Katmai National Park and Preserve

Boston Harbor Islands National Recreation Area

Grand Canyon National Park

NPS National Transit Inventory and Performance Report, 2023

NPS National Transit Inventory and Performance Report

Executive Summary

2023

Marsh-Billings-Rockefeller National Historical Park

This is a summary of the 2023 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 vessels and collects detailed vehicle information.

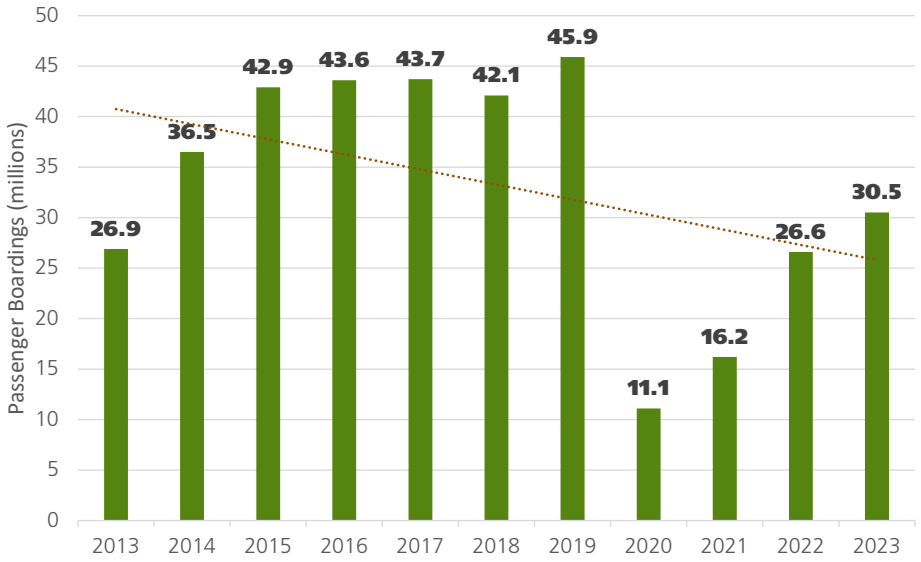
30.5 Million
Passenger Boadings

92 Systems Operated

57 Parks Represented

826 Vehicles & Vessels

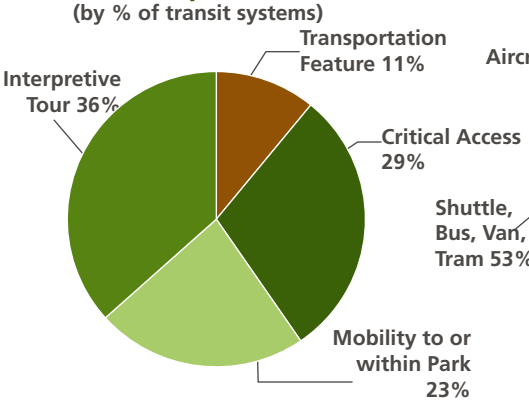
*Reflects systems that operated during the fiscal year 2023 only



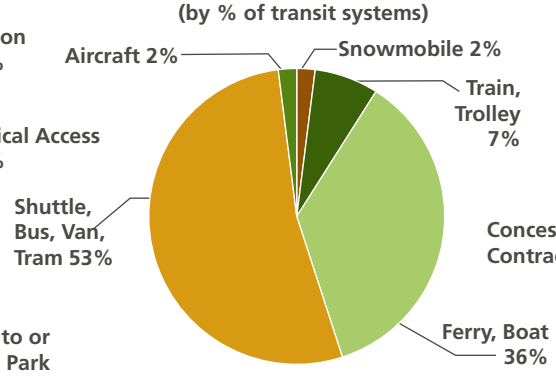
Of the 92 transit systems that operated, the top 10 transit systems accounted for 85% of the passenger boardings in 2023. The systems with over a million boardings are located at Statue of Liberty National Monument, Zion National Park, Grand Canyon National Park, Alcatraz (Golden Gate National Park), Pearl Harbor National Memorial, and Yosemite National Park.

The National Park Service owns vehicle fleets for 19 systems and operated 17 of those systems in 2023. NPS-operated systems account for 432,012 passenger boardings—about 1% of total boardings.

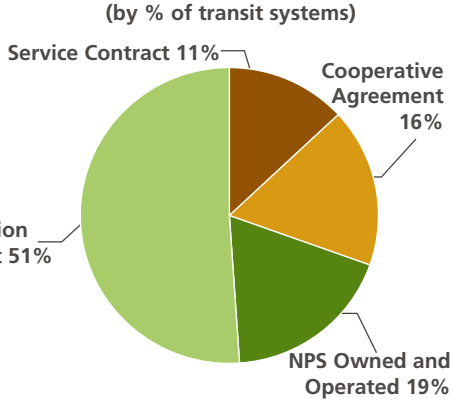
Purpose
(by % of transit systems)



Mode
(by % of transit systems)



Business Model
(by % of transit systems)



