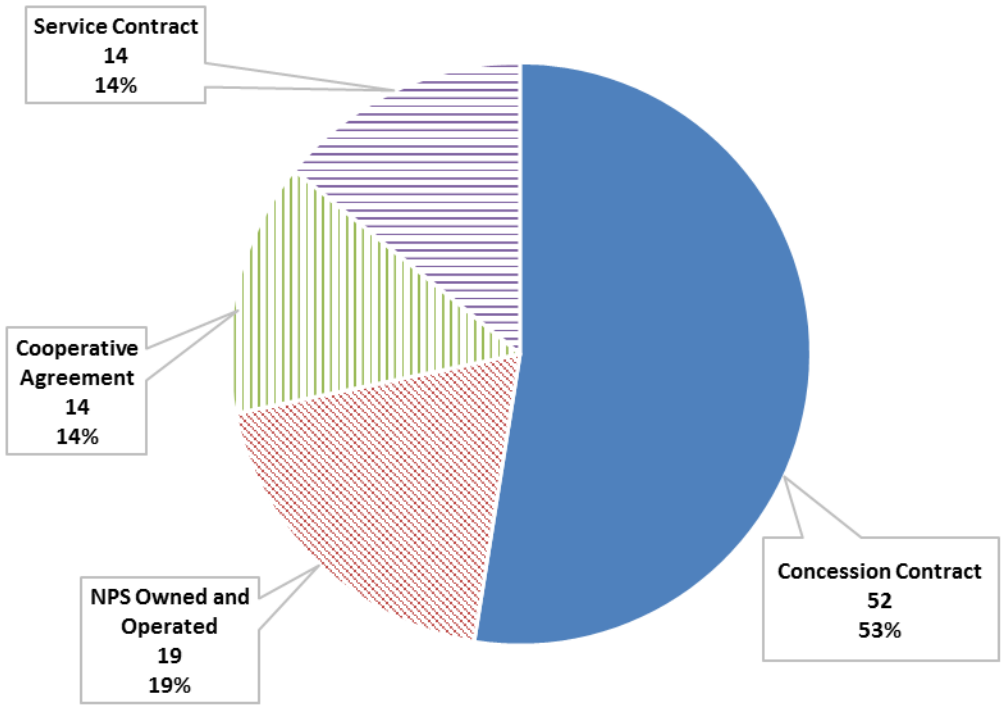


Business Models
There are four types of business models under which the 99 NPS transit systems operate, as shown in Figure 3 and described below:

- **Concession Contracts**: The majority of identified transit systems, 52 systems, operate through concession contracts under which a private concessioner pays the NPS a franchise fee to operate inside a unit. Six concession contract systems utilize vehicle fleets owned by the NPS.
- **Service Contracts**: Transit systems that are primarily owned and operated by a private firm fall under service contracts. In 2017, 14 transit systems operated under a service contract. Six service contract systems utilize vehicle fleets owned by the NPS.
- **Cooperative Agreements**: A local government agency or nonprofit operated 14 of the transit systems under a cooperative agreement. Two cooperative agreement systems utilize vehicle fleets owned by the NPS.
- **NPS Owned and Operated**: The NPS owned and operated 19 of the park transit systems.[7] These systems tend to be small and provide critical access to a park or park site, are interpretive tours, provide service for special needs visitors, or are a park transportation feature not easily provided by a private operator.

[7] In total, the NPS owns vehicle fleets for 33 systems, operating 19 of those systems. The remaining systems are operated through concession contracts (6), cooperative agreements (2), and service contracts (6).

Figure 3: Systems by business model
(N=99 systems)
Source: 2017 NPS Transit Inventory data



Passenger Boardings

In 2017, there were 43.7 million passenger boardings across all NPS transit systems.[8] If the 99 reporting systems (not counting PIRO and SAJU) were considered one enterprise and compared to transit agencies across the country, its boardings are comparable to transit systems in cities such as Milwaukee, WI, and Portland, OR.[9] Excluding concession contracts and cooperative agreements, NPS owned and operated systems and service contract systems reported 18 million trips in 2017.

Table 2 summarizes the methodologies park units use to count boardings. Systems indirectly record most passenger boardings through manual counts (18.7 million) and ticket sales (17.6 million). Estimated, automated, and other counter methodologies account for approximately 7.4 million passenger boardings.

[8] A "passenger boarding" or "unlinked trip" occurs each time a passenger boards a vehicle. This is an industry standard measure used in the Federal Transit Administration's National Transit Database.

[9] Federal Transit Administration National Transit Database, 2016 data. https://www.transit.dot.gov/ntd.

Table 2: Count methodology
(N = 97 systems[10])
Source: 2017 NPS National Transit Inventory data

Count Methodology	Number of Systems	Passenger Boardings (Millions)
Ticket Sales	45	17.6
Manual Counts	39	18.7
Other	6	3.1
Estimated	4	0.2
Automated Counter	3	4.1

Approximately 84 percent (36.7 million) of boardings on NPS transit systems in 2017 are attributable to the 10 highest use transit systems (by boardings). Table 3 summarizes these systems and shows passenger boardings for 2017. Passenger boardings increased in 2017 for six of the top 10 systems. For 2017, the World War II Valor in the Pacific National Monument (VALR) Ford Island Tour is new to the top 10 list, replacing the Rocky Mountain National Park (ROMO) Bear Lake & Moraine Park Shuttle and Hiker Shuttle to Estes Park.

Table 3: Passenger boardings for the 10 highest use transit systems
Source: 2017 NPS Transit Inventory data

Rank	Park	System Name	2017 Boardings	Business Model	System Purpose
1	STLI/ELIS	Statue of Liberty Ferries	10,839,756	Concession Contract	Critical Access
2	GRCA	South Rim Shuttle Service	7,775,599	Service Contract	Mobility to or within park
3	ZION	Zion Canyon Shuttle	6,505,200	Service Contract	Critical Access
4	YOSE	Yosemite Valley Shuttle	3,359,560	Concession Contract	Mobility to or Within Park
5	GOGA/ ALCA	Alcatraz Cruises Ferry	2,993,960	Concession Contract	Critical Access
6	VALR	USS Arizona Memorial Tour	1,904,500	Cooperative Agreement	Critical Access
7	NAMA	Big Bus Tours Washington DC[11]	1,002,784	Concession Contract	Interpretative Tour
8	BRCA	Bryce Canyon Shuttle and Rainbow Point Shuttle	795,217	Service Contract	Mobility to or Within Park
9	SEKI	Giant Forest Shuttle	794,603	Cooperative Agreement	Critical Access
10	VALR	Ford Island Tour	700,000	Service Contract	Interpretive Tour

[10] An N of 97 is used to exclude the two systems that did not provide boarding information for 2017.

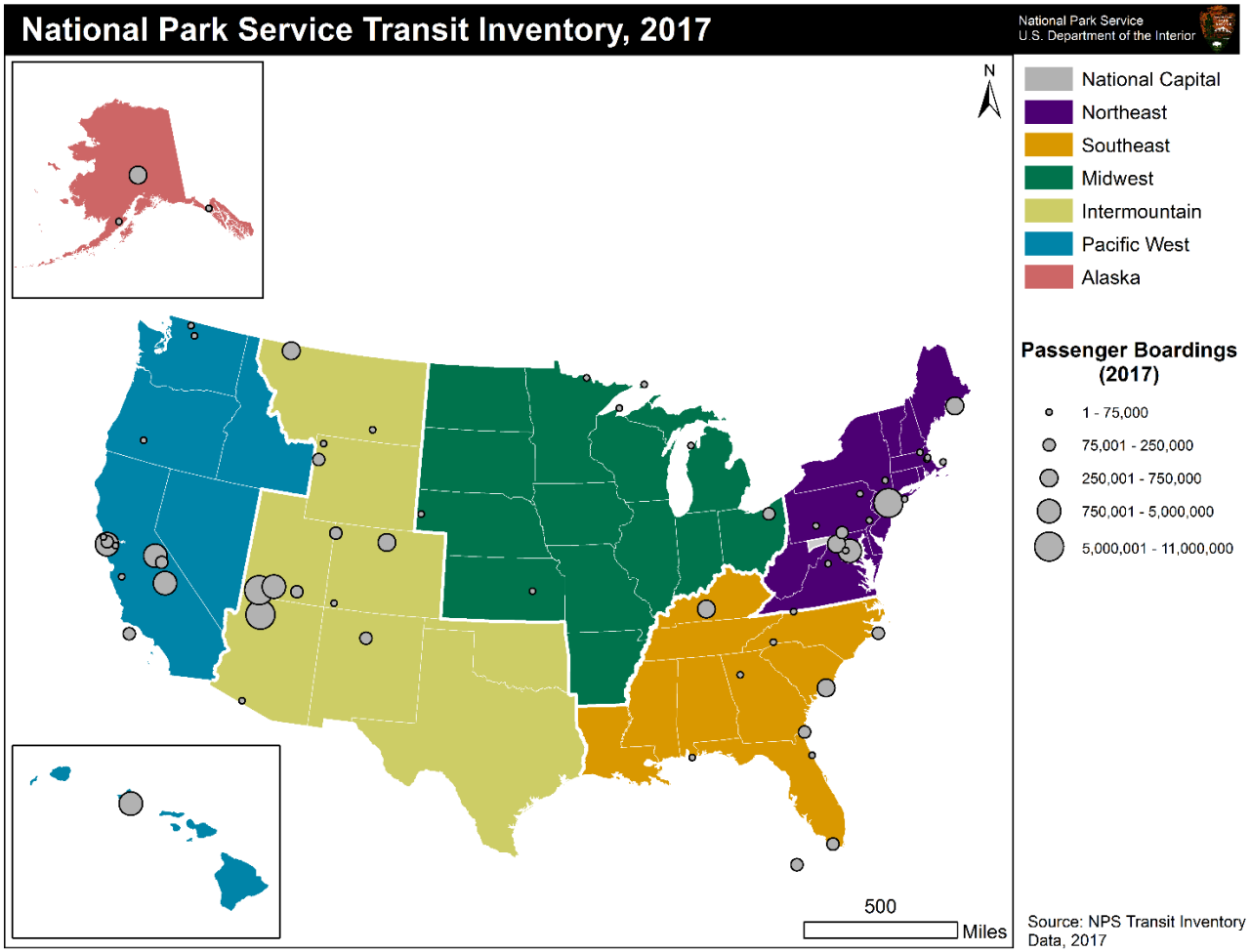
[11] In 2014, the Volpe Center completed a study on passenger boardings for NAMA Big Bus Tours Washington, DC. The multiplier was used to calculate 2017 boardings.

High-ridership shuttle systems are provided via service contracts, concession contracts, and cooperative agreements. A greater proportion of the high-ridership, water-based systems are provided through concession contracts. In many cases, these systems provide critical access to parks and park sites.

The NPS continued to partner with 13 local transit agencies in 2017. Those partnerships accounted for 2 million passenger boardings in 2017. Passenger boardings among NPS owned and operated systems (19 systems) accounted for approximately 515,000 passenger boardings. Most of these systems either provide critical access to a unit/site or an interpretive experience for visitors.

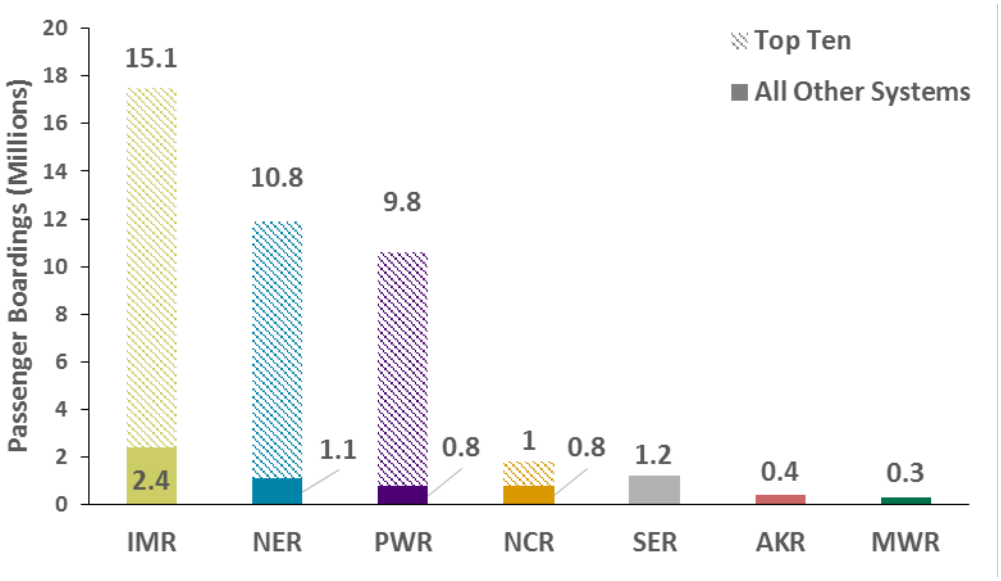
The Intermountain, Northeast, and Pacific West Regions each reported more than 10 million passenger boardings in 2017, far exceeding other regions; however, if the 10 highest use systems are removed from consideration, each region ranged from 300,000 to 2.4 million passenger boardings in 2017. Figure 4 shows the geographic distribution of passenger boarding by park and Figure 5 shows passenger boardings by region.

Figure 4: Passenger boardings by park
(N=63 parks[12])
Source: 2017 NPS Transit Inventory data



[12] An N of 63 is used to exclude the two parks that did not provide boarding information for 2017.

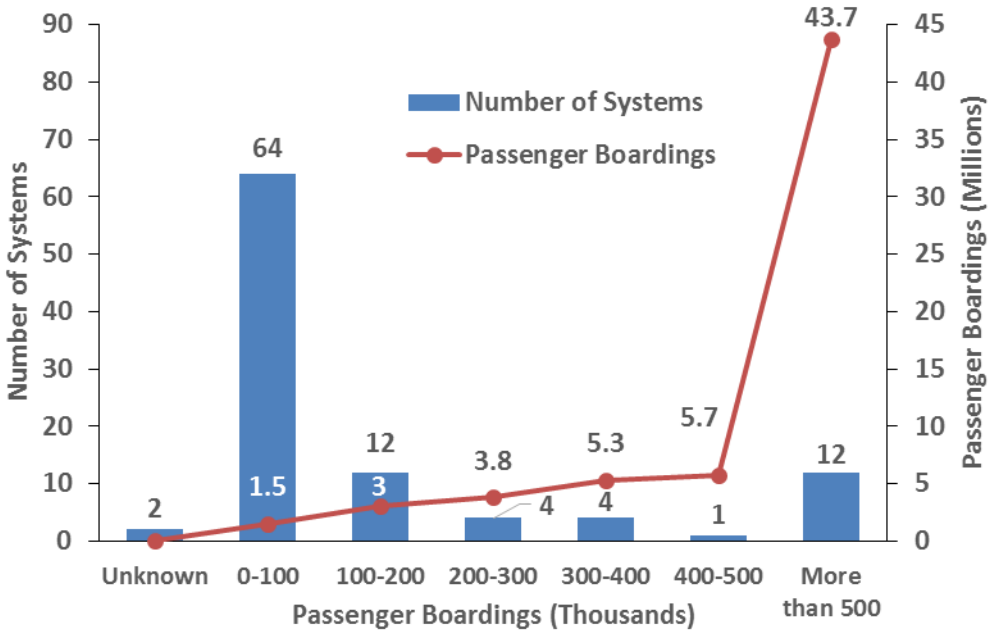
Figure 5: Passenger boardings by NPS region
(N=97 systems[13])
Source: 2017 NPS Transit Inventory data



[13] An N of 97 is used to exclude the two systems that did not provide boarding information for 2017.