NPS National Transit Inventory and Performance Report
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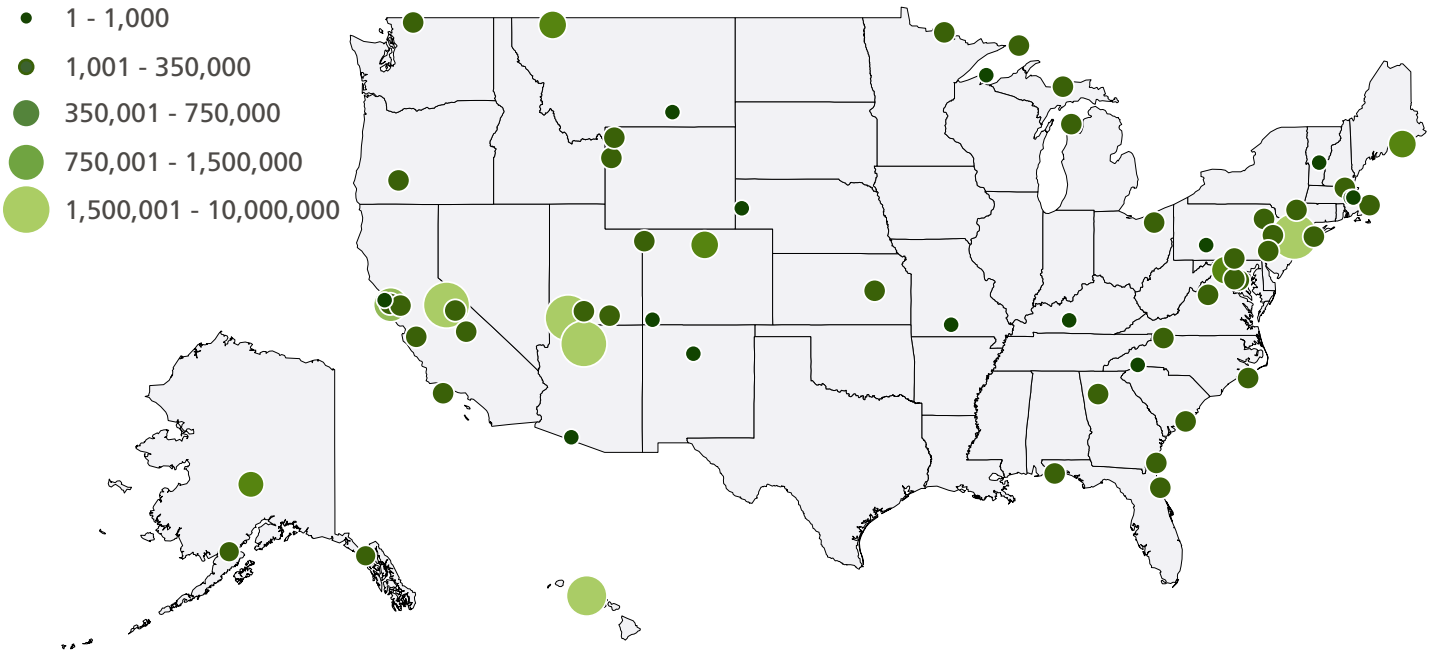
45% of NPS-owned transit vehicles operate on alternative fuel, while 20% of non-NPS-owned vehicles operate on alternative fuel.

92 NPS transit systems operated in fiscal year 2023. Of those, 55 operated for six months or more and of those, 28 operated year-round.

Passenger Boardings by Park



Performance Measures

Visitor Experience

The majority of the NPS-owned transit system vehicles and vessels are accessible for people with mobility impairments. In 2023, 60% of NPS-owned vehicles are accessible to people with mobility impairments (e.g., require a wheelchair lift).

Operations

The National Park Service partners with the private sector to provide the majority of transit services. Non-NPS entities operate 66% of NPS transit systems, which account for 94% of passenger boardings servicewide. The National Park Service owns and operates the remaining 33% of transit systems, which account for the remaining 6% of passenger boardings.

Environmental Impact

National Park Service transit systems mitigate vehicle emissions. The net CO_2 emissions savings of the 807 transit vehicles and vessels evaluated (excluding planes, rail, snowcoaches, and vehicles with incomplete data or that did not operate) was equivalent to removing 11.5 million personal vehicle trips and 151 million passenger vehicle miles from the road.

Asset Management

National Park Service-owned vehicles and vessels have an estimated $135 million in recapitalization needs between 2024 and 2034. Parks with estimated transit vehicle replacement costs over $5 million during the next five years include Acadia National Park, Grand Canyon National Park, Harpers Ferry National Historical Park, Isle Royale National Park, and Yosemite National Park.

Cover Photos:

Upper left: Katmai Bus Tour, Katmai National Park and Preserve (NPS photo)
Upper left: Thompson Island Ferry, Boston Harbor Islands National Recreation Area (Dan Squire, Thompson Island Outward Bound)
Bottom: South Rim Shuttle Service, Grand Canyon National Park (NPS photo)

Executive Summary Photo:

Visitor Shuttle, Marsh-Billings-Rockefeller National Historical Park (NPS photo).

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.

NPSG/999/192980/May 2024

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INTRODUCTION

The *2023 National Park Service (NPS) Transit Inventory and Performance Report* communicates the servicewide outcomes and status of NPS transit systems. This comprehensive listing has been compiled annually in this format since 2012 and covers on- and off-road based, waterborne, and airborne systems. The inventory establishes a working definition of NPS transit systems for the purpose of this document; helps the National Park Service comply with 23 United States Code (USC) 203(c),[1] which requires "a comprehensive national inventory of public Federal lands transportation facilities"; and fulfills other internal needs.

The 2023 inventory is meant to assist the National Park Service with the following:

- Measure NPS transit performance.
- Capture asset management and operational information not tracked in current NPS systems of record.
- Integrate transit data with NPS systems of record, including asset management data in the Financial and Business Management System for NPS-owned vehicles.
- Provide key transit statistics that track progress towards goals identified in the National Transportation Strategy, identify and fix programmatic issues, and meet reporting requirements.
- Comply with Executive Order 14057, "Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability," with a goal of 100% zero-emission vehicle acquisitions by 2035.
- Communicate program information and projected vehicle recapitalization needs.

DATA COLLECTION AND METHODOLOGY

Only parks with transit systems that meet each of the following three criteria listed below are included in this effort (see Appendix B for more information).

1. The NPS transit systems move people by motorized vehicle on a regularly scheduled service.[2]
2. The NPS transit systems operate under one of the following business models: concessions contract; service contract; partner agreement, including memorandum of understanding,

1. 23 USC 203 Federal Lands Transportation Program: https://www.gpo.gov/fdsys/pkg/USCODE-2014-title23/pdf/USCODE-2014-title23-chap2-sec203.pdf.
2. This criterion includes services with a posted schedule and standard operating seasons/days of week/hours. Services that do not operate on a fixed route—charter services for individual groups or services that exist for the sole purpose of providing access to persons with disabilities—are not included.

memorandum of agreement, or cooperative agreement (commercial use agreements are not included); or is NPS owned and operated.[3]

3. All routes and services at a given park that are operated under the same business model by the same operator are considered a single NPS transit system.

The 2023 NPS transit inventory is limited to systems in which the National Park Service has either a direct financial stake or committed resources to develop a formal contract or agreement.

The following information was collected for the 2023 fiscal year:

- transit system name and description
- passenger boardings
- business model
- system purpose
- system type/mode
- system-level safety metrics (accident occurrence and property damage)
- vehicle information, including vehicle type, identifying numbers, fuel type, capacity, service miles, service hours, number of runs completed, engines, horsepower, accessibility, and age
- In 2023, the National Park Service renewed its focus on collecting and verifying annual miles traveled, annual number of runs completed, and number on engine-on operating hours. These performance measures help assess the operational and financial health of transit systems.
- owner and operator type (NPS or non-NPS) and contact information
- operating schedule
- participation of a local transit agency in the service
- operational status (operated, did not operate)[4]

The National Park Service has 104 transit systems at 64 parks. For the 2023 inventory, 63 parks provided information on their transit systems.[5] Some parks report 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. For the purposes of this report, 92 of 104 identified transit systems operated in fiscal year 2023.

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

3. This report does not distinguish between a memorandum of understanding, memorandum of agreement, or cooperative agreement. All are recorded as "cooperative agreement."
4. Systems that did not operate but intend to operate in the future remained part of the inventory.
5. Mammoth Cave National Park did not submit information on their its transit systems for the 2023 inventory.

INVENTORY RESULTS

Detailed findings of the 2023 inventory are presented in the Vehicle Inventory Statistics, System Characteristics, and Passenger Boardings sections below.

Table 1 summarizes the differences in key results of the NPS transit inventories over the last five years.

Table 1. NPS Transit Systems Changes Between Inventories (2019–2023)

Key Findings	2019	2020	2021	2022	2023
Total number of systems	95	96	97	101	102
• Number of systems that operated	95	66	63	81	92
Number of parks represented	60	49	62	63	63
Passenger boardings (millions)	45.9	11.1	16.2	26.6	30.5
• Excluding 10 highest ridership systems	7.1	1.1	2.3	4.7	4.6
Number of vehicles	N/A	N/A	865	874	862
• NPS-owned vehicles	835	673	269	274	272
• NPS-owned vehicles that operated	236	149	215	244	267
• Non-NPS vehicles	599	524	596	600	590
• Non-NPS vehicles that operated	N/A	N/A	508	546	559
Systems operated by local transit agency	9	3	5	5	5*

* The six systems that were operated by a local transit authority are the DC Circulator, Giant Forest Shuttle, Fairfax Connections Wolf Trap Express, Hiker Shuttle (Delaware Water Gap National Recreation Area), Gateway Shuttle, and Island Explorer & Bicycle Express

Source: 2019–2023 NPS transit inventory data

The bus tour at Katmai National Park & Preserve, Isle au Haut Ferry at Acadia National Park, and Winter Giant Forest Shuttle at Sequoia & Kings Canyon National Parks are the three systems added in 2023. The 2023 inventory included a total of 102 systems: 92 operated in some capacity, and 10 systems did not operate. Nonoperational systems listed continued closures from the COVID-19 pandemic, driver availability, permitting, vehicle issues, expired or terminated contracts, and other issues as the reasons they did not operate.