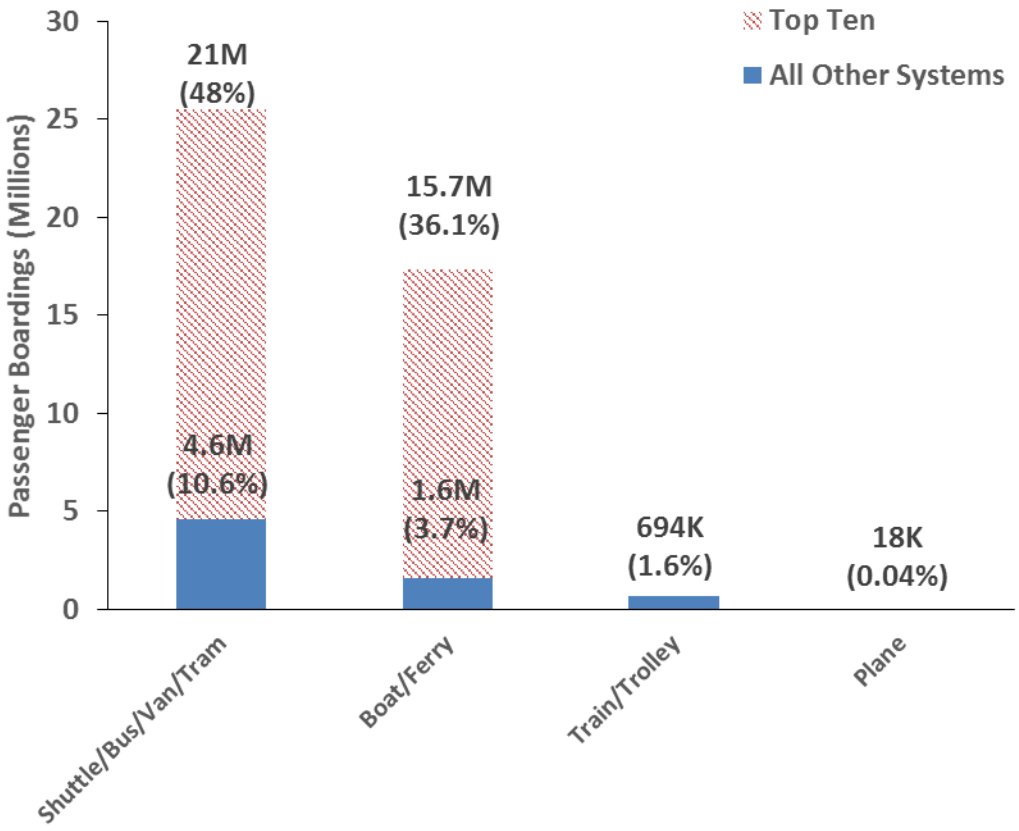
Figure 6 depicts the number of systems and the cumulative total number of passenger boardings at different ranges of passenger boardings. The chart illustrates that while only 12 transit systems have over 500,000 passenger boardings, these systems comprise the largest cumulative total number of passenger boardings. Furthermore, 64 transit systems had fewer than 100,000 passenger boardings, comprising 1.5 million of the total passenger boardings in 2017.

Figure 6: Systems by passenger boardings
(N=99 systems)
Source: 2017 NPS Transit Inventory data



Over half of passenger boardings were on shuttles/buses/vans/trams systems (58.6 percent) and just under half were on boats/ferries (39.8 percent). Trains/trolleys and planes accounted for only about 1.6 percent of all passenger boardings (see Figure 7).

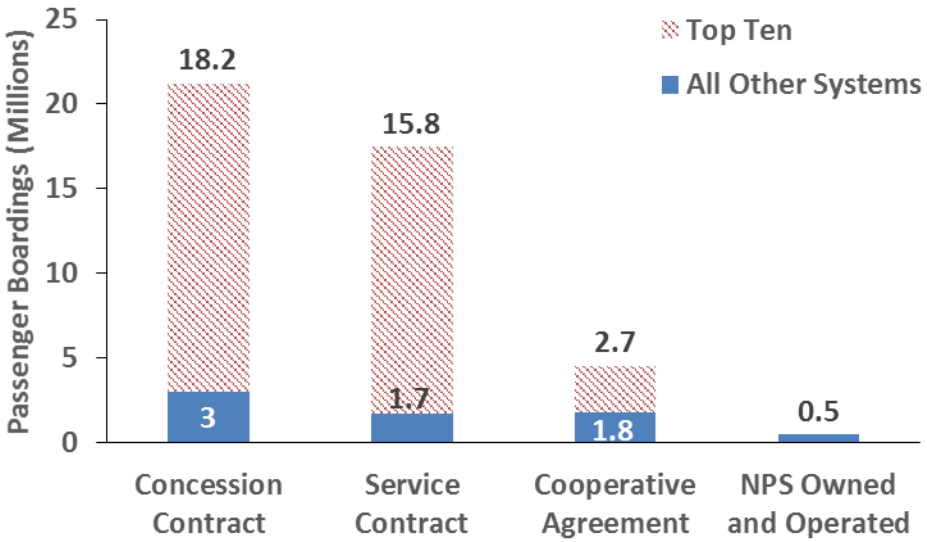
Figure 7: Passenger boardings by mode
(N=97 systems[14])
Source: 2017 NPS Transit Inventory data



[14] An N of 97 is used to exclude the two systems that did not provide boarding information for 2017.

Just under half of passenger boardings (48.5 percent) took place on systems operated under concession contracts. Service contracts carried 40 percent of passenger boardings, 10.3 percent under cooperative agreements, and 1.1 percent under NPS owned and operated systems (see Figure 8). Excluding the 10 highest use systems, concession contracts accounted for the majority of boardings.

Figure 8: Passenger boardings by business model
(N=97 systems[15])
Source: 2017 NPS Transit Inventory data



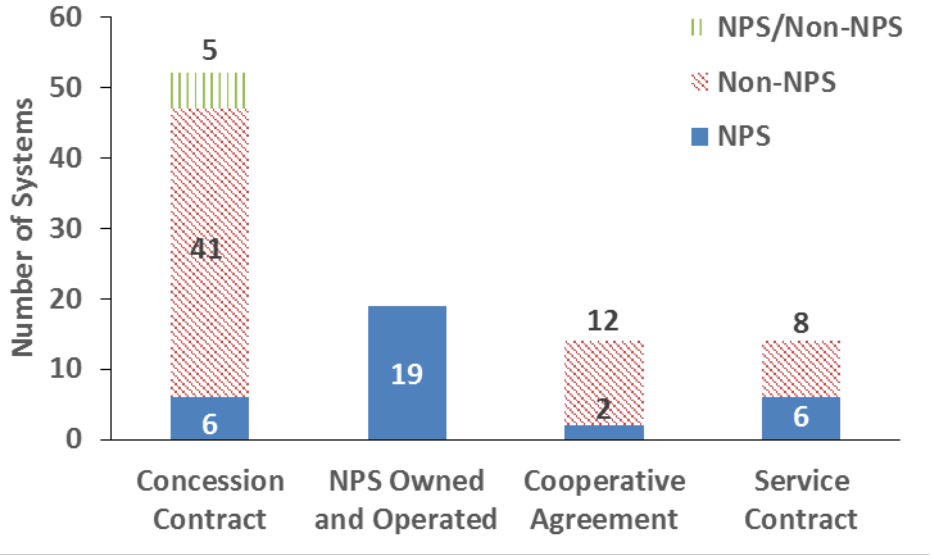
[15] An N of 97 is used to exclude the two systems that did not provide boarding information for 2017.

Vehicles

Vehicle Fleets

Over half of the identified transit systems (52 systems, or 53 percent) operate under concession contracts, of which six systems utilize vehicle fleets owned exclusively by the NPS.[16] These six fleets are among the 33 total fleets owned by the NPS. The NPS owned and operated 19 of the transit systems (19 percent). These owned and operated systems tend to be small and provide critical access to a park or park site, are interpretive tours, provide service for special needs visitors, or are a park transportation feature not easily provided by a private operator. Transit systems managed through cooperative agreements account for 14 of the systems (14 percent), of which two of these systems utilize vehicle fleets owned exclusively by the NPS. The remaining 14 transit systems (14 percent) are operated under service contracts, of which six[17] of these systems utilize vehicle fleets owned by the NPS, including the large surface transportation systems at Grand Canyon National Park and Zion National Park. The figures below indicate whether vehicles are owned by NPS, or owned by outside entities (non-NPS), which indicates the vehicles are owned by a concessioner, local transit agency or other partner.

Figure 9: Fleet ownership by business model
(N=99 systems)
Source: 2017 NPS Transit Inventory data

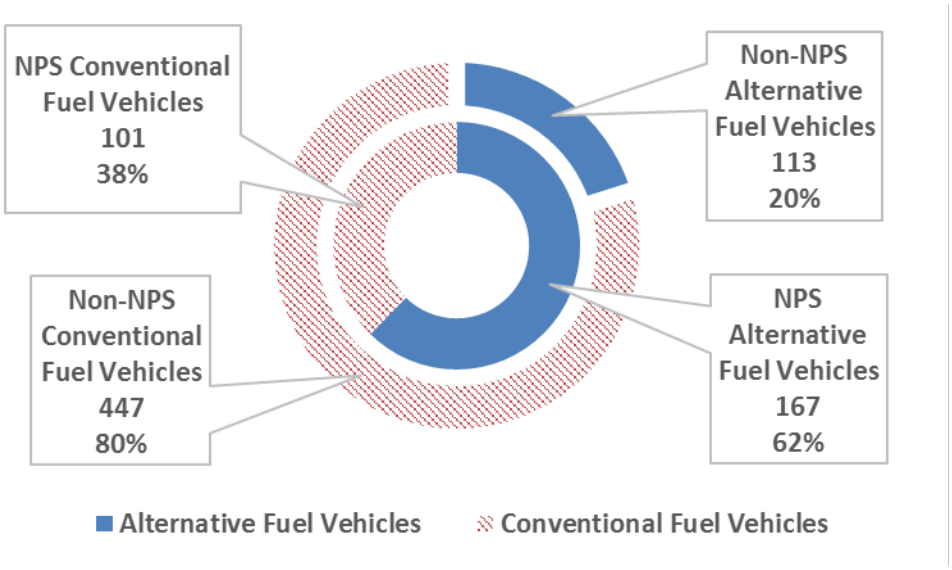


[16] The six systems operating NPS-owned vehicles under a concession contract are: Cumberland Island Land and Legacies Tour, Glacier Red Bus Tours, North Cascades Rainbow Falls Tours, Yellowstone Historic Yellow Bus Tours, Yosemite Tuolumne Shuttle, and the Yosemite Valley Shuttle.

[17] The six systems operating NPS-owned vehicles under a service contract are: Adams Trolley, Grand Canyon South Rim Shuttle, Harpers Ferry Shuttle, Kennesaw Mountain Shuttle, Yosemite Badger Pass-Glacier Point Shuttle, and the Zion Canyon Shuttle.

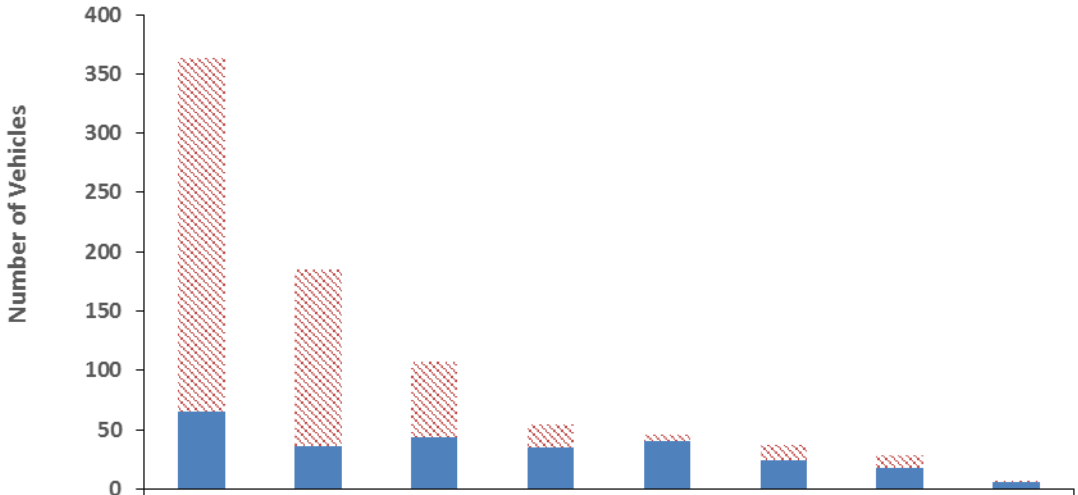
The NPS transit fleet is comprised of vehicles operating on both conventional and alternative fuels (the alternative fuel category includes electric and hybrid-electric vehicles, which are shown in Figure 11).[18] The NPS-owned fleet has 268 vehicles, of which 62 percent are classified as alternative fuel vehicles and 38 percent as conventional vehicle fuel. The non-NPS-owned fleet is larger with 560 vehicles, of which 20 percent of the fleet classifies as alternative fuel vehicles and 80 percent classifies as conventional vehicle fuel (see Figure 10 and Figure 11). The combined fleet of NPS-owned and non-NPS-owned vehicles contains 828 vehicles, of which 34 percent are classified as alternative fuel vehicles and 66 percent as conventional vehicle fuel. Most systems operate between one and 10 vehicles and most larger systems are not owned by the NPS (see Figure 12).