Passenger boardings increased by 10.5 million (14.4%), reflecting increased transit system operations, visitation, and public use of transit systems. Visitation across the national park system increased 4%; 325 million recreation visits were recorded in 2023 compared to 312 million recreation visits in 2022.[6] The increase in boardings indicates that visitors are returning to transit system use, if available. The increase also reflects growing reliance on mandatory transit use in some parks for congestion management.

6. In 2023, the National Park Service received 325 million recreation visits, up 13.5 million visits (4%) from 2022. Servicewide visitation has essentially recovered to pre-pandemic levels. The year 2023 is very much like years immediately before the NPS centennial in 2016 and is less than 2% lower than that all-time record year.

System Characteristics

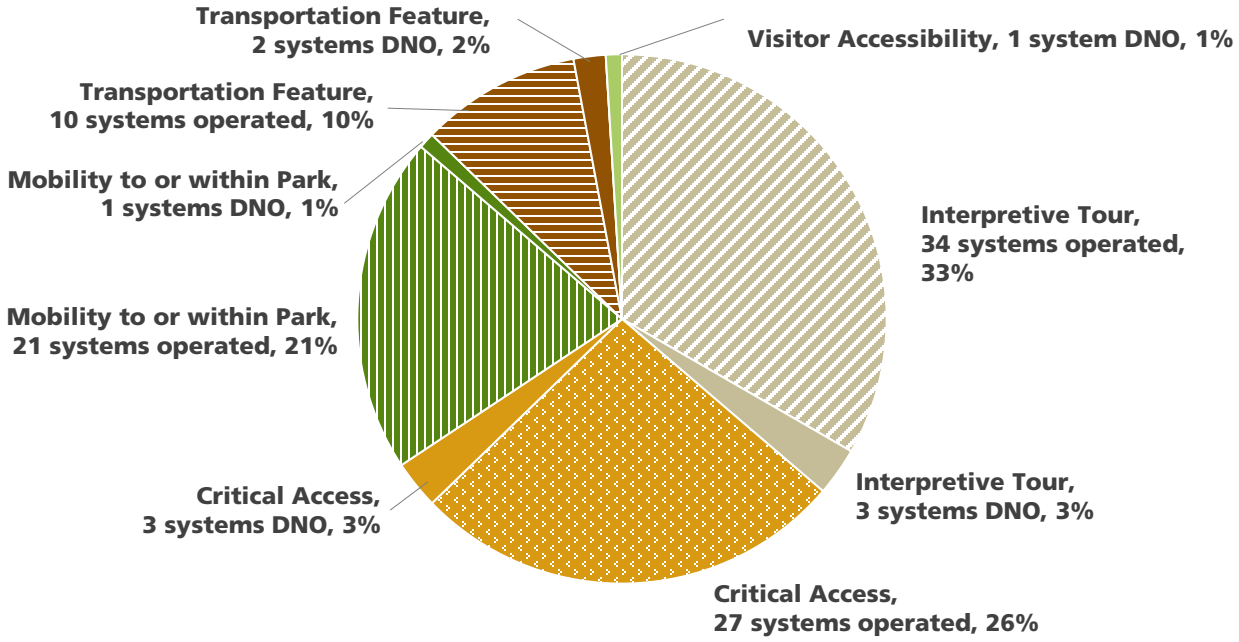
The 2023 inventory identified 92 operating systems in 57 parks. Figure 1 and Figure 2 place these systems in the context of the primary system purpose, mode, and business model. Results for system characteristics in 2023 are similar to the results reported in 2022.

System Purpose

Park staff categorized each of their operating transit systems into one of the five following primary purposes (Appendix B):

- 34 systems are guided **interpretive tours**.
- 27 systems provide **critical access** to a park that is not readily accessible to the public due to geographic constraints, park resource management decisions, or parking lot congestion.
- 21 systems provide **mobility to or within a park** as a supplement to private automobile access.
- 10 systems are considered a **transportation feature** (a primary attraction of the park).
- None of the systems that operated are primarily designed to meet the **visitor accessibility**.