Figure 10: Fleet: conventional vs. alternative fuel vehicles by ownership
(N=828 vehicles)
Source: 2017 NPS Transit Inventory data



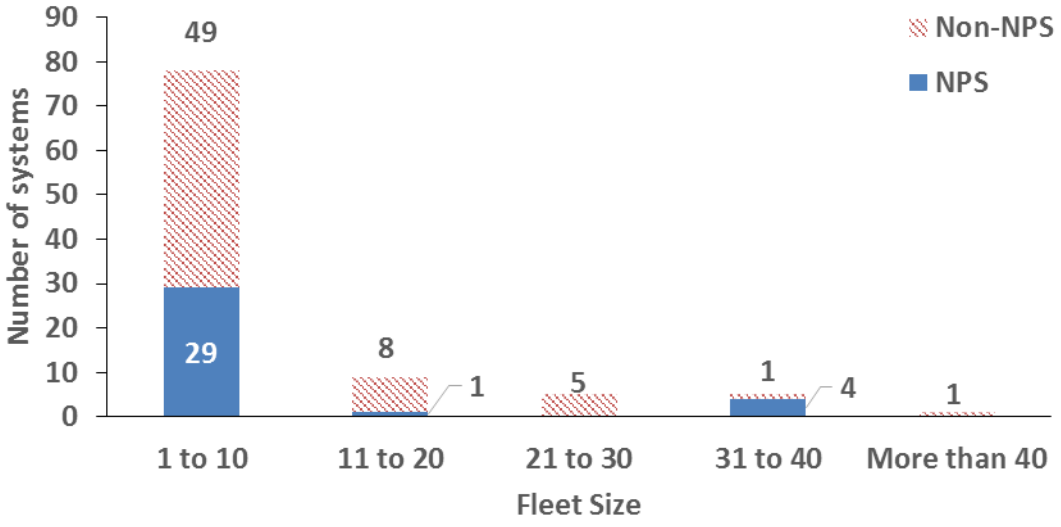
[18]In addition to electric and hybrid-electric vehicles, the alternative fuel category includes vehicles powered by propane, compressed natural gas (CNG), biodiesel, and other alternative fuels.

Figure 11: Number of vehicles by fuel type
(N=828 vehicles)
Source: 2017 NPS Transit Inventory data



	Diesel	Gasoline	Propane	CNG	Other	Hybrid Electric	Biodiesel	Electric
Non-NPS Owned Vehicles	298	149	63	19	6	13	11	1
NPS Owned Vehicles	65	36	44	35	40	24	18	6

Figure 12: Number of systems by fleet size
(N = 98[19] systems)
Source: 2017 NPS Transit Inventory data

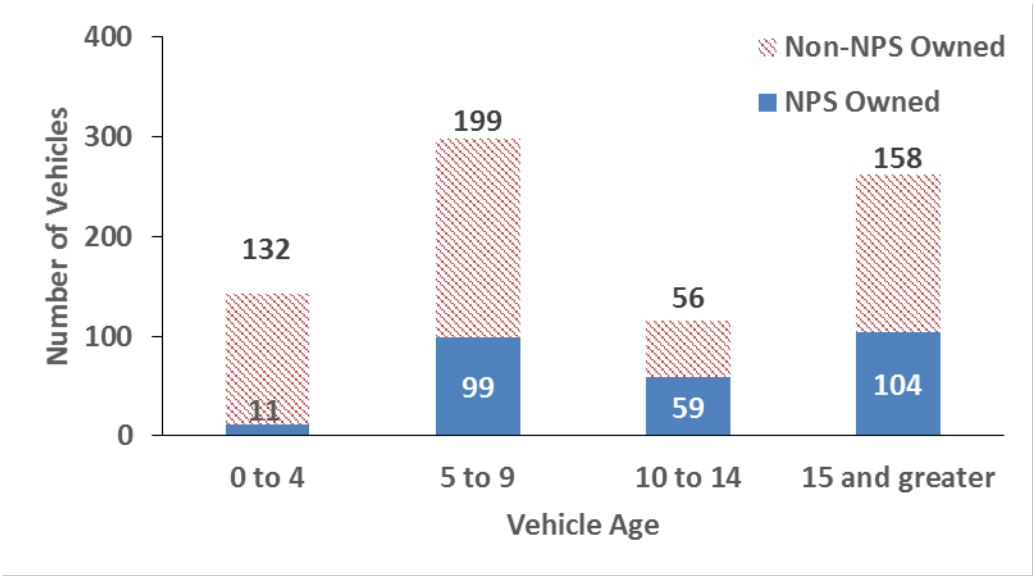


[19] GLAC Boat Tours has been excluded from this analysis as the total fleet size was not reported.

Average Age of Vehicles by Vehicle Type

The majority of vehicles in park transit systems are between 5-9 years old. A large portion of the vehicles in the 15 years and greater age brackets are owned by non-NPS entities, which could indicate that private sector partners may face significant recapitalization needs in the coming years (see Figure 13). In some cases, this could have implications for a contractor's financial ability to carry out or rebid a contract.

Figure 13: All vehicles by age class (years)
(N = 818 vehicles)
Source: 2017 NPS Transit Inventory data



Performance Measures

The NPS ATP seeks to manage the transportation program based on meaningful, reliable data. The objective is to use measurable, applicable, and achievable performance measures and metrics to guide and support decision-making and management of NPS transit systems.

The previous NPS transit inventories (2012-2016) reported performance-oriented findings for CO_2 emissions and fleet recapitalization needs and costs, and the 2017 transit inventory includes these measures and builds upon them.

The performance measures below are split into the following sections which correspond to ATP goals and the NPS National Long Range Transportation Plan (NLRTP): visitor experience; operations; environmental impact; and asset management. The ATP program goals are included in Appendix B.

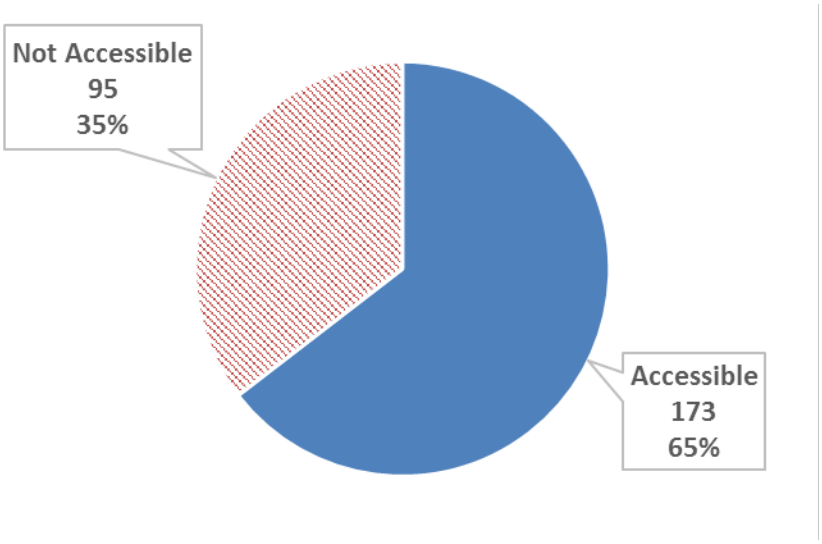
Visitor Experience

This performance area addresses how park transportation systems enhance the visitor experience. For 2017, the visitor experience performance measure includes accessibility for mobility impaired park visitors.

Accessibility for Disabled Visitors

In 2017, the majority (65 percent, 173 vehicles) of NPS-owned transit vehicles are accessible for people with mobility impairments (see Figure 14). At the park level, there are 28 parks with NPS-owned vehicles, and 8 out of the 28 parks with NPS-owned vehicles do not have any vehicles that are accessible.

Figure 14: Accessibility of NPS-owned transit vehicles
(N = 268 vehicles)
Source: 2017 NPS Transit Inventory data



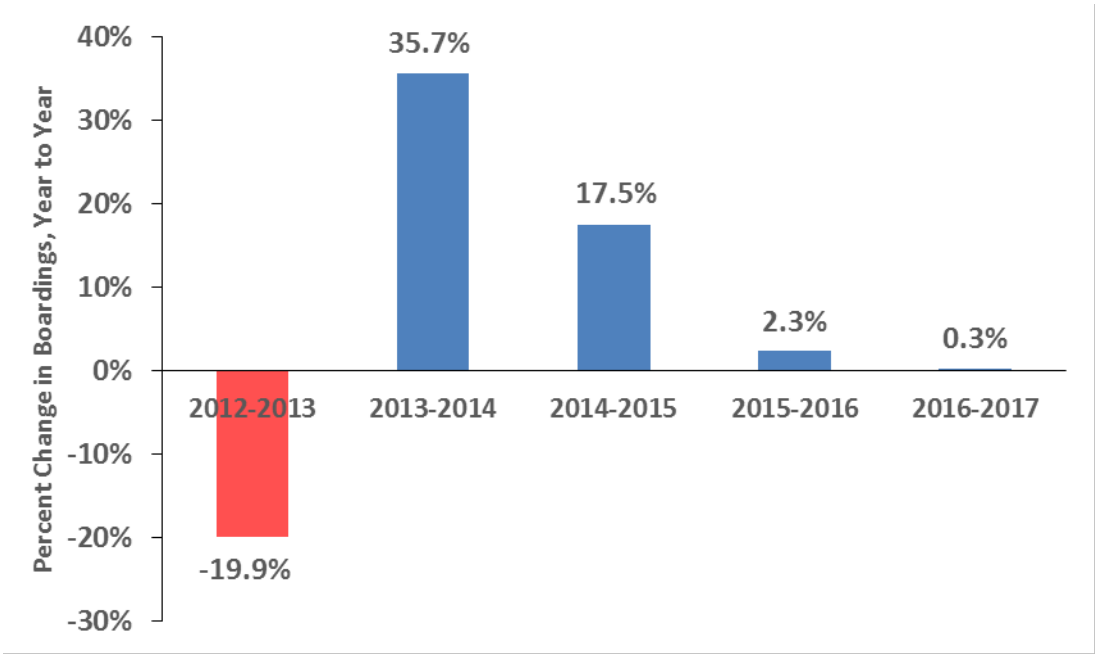
Operations

The measures in this area evaluate the operational performance of the NPS transit systems by measuring the annual percent change in boardings between 2012-2017, and the transit system operational service schedule.

Year-to-Year Trends in Boardings

The graph below shows the percent change in boardings from 2012-2017 (see Figure 15). During this period, the total boardings across NPS transit systems initially decreased in 2013 due to service disruptions from Hurricane Sandy and the government shutdown.[20] Subsequently, boardings increased significantly in 2014. Although boardings continued to increase in 2015, 2016, and 2017 (Table 1), the percent increase declined (Figure 15). In 2016 the list of systems from 2015 were re-evaluated with the definition of transit used within this report. The result was the removal of several smaller excursion systems from the inventory impacting the total change in boardings between 2015 and 2016.

Figure 15: Percent change in boardings from 2012 to 2017
Source: 2017 NPS Transit Inventory data



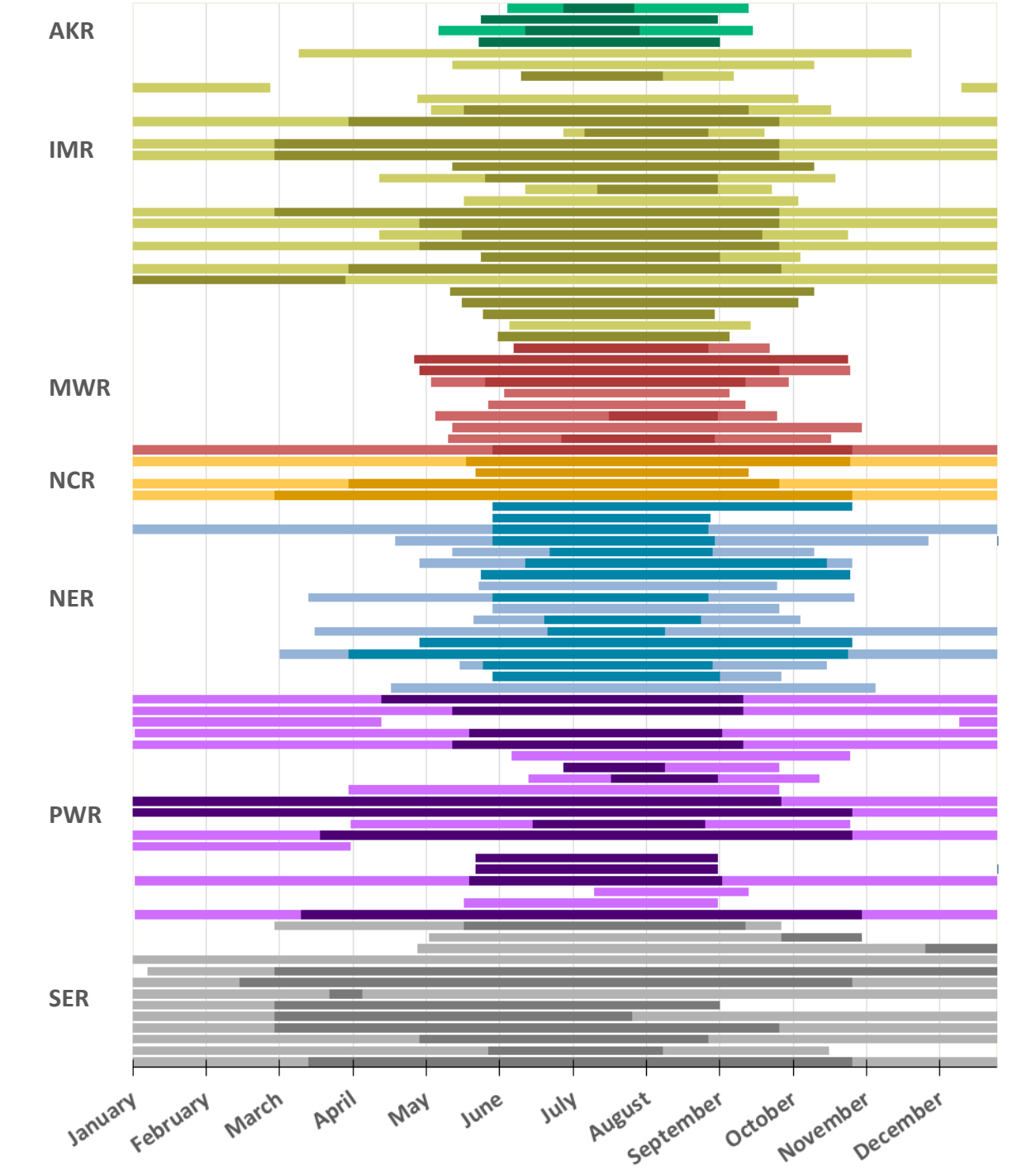
Service Schedule

The 2017 inventory contains data on the service schedules of 94 of the 99 systems, 31 of which reported year-round service—more than 360 days of service per year (see Figure 16). Five systems did not report service start or end dates. Although most seasonal service dates ranged primarily over the summer months and into early fall (June to October), three systems operated primarily in the winter (December to February). The most common peak service months are July and August, though some begin as early as

[20] See the 2013 NPS Inventory Report: http://ntl.bts.gov/lib/52000/52400/52470/NPS_WASO_2014_National_Transit_Inventory.pdf.

January and end as late as October. Peak season is defined as the period when the scheduled transit service is operating at its greatest frequency.