Figure 1. Systems by Primary Purpose



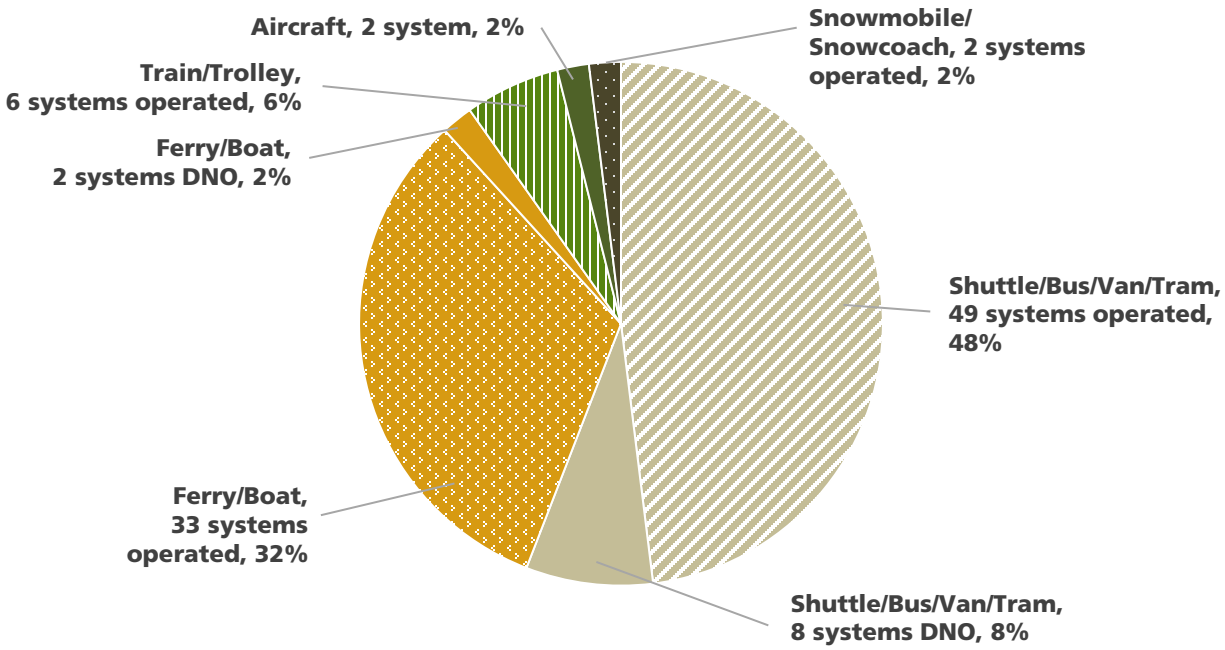
Notes: N=102 systems; DNO=did not operate

Source: 2023 NPS transit inventory data

Mode

The 2023 transit inventory identified four modes operating in NPS transit systems. Most of the transit systems are shuttle/bus/van/tram systems (57 systems, 56%), followed by ferry/boat (35 systems, 34%), train/trolley (6 systems, 6%), aircraft (2 systems, 2%), and snowmobile/snowcoach (2 systems, 2%) (Figure 2).

Figure 2. Systems by Vehicle Mode



Notes: N=102 systems; DNO=did not operate

Source: 2023 NPS transit inventory data

Business Models

NPS transit systems operate under one of four types of business models (Table 2, Figure 3).

- **Concession Contracts:** In 2023, 47 of the transit systems operated through concession contracts in which a private concessioner pays the National Park Service a franchise fee to operate inside a park. Seven concession contract systems used vehicle fleets exclusively owned by the National Park Service. Two systems have a mixed-ownership fleet.
- **Service Contracts:** Transit systems that are owned and/or operated by a private firm use service contracts. In 2023, 12 transit systems operated under a service contract. Out of the 9 service contract systems, 5 service contract systems used vehicle fleets owned by the National Park Service.

- **Cooperative Agreements:**[7] In 2023, 16 transit systems operated under an agreement. None of those systems are owned by the National Park Service.
- **NPS Owned and Operated:** In 2023, the National Park Service owned vehicle fleets for 17 systems and operated all of those systems.[8] These owned-and-operated systems tend to be small and provide critical access to a park or park site or are interpretive tours.