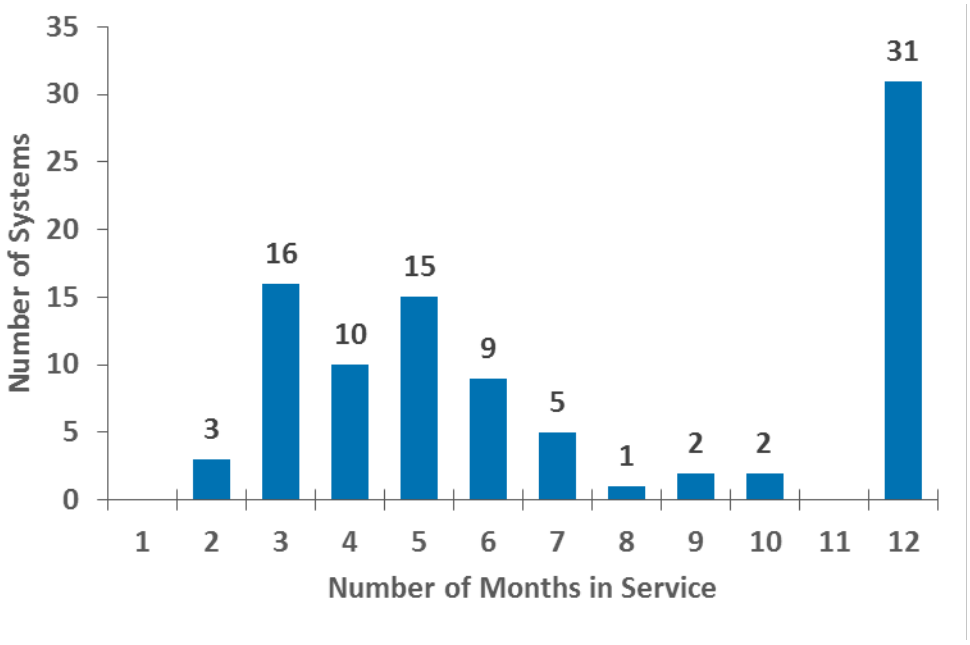
Figure 16: Transit system operating schedules, with peak seasons in darker colors
Source: 2017 NPS Transit Inventory data



Transit systems in colder climates tend to operate for shorter seasons than those in the south. For example, systems in the Alaska Region operate no earlier than May and no later than September. Many Midwest Region transit systems also have shorter seasons. Conversely, many of the year-round systems are in the Southeast Region, with a few operating in the Intermountain Region and the Pacific West Region. The wide range of climates that the Pacific West encompasses—from Yosemite to Hawaii—lead to a wide range of schedules.

The lengths of service period varies from park to park. Out of the 94 transit systems that reported a service period, the majority (31 systems) are in service for all 12 months of the year. Many of these year-round systems are among those with the highest annual ridership. The next most common service period is 3 months out of the year (16 systems), followed by systems that are in service for 5 months (15 systems).

Figure 17: Distribution of service duration by number of months
Source: 2017 NPS Transit Inventory data



Environmental Impact

The 2017 transit inventory uses the US Environmental Protection Agency's (EPA) Motor Vehicle Emissions Simulator (MOVES) for estimating emissions by NPS transit vehicles. MOVES is a state-of-the-science emissions modeling software that:

- estimates airborne emissions from various on-road vehicles across a number of vehicle types at very fine scales;
- uses years of direct measurements inventorying the ways different vehicles, fuel types, road types (e.g., urban vs. rural, highways vs. local streets, etc.), and emission processes (e.g., running, starting, and idling) contribute to air pollution in order to model emissions from similar vehicles;
- performs similar analysis for vehicles operating off-road, such as waterborne vessels; and
- is the regulatory standard for on-road and off-road emission inventory analyses under the Clean Air Act and related legislation.[21]

The prior method for estimating emissions from NPS transit systems relied on a "top-down" approach, applying a laboratory-derived energy density factor, i.e., grams of CO_2 emitted per gallon of fuel burned, to the annual distance traveled by related transit vehicles in each NPS system. In contrast, MOVES uses the pre-loaded measurement data to estimate emissions rates for different vehicle types, model years, fuel types, and road types across a number of Clean Air Act criteria pollutants "from the bottom-up." Consequently, MOVES bases emissions calculations on observations of actual vehicle operations.

The updated methodology the for air quality and emissions analysis is described in additional detail in Appendix E.

Annual CO_2 Emissions

Figure 18 shows the results of MOVES CO_2 emissions modeling for NPS transit systems, aggregated to the regional level and split by ownership. Across all regions, NPS transit fleets emitted just over 18,000 metric tons of CO_2 in 2017. The Intermountain, Pacific West, and Northeast Regions emit the greatest amount of CO_2, with a large number of transit systems in each region and many operating in rural and hilly areas. In contrast, a substantial part of the National Capital Region's transit systems operate on the District of Columbia's relatively flat urban streets. Table 4 shows the distiribution of vehicles, miles traveled, and associated CO_2 emissions.

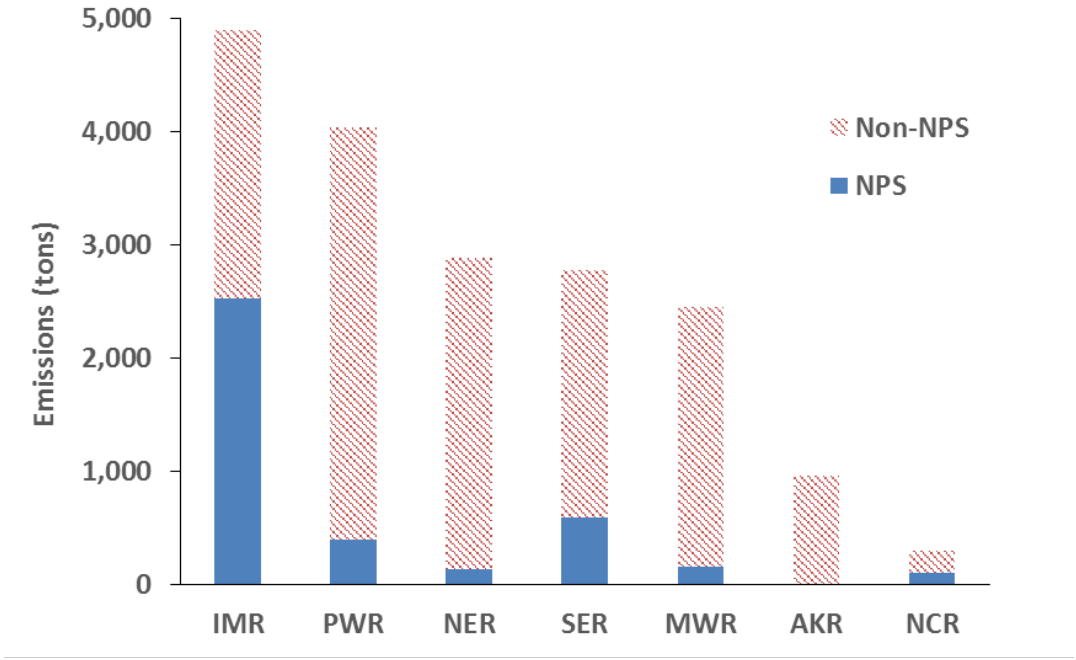
Table 4: Distribution of miles and CO2 emissions (metric tons) by vehicle ownership
Source: 2017 NPS Transit Inventory data
(N = 675[22] vehicles)

	Vehicles		Miles Traveled		CO_2 (Tons)	
	#	%	#	%	#	%
NPS Owned	253	37	3,031,713	52	3,902	21
Non-NPS Owned	422	63	3,303,870	48	14,405	79
Total	675	100	6,335,583	100	18,307	100

[21] "Official Release of the MOVES2014 Motor Vehicle Emissions Model for SIPs and Transportation Conformity." Federal Register 79:194 (October 7, 2014) p. 60343. Available from the Government Publishing Office at: https://www.gpo.gov/fdsys/pkg/FR-2014-10-07/pdf/2014-23258.pdf

[22] Due to data gaps, an N of 675 vehicles is used for the emissions analysis. In addition to excluding vehicles with missing data, snow coach, aircraft, and rail operations are not analyzed in the emissions analysis.

Figure 18: Annual CO_2 Emissions
(N = 675 vehicles)
Source: 2017 NPS Transit Inventory data

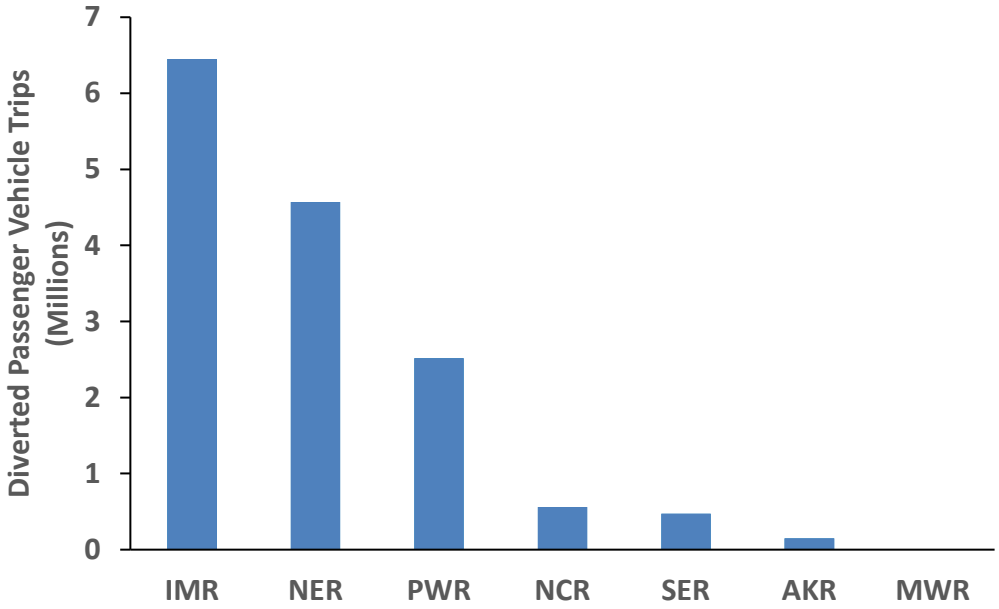


Diverted Passenger Vehicle Trips and CO_2 Emissions Avoided
The benefits of using transit include:

- Reducuction of the number of vehicle trips in parks;
- Congestion relief on park roads by carrying more people per square foot of road space;
- Elimination of associated fuel-inefficient driving behaviors like extended idling and stop-and-go;
- Potential to influence how visitors spend their time in the park; and
- Removal of long lines of cars from viewsheds.

Figure 19 shows the estimated number of personal vehicle trips eliminated as a result of the NPS transit systems in each region. An estimated 14.8 million passenger vehicle trips were eliminated in 2017, which would have driven in excess of 588 million miles and emitted more than 112,500 metric tons of CO_2. NPS transit systems emitted a total of 18,000 metric tons of CO_2 in 2017, which equates to a savings of 94,500 metric tons of CO_2. As stated previously, regions with high transit use and more boardings divert more personal vehicles from the road.

Figure 19: Passenger vehicle trips diverted as a result of NPS transit service
Source: 2017 NPS Transit Inventory data



IMR	NER	PWR	NCR	SER	AKR	MWR
6,400,000	4,600,000	2,500,000	560,000	470,000	147,000	38,000

Asset Management

Performance measures in this area help support the long-term financial viability of the NPS transit systems through tracking the age of NPS vehicle fleets, and estimated fleet recapitalization costs.

Average Age of NPS Vehicles

Table 5 reports the aggregate average age for NPS-owned transit vehicles service-wide. The average age of each NPS vehicle type is below the service life, for all the vehicle types where data is available. The medium-duty transit vehicles are on average the closest to the end of their service lives, while passenger vans, medium-duty shuttles, and school buses are among the newest vehicles.

Table 5: Vehicle age for NPS transit vehicle types
(N=232 vehicles)
Source: 2017 NPS Transit Inventory data

Vehicle Type	Average Age	Service Life (Years)	Number of Vehicles
6-12 pax Electric Tram	7.8	11	11
Passenger Van	5.2	10	6
Light-Duty Shuttle	8.4	15	43
Medium-Duty Shuttle	6.1	15	27
Heavy-Duty Shuttle[23]	12.3	15	63
Medium-Duty Transit	15.6	18	29
Heavy-Duty Transit	10.2	18	32
Ferry/Boat	19.7	N/A	14
Train/Streetcar	47.8	N/A	5
School Bus	7	18	2

Estimated Vehicle Recapitalization Needs

To estimate NPS vehicle replacement needs, the age of the vehicles were used as a starting point, along with the standard replacement costs and service life assumptions shown in Appendix F.[24] The estimated recapitalization needs were validated with input from regional NPS staff, who provided information on any planned changes in vehicles used at each park (e.g. switch to electric vehicles), and additional vehicle needs that parks anticipate. Each park is responsible for determining when a vehicle needs to be replaced, which is dependent on funding availability. Service life is highly dependent upon utilization, not only vehicle age; therefore, more detailed information is needed before determining if a vehicle is truly due for replacement.

[23] The GLAC 33 Red Bus Tours vehicles were excluded from this category, as they are approximately 80 years old.

[24] The service life assumptions used to estimate the recapitalization needs and costs were updated in 2015 to reflect more current cost estimates for the transit vehicles, and to reflect the way NPS transit vehicles are utilized.

Table 6: Estimated NPS-owned shuttle/bus/tram/van overdue recapitalization needs, 2018-2028
(N = 182 vehicles)
Source: 2017 NPS Transit Inventory data and outreach to regional staff

Units	Number of Vehicles to be Replaced (by Type)							Total Cost, 2018-2028
	Light-Duty Shuttle	Medum-Duty Shuttle	Heavy-Duty Shuttle	Heavy-Duty Transit	6-12 Pax Electric Tram	School Bus	Passenger Van	
GLAC	19		13					$3,817,200
GRCA			48					$26,958,600
YELL			8					$1,062,000
ZION		28						$32,880,000
SCBL		1						$147,000
TAPR						2		$253,000
HAFE				6				$720,000
ACAD	18						2	$6,345,300
ADAM				3				$600,000
CACO	3				2			$361,000
HOFR/ELRO/VAMA					2			$40,000
JOFL/ALPO							1	$33,000
SHEN		1					1	$180,000
EUON	3							$535,000
PINN		1						$147,000
POCH							1	$151,800
NOCA/LACH		4						$588,000
YOSE		3	4	18				$15,841,000
CARL					1			$20,000
KEMO		1						$330,000
Grand Total	***43***	***39***	***73***	***27***	***5***	***2***	***5***	***$91,009,900***

Over the next ten years the agency faces an estimated $91 million in rolling stock capital costs between 2018 and 2028. The projected costs are calculated in nominal dollars and may vary from year to year as vehicles from different systems are due to be replaced.

Next Steps

Wrapping up its sixth year, the inventory continues to provide essential information on NPS transit systems at the park, regional, and national levels. This effort allows stakeholders to understand the basic characteristics of NPS transit systems, including how many visitors are served; the number and types of transit systems; vehicle service life and fuel types; the business models that these system operate under; and performance measures, like improved air quality.

The transit inventory collects yearly operational data and examines transit rolling stock, to supplement other data initiatives that focus on NPS fixed, real property assets. This annual effort provides a consistent platform to efficiently gather information and data to not only provide continuity through changes in staffing, but allows the NPS to view these disparate transit systems as a whole and draw conclusions as to their benefit and impact. As visitation at national parks increases, transit systems continue to be important assets that help reduce impacts to resources from personal vehicle use, while improving access and enhancing the visitor experience.

The following lessons will be incorporated to improve future transit data calls:

- **Coordinate with relevant NPS stakeholders:** Continued coordination to share data and identify ways the transit data can be used to support program missions, goals, and outcomes across the NPS. Consider stronger coordination with concessions to include data requirements in new contracts.
- **Create new and/or refine existing data elements**. Continue to refine the number of fields in the data call, adding or removing data fields, as necessary, to gather only necessary information while limiting the burden of data collection on the park staff.
- **Improve the data collection online tool**. The online data collection tool needs additional improvements to make it more user-friendly for park staff, and for the analysis of the transit data.
- **Continue to expand performance measures analysis:** Move towards quantifying additional performance measures to track progress over time of NPS transit systems, and include in this report.
- **Communicate benefit and impact of NPS transit systems to visitors:** Consider communicating to visitors how their choice to use transit has a positive impact on park resources through reducing congestion and emssions from private vehicles. The positive impacts of transit use could be communicated in a variety of way such as consistent signage throughout the national park system , through social media, or on the NPS website.
- **Consider multimodal connections to transit:** The transit inventory could be expanded to also include connections to multiuse trails. Considering opportunitites for bicycling and walking in national parks, and connections to transit, could give a better picture of the opportunities for exploring national parks without using a private vehicle.
- **Revisit Transit Definition** (see page Appendix C) to reflect new laws and regulations.

Appendix

Appendix A – Acknowledgments

The NPS ATP would like to thank the numerous NPS transit system contacts who graciously provided their time, knowledge, and guidance in the development of this inventory.

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Alternative Transportation Program

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Denali National Park

Robert Maupin
Katmai National Park

Intermountain Region
John Hannon
Intermountain Region/Rocky Mountain National Park

Jack Burns
Zion National Park

Katy Canetta
Grand Teton National Park

Daniel Cloud
Bryce Canyon National Park

Pamela Edwards
Grand Canyon National Park

Dan Johnson
Dinosaur National Monument

Allan Loy
Mesa Verde National Park

Dennis Milligan
Bandelier National Monument

Eric Nikkel
Glen Canyon National Recreation Area

Dale Reinhart
Yellowstone National Park

Cynthia Sequanna
Organ Pipe Cactus National Monument

Stephen Smith
Glacier National Park

Jean Tabbert
Glacier National Park

Christina White
Yellowstone National Park

Ken Woody
Little Bighorn Battlefield National Monument

Midwest Region
Bob Kammel
Midwest Region

Phil Akers
Sleeping Bear Dunes National Lakeshore

Chris Amidon
Isle Royale National Park

Heather Brown
Tallgrass Prairie National Preserve

Justin Cawiezel
Scotts Bluff National Monument

Jennifer McMahon
Cuyahoga Valley National Park

John Patmore
Pictured Rocks National Lakeshore

Tawnya Schoewe
Voyageurs National Park

Chris E. Smith
Apostle Islands National Lakeshore

National Capital Region

Makayah Royal
National Capital Region

Dennis Ebersole
Harpers Ferry National Historical Park

Duane Erwin
Wolf Trap National Park
for the Performing Arts

Karl Gallo
National Mall & Memorial Parks

Eliza Voigt
National Mall & Memorial Parks

Northeast Region

Mark Alexander
Northeast Region

Doug Bosley
Johnstown Flood National Memorial and
Allegheny Portage Railroad National Historic Site

Christine Bruins
Lowell National Historical Park

Deborah Conway
Steamtown National Historic Site

Deirdre Gibson
Valley Forge National Historical Park

Ben Hanslin
Statue of Liberty National Monument

Karst Hoogeboom
Cape Cod National Seashore

Beth Jackendoff
Boston Harbor Islands National Recreation Area

Ahna Wilson
Eisenhower National Historic Site

Caroline Keinath
Adams National Historical Park

John Kelly
Acadia National Park

Jason Pristupa
Fire Island National Seashore

Scott Rector
Home of Franklin D. Roosevelt, Eleanor Roosevelt, and
Vanderbilt Mansion National Historic Sites

Tim Taglauer
Shenandoah National Park

Pacific West Region

Dianne Croal
Pacific West Region

Justin DeSantis
Pacific West Region

Greg Ballinger
Pinnacles National Park

Colleen Bathe
Sequoia and Kings Canyon National Parks

Darren Brown
Golden Gate National Recreation Area and
Muir Woods National Monument

Patricia Brown
World War II Valor in the Pacific National Monument

Trish Buffington
Channel Islands National Park

John Dell'Osso
Point Reyes National Seashore

Sean Denniston
Crater Lake National Park

Jim Donovan
Yosemite National Park

Deanna Dulen
Devils Postpile National Monument

Tom Leatherman
Eugene O'Neill National Historic Site

Annelise Lesmeister
North Cascades National Park, Lake Chelan National
Recreation Area, and Ross Lake National Recreation Area

Stefanie Martin
Golden Gate National Recreation Area and Alcatraz Island

Southeast Region

Kent Cochran
Southeast Region

Lee Edwards
Southeast Region

Jon Bergon
San Juan National Historic Site

Shawn Cloutier
Blue Ridge Parkway

Katherine Cusinberry
Cape Lookout National Seashore

William Gordon
Everglades and Dry Tortugas National Parks

Michelle Haas
Fort Sumter National Monument

Jill Hamilton-Anderson
Cumberland Island National Seashore

Steve Kovar
Mammoth Cave National Park

Sarah Perschall
Carl Sandburg Home National Historic Site

Lindsey Phillips
Gulf Islands National Seashore

Bruce Powell
Mammoth Cave National Park

Andrew Rich
Fort Matanzas and Castillo de San Marcos National Monuments

Nancy Walther
Kennesaw Mountain National Battlefield Park

Appendix B – NPS Alternative Transportation Program (ATP) Goals and Objectives

GOAL: Cultivate improvements in transportation connectivity, convenience, and safety for visitors and workforce.

OUTCOME: Access to, from, and within national park units is convenient, safe, and well-connected via appropriate and integrated transportation solutions.

- Develop transportation options that meet the diverse needs of park visitors and NPS workforce.
- Connect and enhance existing transportation options. (Undecided as to whether this one should remain – as it might inhibit creative solutions that can replace existing that do not function or cost too much money)
- Minimize injuries, fatalities, and crashes associated with all modes of transportation.
- Participate in local, regional, and statewide transportation planning processes to ensure appropriate integration of NPS transportation infrastructure, systems, and services.

GOAL: Provide quality transportation experiences that enhance park visits.

OUTCOME: NPS transportation systems contribute to the positive experience of park visitors.

- Improve visitor access to appropriate destinations.
- Use transportation to educate and inform visitors about park resources and services.
- Reduce disruptions to the visitor experience related to vehicle traffic congestion.
- Design and adapt transportation systems to complement each park's unique context and mission.

GOAL: Demonstrate leadership in environmentally-responsible transportation.

OUTCOME: NPS is recognized as a leader in environmentally-responsible transportation.

- Prioritize investments and operations that reduce vehicle emissions, noise and light pollution, traffic congestion, and unendorsed parking.
- Educate park visitors and workforce about the environmental benefits of transportation options within and beyond park boundaries.
- Contribute to NPS and park unit greenhouse gas emissions reduction goals.
- Implement proven green transportation innovations and best practices where appropriate.

GOAL: Ensure the long-term financial viability of NPS transportation infrastructure, systems, and services.

OUTCOME: Funding is adequate to maintain transportation infrastructure, operate transportation systems, and manage transportation services now and into the foreseeable future

- Consider the full range of business models and associated lifecycle costs (direct and indirect) before making investments.
- Increase the flexibility of funding mechanisms to better support transportation options.
- Right-size and maintain needed transportation assets and services in a state of good repair.

- Develop transportation options with reciprocal benefits for NPS and gateway communities which can be collaboratively funded and/or operated.
- Seek to enhance or develop partnerships with public, private, and philanthropic organizations that are aligned with the NPS mission.

GOAL: Manage the transportation program based on meaningful, reliable data.

OUTCOME: NPS demonstrates accountability in the management of transportation resources.

- Use measurable, applicable, and achievable performance measures and metrics to guide and support decision-making and management of the transportation program.
- Invest in and maintain data that supports performance measures aligned with program goals.
- Continually evaluate transportation options to ensure they meet program goals, and adjust operations to optimize system performance.

Appendix C – Definition of Transit

The NPS ATP developed a definition for an "NPS transit system" prior to conducting the 2012 transit inventory. Only units with systems that met each of these three criteria were considered for the inventory:

1. Moves people by motorized vehicle on a regularly scheduled service;[25]
2. Operates under one of the following business models: concessions contract; service contract; partner agreement including memorandum of understanding, memorandum of agreement, or cooperative agreement (commercial use agreements are not included); or NPS-owned and operated; and[26]
3. All routes and services at a given unit that are operated under the same business model by the same operator are considered a single NPS transit system.

This definition was based on a review of past efforts, analysis of the existing transit portfolio, and individual and group conversations with the Regional Transportation Program coordinators and the Federal Lands Highway Program Service-wide Maintenance Advisory Committee. In response to challenges encountered during the course of the inventory, made small changes to the original draft definition to improve clarity. The definition was uniformly applied to all potential systems to determine whether or not each should be included in the inventory.

The NPS ATP investigated several potential criteria that stemmed from existing ATP documents, Transit in Parks Program (TRIP) documents and applications, and conversations with ATP stakeholders, as presented below.

Provides transit service: An "NPS transit system" should provide transit service. In the glossary of the National Transit Database, the Federal Transit Administration defines transit as synonymous with public transportation and public transportation is defined as follows in the Federal Transit Act, "transportation by a conveyance that provides regular and continuing general or special transportation to the public, but does not include school bus, charter, or intercity bus transportation or intercity passenger rail transportation provided by [Amtrak]."Conversations with NPS regional transportation coordinators further specified transit service should be limited to motorized conveyances. Based on this, the NPS ATP proposed the following criterion: "***moves people by motorized vehicle on a regularly scheduled service***."

Is important to the NPS mission: The importance of transit systems to fulfilling the NPS mission is a core tenet of the ATP, as established in previous program plans and extensively discussed at program meetings. However, the simple question "Is this system important to the NPS mission?" is subjective and would return inconsistent results. For many systems, particularly those for which the NPS has a financial stake or has a formal contract or agreement in place, the answer seems clear: because the NPS has made an effort to provide the service, the service is assumed to be important to the mission. Other services, particularly those which are operated under commercial use agreement (CUA), are not as clearly essential to the mission. Thus, the NPS ATP proposed the following criterion: ***"operates under one of the following business models: concessions contract; service contract; partner agreement including memorandum of understanding, memorandum of agreement, or cooperative agreement (commercial use agreements are not***

[25] Services with a posted schedule that have standard operating seasons/days of week/hours. Services which do not operate on a fixed route, are charter services for individual groups, or exist for the sole purpose of providing access to persons with disabilities, are not included.

[26] For the purposes of this inventory, no distinction was drawn between memorandum of understanding, memorandum of agreement, and cooperative agreement. All were recorded as "cooperative agreement."

included); or NPS owned and operated systems." The NPS ATP used "cooperative agreement" as a general term, encompassing all qualifying partner agreements (memorandum of understanding, memorandum of agreement, and cooperative agreement).

Concession contracts were included because they require resources and desire by the NPS to initiate. Also, after the bid and award process, concession contracts limit competition with other private operators and thus generally result in close working relationships with the NPS. Commercial use agreements are not included because prospective CUA operators request permission from NPS to operate. These agreements are not initiated by the NPS and the resulting services are inherently not "NPS" systems.

CUAs were not included because these services are owned and operated by private operators, and the NPS only provides oversight to ensure that the services are operated in accordance with NPS policies and requirements. There are hundreds of CUAs service-wide that provide visitors tours and transportation. Collecting and reporting information on all of these systems could be burdensome to units and regions. If information were to be collected and reported on CUA services at all, an objective measure of importance would need to be identified and two key questions would need to be addressed. First, how does one objectively determine whether a service operated under a CUA is important versus non-essential to the NPS mission? This effort found only one sub-category of CUA that could be considered objective: services that provide sole access to an NPS resource. Second, should NPS represent as its own services for which it has no role in the acquisition, operations, or maintenance activities? Even for CUAs which provide sole access, this effort suggests not. This determination is not to suggest that the service is not important to the NPS, but rather to acknowledge that the service is not the responsibility of NPS – in other words, it is not an "NPS transit system." These systems could be tracked separately but would not be included in the inventory.

Reduces Vehicle Miles Traveled (VMT): Reduced VMT was a key factor in TRIP applications because, in theory, reducing VMT reduces emissions. However, the simple question of "Does a system reduce VMT?" was tested on candidate NPS transit systems, and answers tended to be complex and debatable. The NPS ATP determined that "reduces VMT" is not an objective criterion. Although reducing VMT can be a goal of NPS transit systems, it should not be a defining characteristic.

Provides critical access: Both TRIP and Category III have traditionally funded systems which provide sole access via alternative transportation. The question "Does a system provide critical access?" was tested on candidate NPS transit systems. However, not all NPS transit systems provide critical access, and not all systems which provide critical access meet other likely criteria of a definition, such as NPS having a financial stake. Thus, this would not contribute toward a simple, clear definition.

Tours versus transportation: The TRIP program made a distinction between interpretive tours and transportation, the former being a recreational activity itself, and the latter being the conveyance of a passenger to or between activities. Whether a system is a tour or provides transportation was tested on candidate NPS transit systems. The distinction was often ambiguous. Many "transportation services" also provide interpretation or offer an experience on board. Many "tours" transport people to activities, allow people to get on and off, and/or take passengers to places in national parks that they could not access in their cars (for example, to a point on a body of water). Furthermore, both tours and transportation services further the visitor experience component of the NPS mission, and the NPS ATP sought not to prioritize one over the other. Although in daily life a transportation trip (often thought to be mandatory, for instance, to the grocery store) might be more important than a tour trip (often thought to be discretionary, for instance, a historical tour of a battlefield), in a recreational setting such as national park both types of trips may be vital to providing high quality visitor experiences.

Is part of a connected, multimodal network: Several stakeholders suggested this criterion. However, it is vague, and requires further definition of the term "connected, multimodal network."

Identifying unique systems: In order to be consistent service-wide in counting the number of transit systems, the NPS ATP investigated methods for defining where one transit system stops and another starts and tested these with candidate NPS transit systems, particularly at units thought to have more than one system. Based on this, the NPS ATP proposed a final criterion: "***all routes and services operated by the same operator under the same business model at a given unit are considered a single transit system***."