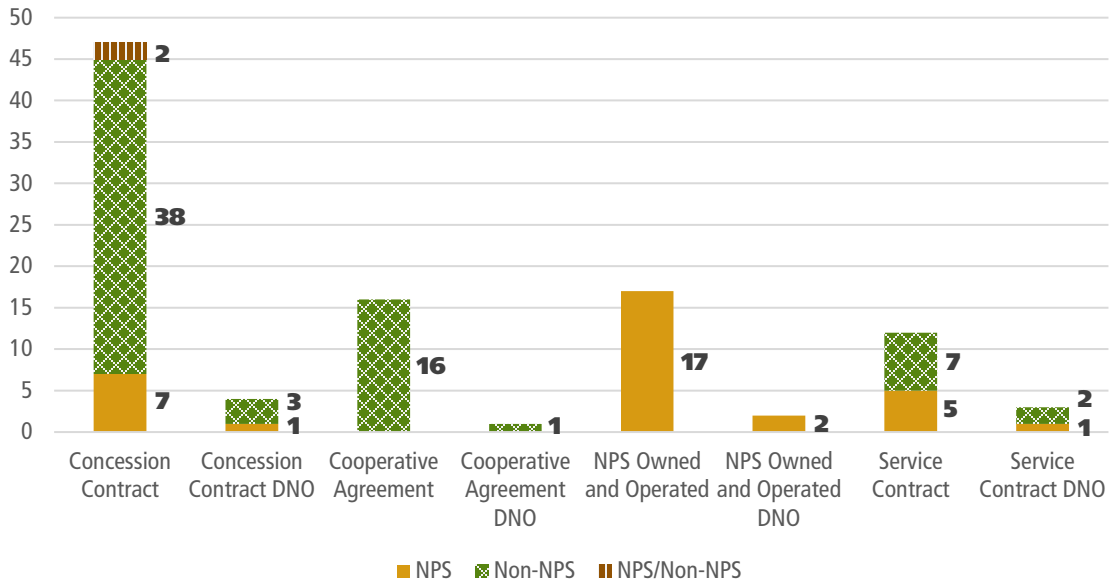
Table 2. Systems by Primary Purpose

System Purpose	Concession Contract	Cooperative Agreement	NPS Owned and Operated	Service Contract	Total
Critical access	13 (0 DNO)	6 (1 DNO)	5 (0 DNO)	3 (2 DNO)	**27 (3 DNO)**
Interpretive tour	23 (3 DNO)	3 (0 DNO)	5 (0 DNO)	3 (0 DNO)	**34 (3 DNO)**
Mobility to or within park	5 (0 DNO)	5 (0 DNO)	6 (1 DNO)	5 (0 DNO)	**21 (1 DNO)**
Visitor accessibility	0 (0 DNO)	0 (0 DNO)	0 (1 DNO)	0 (0 DNO)	**0 (1 DNO)**
Transportation feature	6 (1 DNO)	2 (0 DNO)	1 (0 DNO)	1 (1 DNO)	**10 (2 DNO)**
Total	**47 (4 DNO)**	**16 (1 DNO)**	**17 (2 DNO)**	**12 (3 DNO)**	**92 (10 DNO)**

Notes: N=102 systems; DNO=did not operate

Source: 2023 NPS transit inventory data

Figure 3. Fleet Ownership by Business Model



Notes: N=102 systems; DNO=did not operate

Source: 2023 NPS transit inventory data

7. This report uses "cooperative agreement" as a general term, encompassing all qualifying partner agreements (memorandum of understanding, memorandum of agreement, and cooperative agreement).
8. The National Park Service maintained ownership of vehicle fleets for 33 systems in 2023. Four systems with NPS-owned vehicle fleets were idle in 2023.

Passenger Boardings

In 2023, over 30.4 million passenger boardings occurred across all NPS transit systems.[9] If the 92 operating systems were considered one enterprise and compared to public transit agencies across the country, its boardings would be comparable to transit systems in medium-sized US cities, such as Pittsburgh, Pennsylvania.[10] Excluding concession contracts and cooperative agreements, NPS-owned and operated systems and service contract systems reported 13.4 million trips (44% of total boardings) in 2023.

Parks use various methodologies to count boardings. Almost all systems indirectly record passenger boardings through ticket sales (11 million) or directly through manual counts (8.6 million). Estimated, automated, and other counter methodologies account for the remaining approximately 10.8 million passenger boardings.

Table 3. Count Methodology

Count Methodology	Number of Systems	Passenger Boardings
Ticket sales	44	11,054,173
Manual	35	8,557,879
Estimated	6	1,982,082
Automatic	4	7,459,013
Other	3	1,415,841

Source: 2023 NPS transit inventory data

Approximately 85% (26 million) of boardings on NPS transit systems in 2023 are attributable to 10 systems with the highest ridership (Table 4). Two systems from the 2022 top 10 list did not make the top 10 list in 2023.[11] The Mariposa Grove Transportation Service (Yosemite National Park) and Island Explorer & Bicycle Express (Acadia National Park) are new to the top 10 list in 2023. Boardings increased in 2023 for 8 of the 10 highest-use systems.[12]

9. 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.
10. Public Transit Ridership Report Third Quarter 2023." American Public Transportation Association. November 22, 2022. Retrieved February 9, 2024. https://www.apta.com/wp-content/uploads/2023-Q3-Ridership-APTA.pdf.
11. The DC Circulator (National Mall and Memorial Parks) and Giant Forest Shuttle (Sequoia & Kings Canyon National Parks) were not in the top 10 list in 2023.
12. Passenger boardings decreased in 2023 for the visitor shuttle (Rocky Mountain National Park) and the Island Explorer & Bicycle Express (Acadia National Park).

Table 4. Passenger Boardings for the 10 Highest-Use Transit Systems

Rank	Park	System Name	2023 Boardings	Business Model	System Purpose
1	STLI	Statue of Liberty Ferries	8,780,307	Concession contract	Critical access
2	ZION	Zion Shuttle	5,730,436	Service contract	Critical access
3	GRCA	South Rim Shuttle Service	4,745,966	Service contract	Mobility to or within park
4	YOSE	Yosemite Valley Shuttle	1,595,104	Concession contract	Mobility to or within park
5	GOGA	Alcatraz Cruises Ferry	1,412,817	Concession contract	Critical access
6	PERL	USS Arizona Memorial Tour	1,388,632	Cooperative agreement	Interpretive tour
7	YOSE	Mariposa Grove Transportation Service	677,739	Service contract	Critical access
8	BRCA	Bryce Canyon Shuttle and Rainbow Point Shuttle	666,911	Service contract	Mobility to or within park
9	ROMO	Visitor Shuttle	561,716	Service contract	Mobility to or within park
10	ACAD	Island Explorer & Bicycle Express	451,032	Cooperative agreement	Mobility to or within park