Once developed, the pilot definition was shared individually with the Transportation Program Coordinators from each of the seven NPS regions. Feedback from each region was generally supportive. The definition was also presented at the May 2012 Federal Lands Highway Program Service-wide Maintenance Committee. Again, reaction by meeting participants was generally supportive. The Associate Director, Park Planning, Facilities, and Lands, formalized the draft definition in August 2012 in a memo titled: "National Park Service Transit Inventory Definition and Next Steps.

Appendix D – 2017 NPS National Inventory System List

Alaska Region (AKR)

Park Code	System Name	Vehicle Type	2017 Passenger Boardings	Vehicle Ownership	Agreement Type	Purpose	NPS Contact Name
DENA	Bus Tours and Shuttle Service	Shuttle/Bus /Van/Tram	365,791	NPS/Non-NPS	Concession Contract	Critical Access	Jim LeBel
GLBA	Day boat tour	Boat/Ferry	6,982	Non-NPS	Concession Contract	Interpretive Tour	Melanie Berg
GLBA	Airport Shuttle	Shuttle/Bus /Van/Tram	7,771	Non-NPS	Concession Contract	Transportation Feature	Melanie Berg
KATM	KATM bus tours	Shuttle/Bus /Van/Tram	1,595	Non-NPS	Concession Contract	Interpretive Tour	Robert Maupin

Intermountain Region (IMR)

Park Code	System Name	Vehicle Type	2017 Passenger Boardings	Vehicle Ownership	Agreement Type	Purpose	NPS Contact Name
BAND	Bandelier National Monument Shuttle	Shuttle/Bus /Van/Tram	99,504	Non-NPS	Service Contract	Critical Access	Dennis Milligan
BRCA	Bryce Canyon Shuttle and Rainbow Point Shuttle	Shuttle/Bus /Van/Tram	795,217	Non-NPS	Service Contract	Mobility to or Within Park	Daniel Cloud
DINO	Tram transit	Shuttle/Bus /Van/Tram	204,606	Non-NPS	Service Contract	Critical Access	Dan Johnson
GLAC	Sprinter Shuttles & Optima Shuttles	Shuttle/Bus /Van/Tram	227,707	NPS	Cooperative Agreement	Mobility to or Within Park	Stephen N. Smith
GLAC	Glacier Park Boat Company -interpretive boat tours	Boat/Ferry	86,109	Non-NPS	Concession Contract	Interpretive Tour	Jean Tabbert
GLAC	Red Bus Tours	Shuttle/Bus /Van/Tram	62,163	NPS	Concession Contract	Interpretive Tour	Jean Tabbert
GLAC	Hiker Shuttle	Shuttle/Bus /Van/Tram	10,736	Non-NPS	Concession Contract	Mobility to or Within Park	Jean Tabbert
GLAC	Sun Tours	Shuttle/Bus /Van/Tram	5,489	Non-NPS	Concession Contract	Interpretive Tour	Jean Tabbert
GLCA	Boat tours	Boat/Ferry	112,567	Non-NPS	Concession Contract	Interpretive Tour	Eric Nikkel
GLCA	Flatwater tour	Boat/Ferry	59,126	Non-NPS	Concession Contract	Interpretive Tour	Eric Nikkel
GLCA	Antelope Point	Boat/Ferry	55,970	Non-NPS	Concession Contract	Interpretive Tour	Eric Nikkel

Park Code	System Name	Vehicle Type	2017 Passenger Boardings	Vehicle Ownership	Agreement Type	Purpose	NPS Contact Name
GLCA	SR276 passenger ferry	Boat/Ferry	8,859	Non-NPS	Service Contract	Transportation Feature	Eric Nikkel
GRCA	South Rim Shuttle Service	Shuttle/Bus /Van/Tram	7,775,599	NPS	Service Contract	Mobility to or Within Park	Pamela Edwards
GRCA	Grand Canyon Railway	Trolley/ Train	395,684	Non-NPS	Concession Contract	Mobility to or Within Park	Pamela Edwards
GRCA	South Rim Bus Tours	Shuttle/Bus /Van/Tram	108,862	Non-NPS	Concession Contract	Interpretive Tour	Pamela Edwards
GRCA	North Rim Hiker Shuttle	Shuttle/Bus /Van/Tram	1,050	Non-NPS	Concession Contract	Mobility to or Within Park	Pamela Edwards
GRTE	Jenny Lake Shuttle Boat	Boat/Ferry	152,675	Non-NPS	Concession Contract	Mobility to or Within Park	Katy Canetta
LIBI	LIBI bus tours	Shuttle/Bus /Van/Tram	11,273	Non-NPS	Concession Contract	Interpretive Tour	Ken Woody
MEVE	Long House Trailhead tram and Half-day ranger guided	Shuttle/Bus /Van/Tram	10,678	Non-NPS	Concession Contract	Interpretive Tour	Allan Loy
ORPI	Ajo Mountain Drive tour	Shuttle/Bus /Van/Tram	1,466	NPS	NPS Owned and Operated	Critical Access	Cynthia Sequanna
ROMO	Bear Lake & Moraine Park shuttle, Hiker Shuttle to Estes Park	Shuttle/Bus /Van/Tram	691,803	Non-NPS	Service Contract	Critical Access	John Hannon
YELL	YELL boat	Boat/Ferry	20,112	Non-NPS	Concession Contract	Interpretive Tour	Dale Reinhart
YELL	Xanterra Parks & Resorts interpretive bus tours	Shuttle/Bus /Van/Tram	17,707	NPS/Non-NPS	Concession Contract	Interpretive Tour	Christina White
YELL	Historic Yellow Bus tours	Shuttle/Bus /Van/Tram	12,214	NPS	Concession Contract	Interpretive Tour	Dale Reinhart
YELL	Xanterra Parks & Resorts interpretive snowcoaches tours	Shuttle/Bus /Van/Tram	9,054	Non-NPS	Concession Contract	Interpretive Tour	Christina White
ZION	Zion Canyon Shuttle	Shuttle/Bus /Van/Tram	6,505,200	NPS	Service Contract	Critical Access	Jack Burns

Midwest Region (MWR)

Park Code	System Name	Vehicle Type	2017 Passenger Boardings	Vehicle Ownership	Agreement Type	Purpose	NPS Contact Name
APIS	Excursion Boat	Boat/Ferry	41,966	Non-NPS	Concession Contract	Interpretive Tour	Chris E. Smith
CUVA	Cuyahoga Valley Scenic Railroad	Trolley/ Train	213,540	Non-NPS	Cooperative Agreement	Mobility to or Within Park	Jennifer McMahon
ISRO	MV Isle Royal Queen IV	Boat/Ferry	13,383	Non-NPS	Concession Contract	Critical Access	Chris Amidon
ISRO	MV Voyageur II and Sea Hunter III	Boat/Ferry	11,517	NPS/Non-NPS	Concession Contract	Critical Access	Chris Amidon
ISRO	MV Ranger III	Boat/Ferry	4,984	NPS	NPS Owned and Operated	Critical Access	Chris Amidon
ISRO	MV Sandy tour	Boat/Ferry	4,442	Non-NPS	Concession Contract	Interpretive Tour	Chris Amidon
ISRO	Royale Air Service Inc. float plane	Plane	2,980	Non-NPS	Concession Contract	Critical Access	Chris Amidon
PIRO	Pictured Rocks Cruises	Boat/Ferry	Not reported	Non-NPS	Concession Contract	Interpretive Tour	John Patmore
SCBL	SCBL free shuttle service	Shuttle/Bus /Van/Tram	3,266	NPS	NPS Owned and Operated	Mobility to or Within Park	Justin Cawiezel
SLBE	Manitou Island Transit	Boat/Ferry	11,113	Non-NPS	Concession Contract	Transportation Feature	Phil Akers
TAPR	TAPR bus tour	Shuttle/Bus /Van/Tram	4,939	NPS	NPS Owned and Operated	Interpretive Tour	Heather Brown
VOYA	VOYA tour boat	Boat/Ferry	2,512	NPS	NPS Owned and Operated	Interpretive Tour	Tawnya Schoewe

National Capital Region (NCR)

Park Code	System Name	Vehicle Type	2017 Passenger Boardings	Vehicle Ownership	Agreement Type	Purpose	NPS Contact Name
HAFE	HAFE shuttle transport	Shuttle/Bus /Van/Tram	449,750	NPS	Service Contract	Critical Access	Dennis Ebersole
NAMA	Big Bus Tours Washington DC	Shuttle/Bus /Van/Tram	1,002,784	Non-NPS	Concession Contract	Interpretive Tour	Karl Gallo
NAMA	DC Circulator	Shuttle/Bus /Van/Tram	358,129	Non-NPS	Cooperative Agreement	Transportation Feature	Eliza Voigt
WOTR	Fairfax Connectors Wolf Trap Express	Shuttle/Bus /Van/Tram	6,978	Non-NPS	Service Contract	Mobility to or Within Park	Duane Erwin

Northeast Region (NER)

Park Code	System Name	Vehicle Type	2017 Passenger Boardings	Vehicle Ownership	Agreement Type	Purpose	NPS Contact Name
ACAD	Island Explorer & Bicycle Express	Shuttle/Bus /Van/Tram	581,455	Non-NPS	Cooperative Agreement	Mobility to or Within Park	John Kelly
ADAM	Adams trolley	Shuttle/Bus /Van/Tram	68,232	NPS	Service Contract	Critical Access	Caroline Keinath
BOHA	Thompson Island Ferry	Boat/Ferry	28,938	Non-NPS	Cooperative Agreement	Mobility to or Within Park	Beth Jackendoff
BOHA	Boston Light Tour	Boat/Ferry	2,118	Non-NPS	Cooperative Agreement	Interpretive Tour	Beth Jackendoff
CACO	Coastguard Beach Shuttle	Shuttle/Bus /Van/Tram	73,338	NPS	NPS Owned and Operated	Critical Access	Karst Hoogeboom
EISE	EISE shuttle	Shuttle/Bus /Van/Tram	84,690	Non-NPS	Concession Contract	Critical Access	Ahna Wilson
FIIS	Sailors Haven Ferry	Boat/Ferry	48,858	Non-NPS	Concession Contract	Critical Access	Jason Pristupa
HOFR/ ELRO/ VAMA	Roosevelt Ride	Shuttle/Bus /Van/Tram	23,108	NPS	NPS Owned and Operated	Mobility to or Within Park	Scott Rector
HOFR/ ELRO/ VAMA	FDR Tram	Shuttle/Bus /Van/Tram	25,571	NPS	NPS Owned and Operated	Special Needs	Scott Rector
HOFR/ ELRO/ VAMA	Val-Kill Tram	Shuttle/Bus /Van/Tram	16,017	NPS	NPS Owned and Operated	Special Needs	Scott Rector
JOFL/ ALPO	Lakebed Tours	Shuttle/Bus /Van/Tram	1,112	NPS	NPS Owned and Operated	Interpretive Tour	Doug Bosley
LOWE	LOWE Historic Trolley	Train/ Trolley	57,266	NPS	NPS Owned and Operated	Mobility to or Within Park	Christine Bruins
LOWE	Canal Tours	Boat/Ferry	15,158	NPS	NPS Owned and Operated	Interpretive Tour	Christine Bruins
SHEN	Rapidan Camp bus	Shuttle/Bus /Van/Tram	1,350	NPS	NPS Owned and Operated	Interpretive Tour	Tim Taglauer
STEA	Scranton Limited & Live Steam Excursions	Train/ Trolley	27,336	NPS	NPS Owned and Operated	Interpretive Tour	Deborah Conway
STLI/ ELIS	Statue of Liberty Ferries	Boat/Ferry	10,839,756	Non-NPS	Concession Contract	Critical Access	Ben Hanslin
VAFO	History of Valley Forge Trolley Tour	Shuttle/Bus /Van/Tram	10,657	Non-NPS	Cooperative Agreement	Interpretive Tour	Deirdre Gibson

Pacific West Region (PWR)

Park Code	System Name	Vehicle Type	2017 Passenger Boardings	Vehicle Ownership	Agreement Type	Purpose	NPS Contact Name
CHIS	Island Packers	Boat/Ferry	134,444	Non-NPS	Concession Contract	Critical Access	Trish Buffington
CRLA	Crater Lake Boat Tour	Boat/Ferry	9,170	Non-NPS	Concession Contract	Interpretive Tour	Sean Denniston
CRLA	Rim Drive Trolley Tour	Shuttle/Bus /Van/Tram	7,703	Non-NPS	Concession Contract	Interpretive Tour	Sean Denniston
DEPO	Reds Meadow Shuttle Bus	Shuttle/Bus /Van/Tram	105,960	Non-NPS	Cooperative Agreement	Critical Access	Deanna Dulen
EUON	NPS Shuttle	Shuttle/Bus /Van/Tram	5,165	NPS	NPS Owned and Operated	Critical Access	Tom Leatherman
GOGA/ ALCA	Alcatraz Cruises ferry	Boat/Ferry	2,993,960	Non-NPS	Concession Contract	Critical Access	Stefanie Martin
MUWO	Muir Woods Shuttle	Shuttle/Bus /Van/Tram	128,045	Non-NPS	Cooperative Agreement	Mobility to or Within Park	Darren Brown
NOCA/ LACH	Rainbow Falls Tours	Shuttle/Bus /Van/Tram	11,307	NPS	Concession Contract	Interpretive Tour	Annelise Lesmeister
NOCA/ ROLA	Ross Lake Hiker Shuttle	Boat/Ferry	493	Non-NPS	Concession Contract	Transportation Feature	Annelise Lesmeister
PINN	Pinnacle Shuttle	Shuttle/Bus /Van/Tram	53,621	NPS	NPS Owned and Operated	Mobility to or Within Park	Greg Ballinger
PORE	Headlands Shuttle	Shuttle/Bus /Van/Tram	27,369	Non-NPS	Service Contract	Critical Access	John A. Dell'Osso
SEKI	Giant Forest Shuttle	Shuttle/Bus /Van/Tram	794,603	Non-NPS	Cooperative Agreement	Critical Access	Colleen Bathe
SEKI	Gateway Shuttle	Shuttle/Bus /Van/Tram	12,326	Non-NPS	Cooperative Agreement	Mobility to or Within Park	Colleen Bathe
VALR	USS Arizona Memorial Tour	Boat/Ferry	1,904,500	Non-NPS	Cooperative Agreement	Critical Access	Patricia Brown
VALR	Ford Island Tour	Shuttle/Bus /Van/Tram	700,000	Non-NPS	Service Contract	Interpretive Tour	Patricia Brown
YOSE	Yosemite Valley Shuttle	Shuttle/Bus /Van/Tram	3,359,560	NPS	Concession Contract	Mobility to or Within Park	Jim Donovan
YOSE	Badger Pass-Glacier Point shuttle	Shuttle/Bus /Van/Tram	139,113	NPS	Service Contract	Mobility to or Within Park	Jim Donovan
YOSE	Tram Tours and Hiker Shuttle	Shuttle/Bus /Van/Tram	64,647	Non-NPS	Concession Contract	Interpretive Tour	Jim Donovan
YOSE	YARTS	Shuttle/Bus /Van/Tram	117,381	Non-NPS	Cooperative Agreement	Mobility to or Within Park	Jim Donovan
YOSE	Winter Ski Shuttle	Shuttle/Bus /Van/Tram	5,064	Non-NPS	Concession Contract	Mobility to or Within Park	Jim Donovan
YOSE	Tuolumne Shuttle	Shuttle/Bus /Van/Tram	2,987	NPS	Concession Contract	Mobility to or Within Park	Jim Donovan

Southeast Region (SER)

Park Code	System Name	Vehicle Type	2017 Passenger Boardings	Vehicle Ownership	Agreement Type	Purpose	NPS Contact Name
BLRI	Sharp Top Mountain Shuttle	Shuttle/Bus /Van/Tram	5,180	Non-NPS	Concession Contract	Transportation Feature	Shawn Cloutier
CALO	Ferry service	Boat/Ferry	102,568	Non-NPS	Concession Contract	Critical Access	Katherine Cusinberry
CARL	Electric Shuttle	Shuttle/Bus /Van/Tram	2,774	NPS	NPS Owned and Operated	Special Needs	Sarah Perschall
CUIS	Ferry service	Boat/Ferry	78,406	Non-NPS	Concession Contract	Critical Access	Jill Hamilton-Anderson
CUIS	Land and Legacies Tour	Shuttle/Bus /Van/Tram	8,354	NPS	Concession Contract	Interpretive Tour	Jill Hamilton-Anderson
DRTO	Ferry service	Boat/Ferry	102,154	Non-NPS	Concession Contract	Critical Access	William Gordon
DRTO	Key West Seaplane Adventures	Plane	15,118	Non-NPS	Concession Contract	Interpretive Tour	William Gordon
EVER	Shark Valley Tram Tour	Shuttle/Bus /Van/Tram	120,322	Non-NPS	Concession Contract	Interpretive Tour	William Gordon
FOMA/ CASA	Ferry service	Boat/Ferry	16,069	NPS	NPS Owned and Operated	Critical Access	Andrew Rich
FOSU	Ferry service	Boat/Ferry	336,059	Non-NPS	Concession Contract	Critical Access	Michelle Haas
GUIS	Ship Island Ferry	Boat/Ferry	47,452	NPS/Non-NPS	Concession Contract	Transportation Feature	Lindsey Phillips
KEMO	Shuttle Bus	Shuttle/Bus /Van/Tram	9,744	NPS	Service Contract	Critical Access	Nancy Walther
MACA	Cave Tours Bus Shuttle	Shuttle/Bus /Van/Tram	214,198	NPS/Non-NPS	Concession Contract	Transportation Feature	Bruce Powell
MACA	Green River and Houchin Ferries	Boat/Ferry	180,000	NPS	NPS Owned and Operated	Transportation Feature	Steve Kovar
SAJU	San Juan Trolley	Shuttle/Bus /Van/Tram	Not reported	NPS	Cooperative Agreement	Mobility to or Within Park	Jon Bergon

Appendix E – Air Quality and Emissions

The 2017 transit inventory uses an updated methodology to analyze the air quality and emissions impacts of NPS transit systems. The improved analysis uses the US Environmental Protection Agency's (EPA) Motor Vehicle Emissions Simulator (MOVES) for estimating emissions by NPS transit vehicles. MOVES is a state-of-the-science emissions modeling software that estimates airborne emissions from various on-road vehicles across a number of vehicle types at very fine scales. MOVES uses years of direct measurements inventorying the ways different vehicles, fuel types, road types (e.g., urban vs. rural, highways vs. local streets, etc.), and emission processes (e.g., running, starting, and idling) contribute to air pollution. This process allows MOVES to then model emissions from similar vehicles. MOVES also performs similar analysis for vehicles operating off-road, such as waterborne vessels.

The prior method for estimating emissions from NPS transit systems relied on a "top-down" approach, applying a laboratory-derived energy density factor, i.e., grams of CO_2 emitted per gallon of fuel burned, to the annual distance traveled by related transit vehicles in each NPS system. By contrast, MOVES uses the pre-loaded measurement data to estimate emissions rates for different vehicle types, model years, fuel types, and road types across a number of Clean Air Act criteria pollutants "from the bottom-up." Consequently, MOVES bases emissions calculations on observations of actual vehicle operations.

MOVES is the regulatory standard for air quality analyses under the Clean Air Act and related legislation. Using MOVES for the transit inventory offers two major improvements to the prior method:

- MOVES' "bottom-up" approach and its incorporation of more detailed parameters related to vehicular emissions improves the accuracy of the fuel consumption and criteria air pollutant assessment while relying on fewer simplifying assumptions.
- Estimating additional pollutants beyond CO_2 acknowledges the differences among pollution profiles for different vehicle types (see "Pollutants Analyzed" below), and allows for a more holistic understanding of a transit system's contributions to local air quality.

The improvements in the emissions and air quality analyses described above enable NPS units to engage directly with other local, state, and national air quality initiatives, as well as make informed programmatic decisions that improve resource management and visitor experience in the parks.

The following pollutants are included in the 2017 air quality analysis:

Carbon Dioxide (CO_2)[27]
Carbon dioxide (CO_2) is a colorless gas produced through chemical combustion, including burning fuels to power automobiles and homes. Typically, gasoline combustion emits more CO_2 than other fuels.

Oxides of Nitrogen (NOx) and Volatile Organic Compounds (VOCs)
NOx is a collection of gaseous molecules containing one nitrogen atom and a number of oxygen atoms. As with the other pollutants described here, fuel combustion emits NOx. While upper-atmospheric NOx can actually counteract the warming effects of greenhouse gases, ground-level

[27] IPCC 2013, "Climate Change: The Phyiscal Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change."

NOx molecules react with other airborne chemicals to become particles that can cause respiratory conditions in humans.[28]

VOCs are a broad category of organic molecules that evaporate at very low temperatures; flammable solvents like paint thinners and some household cleaners, as well as other aromatics including vehicular fuels, all contain VOCs. State, local, and federal institutions tightly regulate VOCs, as they are easily absorbed into human tissue and can have harmful health effects.[29]

NOx and VOCs can together form ozone (O_3), a highly reactive gas. Stratospheric ozone, very high up in Earth's atmosphere, deflects harmful solar radiation away from Earth's surface. However, NOx and VOCs interacting at the surface produce ground ozone, causing a variety of negative health effects. Ground-level ozone can also severely harm plants and wildlife, and because ozone can travel long distances by wind, rural areas may experience high exposure even with little ozone production.[30]

Carbon Monoxide (CO)[31]
CO is a colorless and odorless gas released through burning fossil fuels, though the emissions quantities vary by fuel type. CO can be extremely dangerous in large quantities for animals and humans because it inhibits the absorption of oxygen into the bloodstream. While CO toxicity is ordinarily only a concern indoors, where such quantities easily accumulate, the elderly and those with certain cardiovascular are at risk of serious health impacts at higher outdoor concentrations. This often occurs at hot outdoor locations in the presence of numerous running motors, such as parking lots in summertime.

Particulate Matter (PM)[32]
PM encompasses solid and liquid particles emitted into the air, including dust, soot, and aerosolized chemicals. PM can come from construction sites, roadway wear as tires and heavy vehicles move over them, and from burning fuels. Diesel fuel combustion generally emits more PM than other fuels, and driving over unpaved surfaces can kick up PM10 particles. Two categories of PM concerning regulatory analyses of air quality include those with negative impacts on respiratory health, i.e. inhalable particles ten micrometers and smaller (PM10), as well as those 2.5 micrometers and smaller (PM2.5). Exposure to PM can cause and aggravate respiratory conditions such as asthma – this is especially true of PM10. PM2.5 particles are a major contributor to smog, which both obscures views and damages natural resources.

Results

Diverted Passenger Vehicle Trips and CO_2 Emissions Avoided
Though transit still contributes to emissions, the presence of transit has a net positive effect on air quality, as well as the visitor experience because transit use reduces the number of vehicle trips in parks. Transit buses carry more people per square foot of road space, relieving congestion on park roads and eliminating associated fuel-inefficient driving behaviors like extended idling and stop-and-go. In addition to the air quality benefits of burning less fuel per passenger transported,

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[28] US Environmental Protection Agency, "NOx: How Nitrogen Oxides Affect the Way We Live and Breathe."

[29] US Environmental Protection Agency, "NOx: How Nitrogen Oxides Affect the Way We Live and Breathe."

[30] US Environmental Protection Agency, "Basic Information about Ozone | Ozone Pollution | US EPA."

[31] US Environmental Protection Agency, "Basic Information about Carbon Monoxide (CO) Outdoor Air Pollution | Carbon Monoxide (CO) Pollution in Outdoor Air | US EPA."

[32] Ibid.

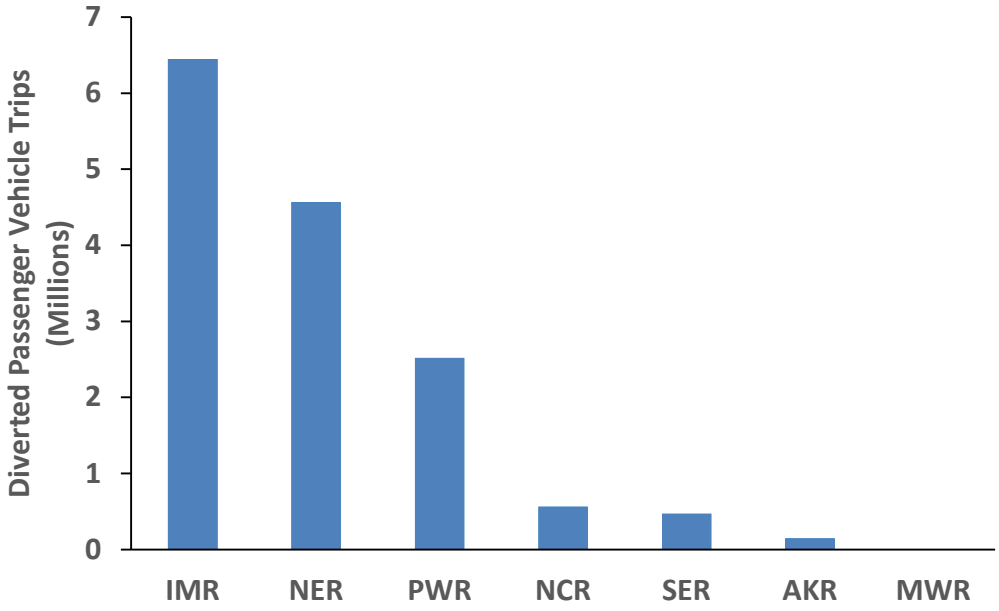
increasing transit use influences how visitors spend their time in the park, and removes long lines of cars from viewsheds.

Figure 20 shows the estimated number of vehicle trips eliminated as a result of the presence of transit service in each region. NPS transit services eliminated an estimated 14.8 million passenger vehicle trips in 2017, which would have driven in excess of 588 million miles and emitted more than 112,500 metric tons of CO_2. Regions with high transit use and more boardings divert more personal vehicles from the road.

Passenger vehicle diversion is calculated by dividing the total number of passenger boardings by 2.6, the assumed average occupancy of visitors' personal vehicles. Emissions avoided are calculated by first determining the avoided vehicle miles travelled (VMT), and then multiplying by a light-duty vehicle emissions factor; it is assumed that the passenger vehicles use conventional gasoline fuel.

$$Emissions\ Avoided = \frac{\left(\frac{total\ transit\ VMT}{total\ transit\ runs}\right) * total\ transit\ boardings}{2.6\ occupants\ per\ vehicle}$$

Figure 20: Vehicle trips avoided as a result of NPS transit systems
Source: 2017 NPS Transit Inventory data



IMR	NER	PWR	NCR	SER	AKR	MWR
6,400,000	4,600,000	2,500,000	560,000	470,000	147,000	38,000

As shown in the following figures and tables, vehicle fuel and terrain type influence the emissions results. Diesel contributes a different pollution profile than alternative fuels, buses contribute differently than cars, heavy-duty ferries pollute differently than automobiles, and heavy engine loads on unpaved surfaces require more fuel. However, fewer vehicles burning fuel in the park has a net postive effect on local air quality.

Figure 21 shows the results of MOVES CO_2 emissions modeling for 2017 NPS transit system activity, aggregated to the regional level. The results are also split by ownership. Across all regions, NPS transit fleets emitted about 18,000 metric tons of CO_2 in 2017. Regions like the Intermountain Region and Pacific West Region have the highest emissions, but the largest CO_2 emitting regions also operate the most transit services: the Intermountain, Pacific West, and the Northeast Region all have upwards of roughly thirteen transit systems each, with many operating in rural and hilly areas. Comparatively, the National Capitol Region only has two transit systems whose buses operate on relatively flat urban streets.

Figure 21: NPS Transit System CO_2 Emissions
Source: 2017 NPS NPS Transit Inventory data

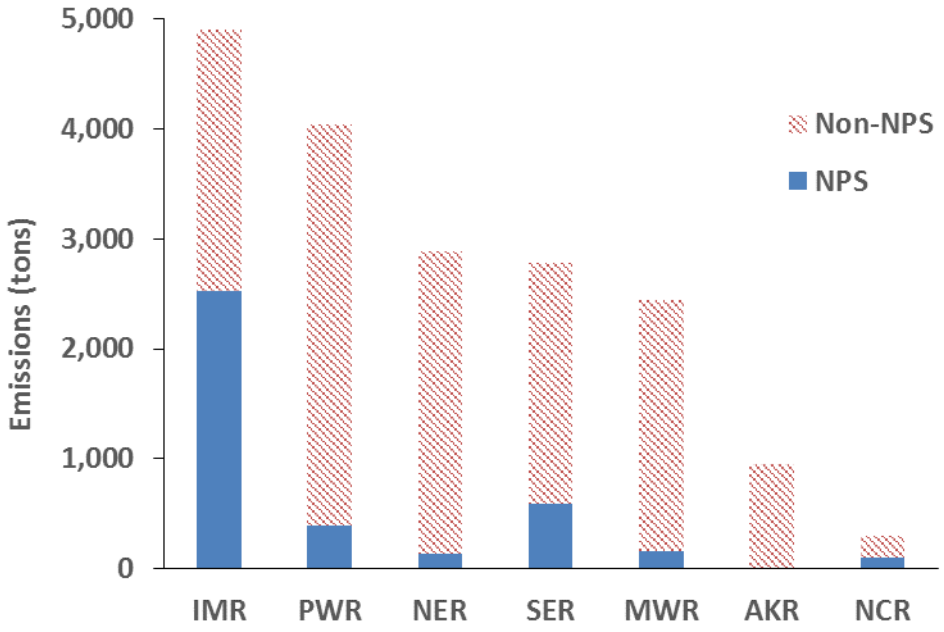


Figure 22 shows the results of MOVES NOx emissions modeling for 2017 NPS transit system activity, split by ownership. Across all regions, NPS transit fleets emitted 146 tons of NOx in 2017. Diesel fuel emits more NOx than other fuels, particularly under heavy engine loads. The Midwest region systems emitted a large amount of NOx compared to its contributions in other pollutants, likely due to the prevalence of ferry services operated in the region's parks that are fueled by marine diesel.