Park key: ACAD=Acadia National Park; BRCA=Bryce Canyon National Park; GOGA=Golden Gate National Recreation Area; GRCA=Grand Canyon National Park; PERL=Pearl Harbor National Memorial; ROMO=Rocky Mountain National Park; SEKI=Sequoia & Kings Canyon National Parks; STLI=Statue of Liberty National Monument; YOSE=Yosemite National Park; ZION=Zion National Park

Source: 2023 NPS transit inventory data

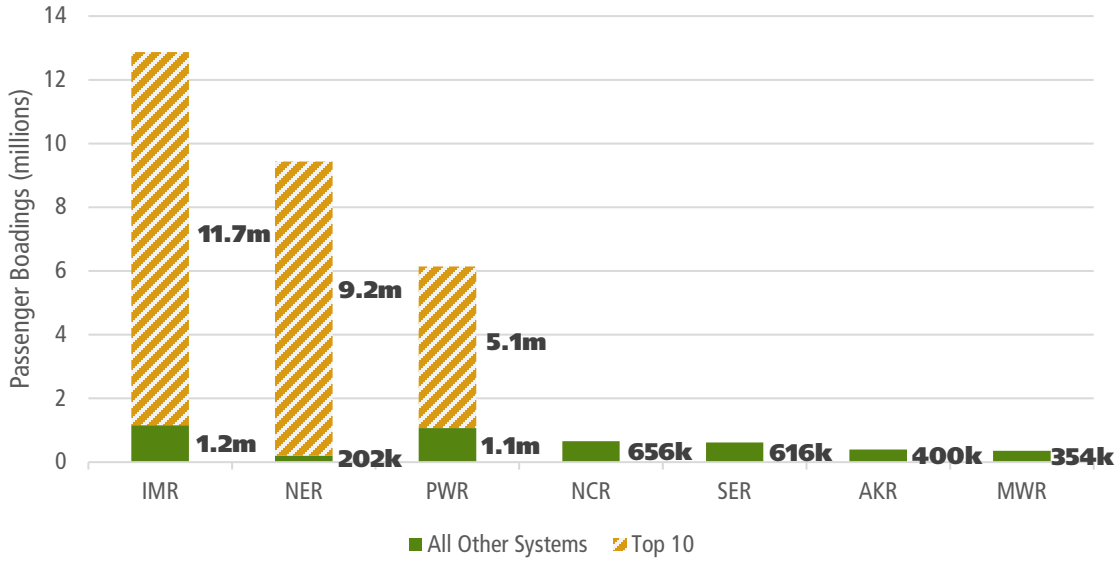
High-ridership shuttle systems are typically provided via service contracts and cooperative agreements. A greater proportion of the water-based systems are provided through concession contracts and either provide critical access to parks and park sites or serve as interpretive tours.

The National Park Service partnered with six local transit agencies in 2023 those partnerships accounted for 793,769 passenger boardings in that year.[13] Passenger boardings among NPS-owned and operated systems (17 systems) accounted for 432,012 passenger boardings.

The Intermountain, Northeast, and Pacific West Regions each reported more than 5 million passenger boardings in 2023, exceeding other regions. However, if the 10 highest-use systems are excluded, each region ranged from 354,000 to 1.1 million passenger boardings in 2023 (Figure 4).

13. The Island Explorer & Bicycle Express (Acadia National Park), Hiker Shuttle (Delaware Water Gap National Recreation Area), DC Circulator (National Mall & Memorial Parks), Gateway Shuttle (Sequoia & Kings Canyon National Parks), Giant Forest Shuttle (Sequoia & Kings Canyon National Parks), and Fairfax Connections Wolf Trap Express (Wolf Trap National Park for the Performing Arts) are the five systems that were operated by a local transit authority.