Figure 22: NPS Transit System NOx Emissions
Source: 2017 NPS Transit Inventory data

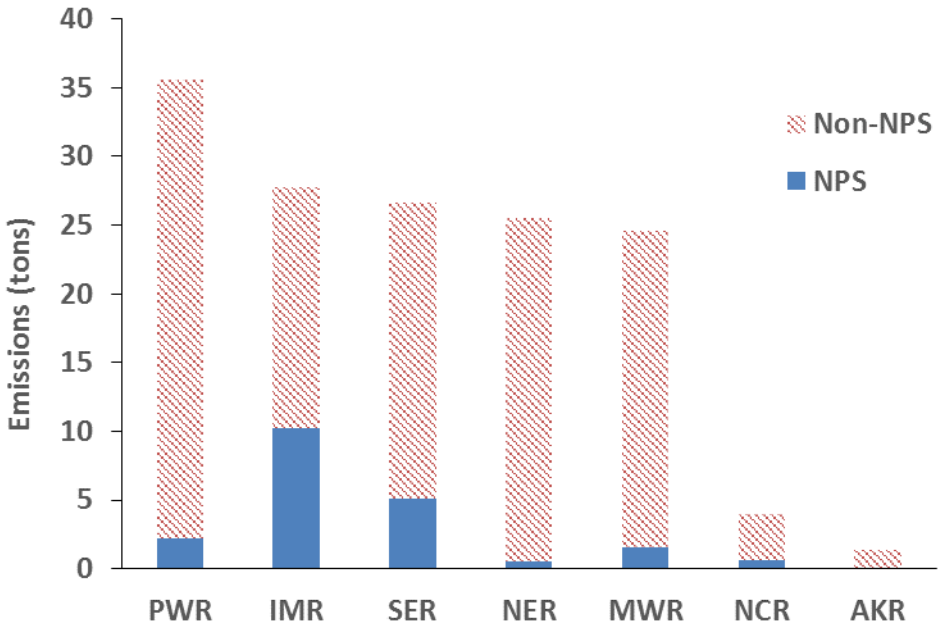
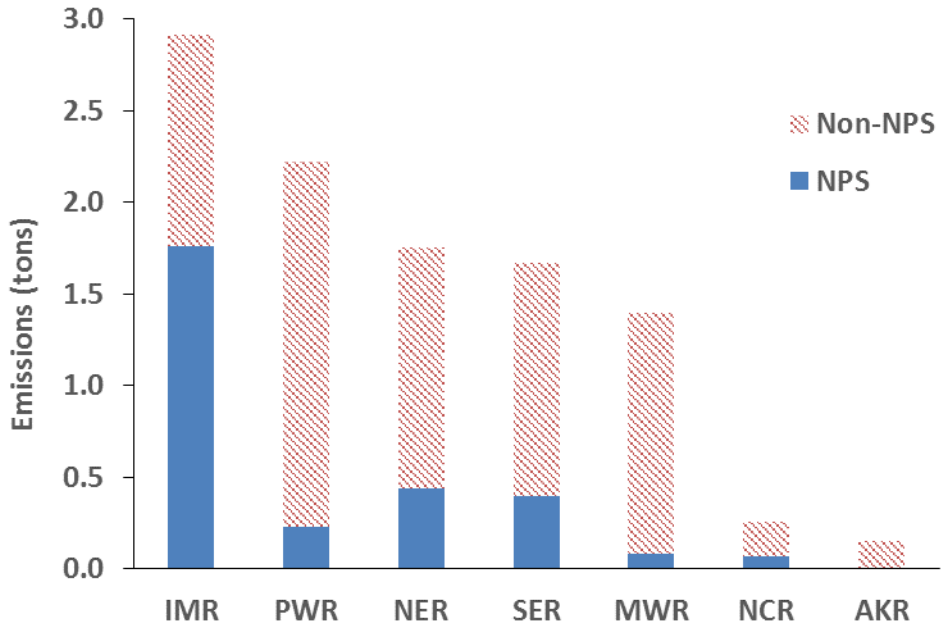


Figure 23 shows the results of MOVES VOCs emissions modeling for 2017 NPS transit system activity, split by ownership. Across all regions, NPS transit fleets emitted just over 10 tons of VOCs in 2017. VOCs combine with other airborne compounds to produce smog. The Intermountain region has the largest VOCs as the region has a substantial proportion of vehicles powered by propane and marine diesel. Propane combustion becomes less chemically efficient at high altitudes, i.e., where there is less oxygen, and can therefore leave behind additional VOCs as well as CO.[33]

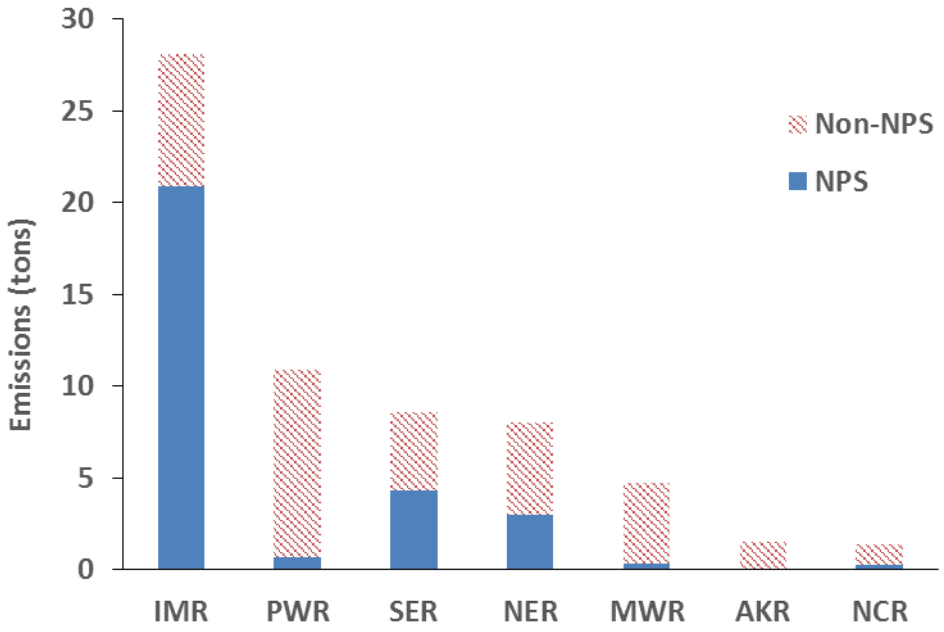
Figure 23: NPS Transit System VOC Emissions
Source: 2017 NPS Transit Inventory data



[33] S. McAllister et al., "Chapter 2: Thermodynamics of Combustion". *Fundamentals of Combustion Processes*, Springer (2011).

Figure 24 shows the results of MOVES CO emissions modeling for 2017 NPS transit system activity, split by ownership. Across all regions, NPS transit fleets emitted approximately 63 tons of CO in 2017. As discussed earlier, the Intermountain region's CO emissions are likely due to the large number of propane-powered transit vehicles operating at higher altitudes: without enough oxygen, inefficient propane combustion can leave behind CO.

Figure 24: NPS Transit System CO Emissions
Source: 2017 NPS Transit Inventory data



For PM emissions, ferries, which burn marine diesel, and buses fueled by propane contribute significantly more than those powered by other fuels. Several parks in the Pacific West Region are exclusively marine transit fleets, and the Ellis Island ferry fleet contributes majority of the Northeast Region's PM emissions. In addition, the Intermountain Region's ferries at Glen Canyon, and the propane bus fleet at Zion increase their emissions in this category.

Figure 25 shows the results of MOVES PM2.5 emissions modeling for 2017 NPS transit system activity, split by ownership. Across all regions, NPS transit fleets emitted 3.7 tons of PM2.5 in 2017. The primary public health concern with PM2.5 is the pulmonary health risks posed by breathing very fine particles.

Figure 25: NPS Transit System PM2.5 Emissions
Source: 2017 NPS Transit Inventory data

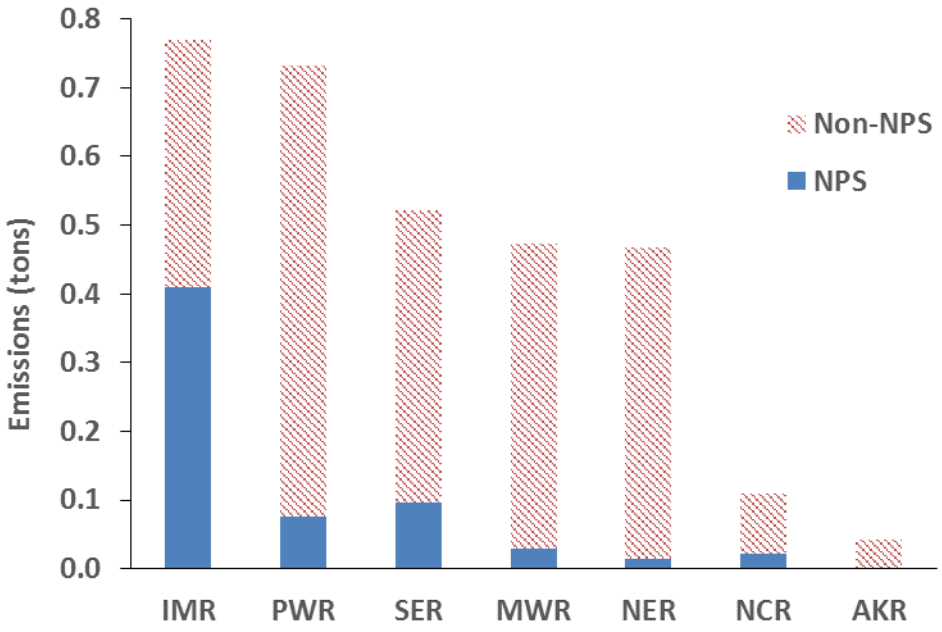
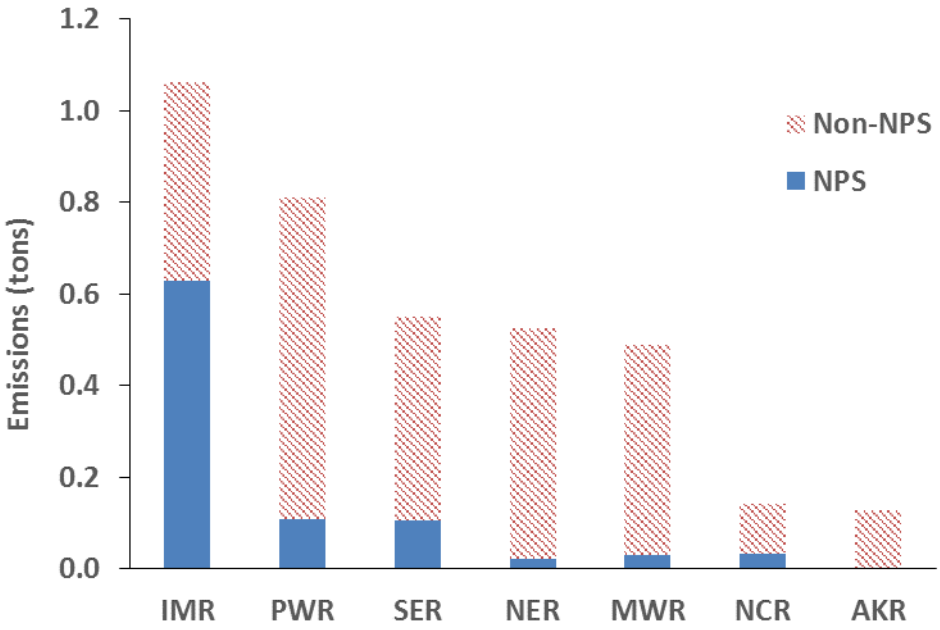


Figure 26 shows the results of MOVES PM10 emissions modeling for 2017 NPS transit system activity, split by ownership. Across all regions, NPS transit fleets emitted 4 tons of PM10 in 2017. The Alaska Region produces more PM10 than PM2.5, in part due to the unpaved roadways driven by systems in that region.

Figure 26: NPS Transit System PM10 Emissions
Source: 2017 NPS Transit Inventory data



Appendix F – Vehicle Replacement Assumptions

Uniform vehicle replacement costs and expected service lives were used to provide service-wide consistency in estimates of vehicle age, remaining service life, and recapitalization costs. The assumptions below provided the basis for the recapitalization analysis, which was also validated by regional staff to reflect variations in timelines, vehicle types purchased, and growth in vehicle fleets. These assumptions were updated for the 2015 Inventory from, previous inventories[34], to reflect the usage and operating characteristics of NPS vehicles (see Table 7 and Table 8). NPS vehicles are not utilized in the same way that city transit vehicles are; they are typically not used for the entire year, nor are they used as intensively as transit vehicles in an urban environment. Vehicle cost estimates were mostly taken from the General Service Administration's AutoChoice Database.

Table 7: Vehicle replacement costs and expected life for non-electric vehicles
Source: Transit standards[35] updated to reflect NPS typical usage and operating characteristics

Assumptions	Gas/Diesel/Biodiesel/Propane		CNG	
Vehicle Type	**Replacement Cost**	**Expected Life**	**Replacement Cost**	**Expected Life**
Passenger Van	$33,000	10	N/A	N/A
Light-duty Shuttle	$107,000	15	$120,500	10
Medium-Duty Shuttle	$147,000	15	$154,000	10
Heavy-Duty Shuttle	$147,000	15	$158,000	10
Medium-Duty Transit	$275,000	18	$330,000	20
Heavy-Duty Transit	$440,000	18	$478,000	20
School Bus	$126,500	18	N/A	N/A
6-12 pax Electric Tram	N/A	11	N/A	11

[34] The 2014 Inventory used Replacement costs and expected life assumptions based on the Federal Transit Administration: Useful Life of Transit Buses and Vans – April 2007.

[35] Ibid.

Table 8: Vehicle replacement costs and expected life for electric vehicles
Source: Transit standards[36] updated to reflect NPS typical usage and operating characteristics

Assumptions	Electric-Hybrid		Electric	
Vehicle Type	**Replacement Cost**	**Expected Life**	**Replacement Cost**	**Expected Life**
Passenger Van	N/A	10	$100,000	10
Light-duty Shuttle	$136,000	15	$395,000	15
Medium-Duty Shuttle	$330,000	15	N/A	15
Heavy-Duty Shuttle	$352,000	15	N/A	15
Medium-Duty Transit	$495,000	18	$500,000	18
Heavy-Duty Transit	$605,000	18	$750,000	18
School Bus	N/A	18	N/A	18
6-12 pax Electric Tram	$20,000	11	N/A	11

[36] The 2014 Inventory used Replacement costs and expected life assumptions based on the Federal Transit Administration: Useful Life of Transit Buses and Vans – April 2007.

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

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