Figure 4. Passenger Boardings by NPS Region

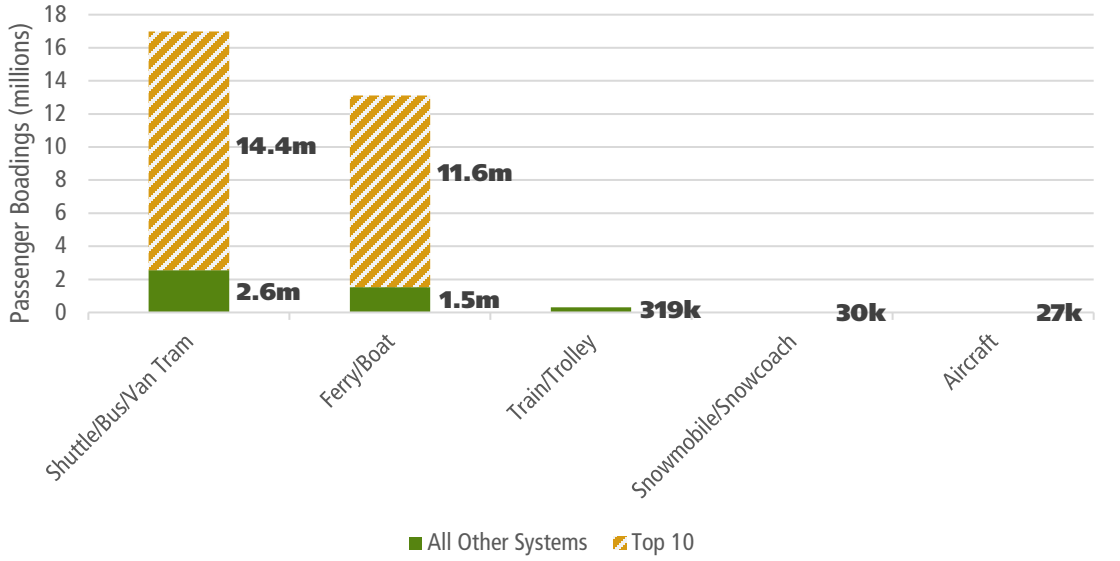


Region key: IMR=Intermountain; NER=Northeast; PWR=Pacific West; NCR=National Capital; SER=Southeast; MWR=Midwest; AKR=Alaska

Source: 2023 NPS transit inventory data

Over half (55%) of passenger boardings were on systems that use shuttles, buses, vans, or trams, and 43% were in water-based systems that use boats and ferries. Trains, trolleys, snowmobiles, snowcoaches, and aircraft accounted for only less than 1% of all passenger boardings (Figure 5).

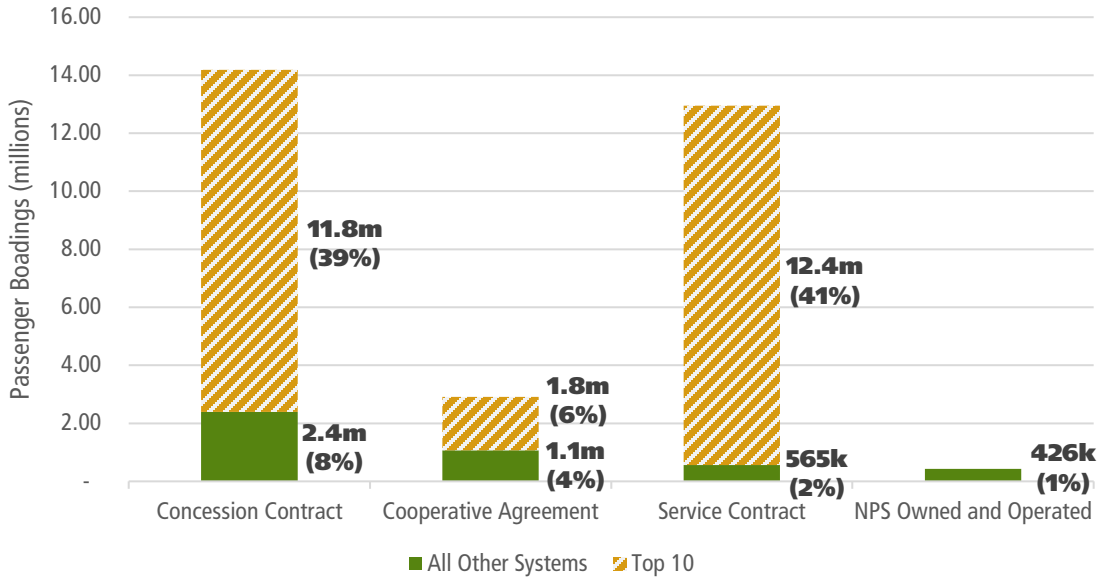
Figure 5. Passenger Boardings by Mode



Source: 2023 NPS transit inventory data

Less than half of passenger boardings (47%) took place on systems operated using concession contracts. Service contracts carried 43% of passenger boardings and 10% used cooperative agreements. NPS-owned and operated systems carried 1% of boardings (see Figure 6). Excluding the 10 highest-use systems, concession contracts accounted for the most boardings (8%), followed by cooperative agreements (4%), services contracts (2%) and NPS-owned and operated (1%).

Figure 6. Passenger Boardings by Business Model



Source: 2023 NPS transit inventory data

Service Schedule

The 2023 inventory analyzed the reported service schedules of the 92 operating systems to understand the general calendar spread of NPS transit systems. Although most seasonal service dates ranged primarily over the summer and into early autumn (June–October), very few operate in the winter (December–February), with 27% of systems (25 systems) operating year-round (Figure 7).

Peak season is defined as the period when the scheduled transit service is operating at its greatest frequency. The most common peak season months are July and August, with shoulder peak seasons extending from May through September. For year-round systems, many parks report peak seasons beginning as early as March and extending into October.

Systems operating year-round are among those with the highest annual ridership, representing 65% of total boardings. Of the 25 systems that operated year-round, 9 provide critical access, 8 are interpretive tours, 6 provide mobility within the park, and 2 are transportation features. The next most common service period is 5 months out of the year (18 systems), followed by systems that are in service for 6 months (13 systems each).

Transit systems in colder climates tend to operate for shorter seasons than those in warmer areas. For example, systems in Alaska operate through September. Conversely, many of the year-round systems are in the southern and western parts of the country, where the climates are milder. The

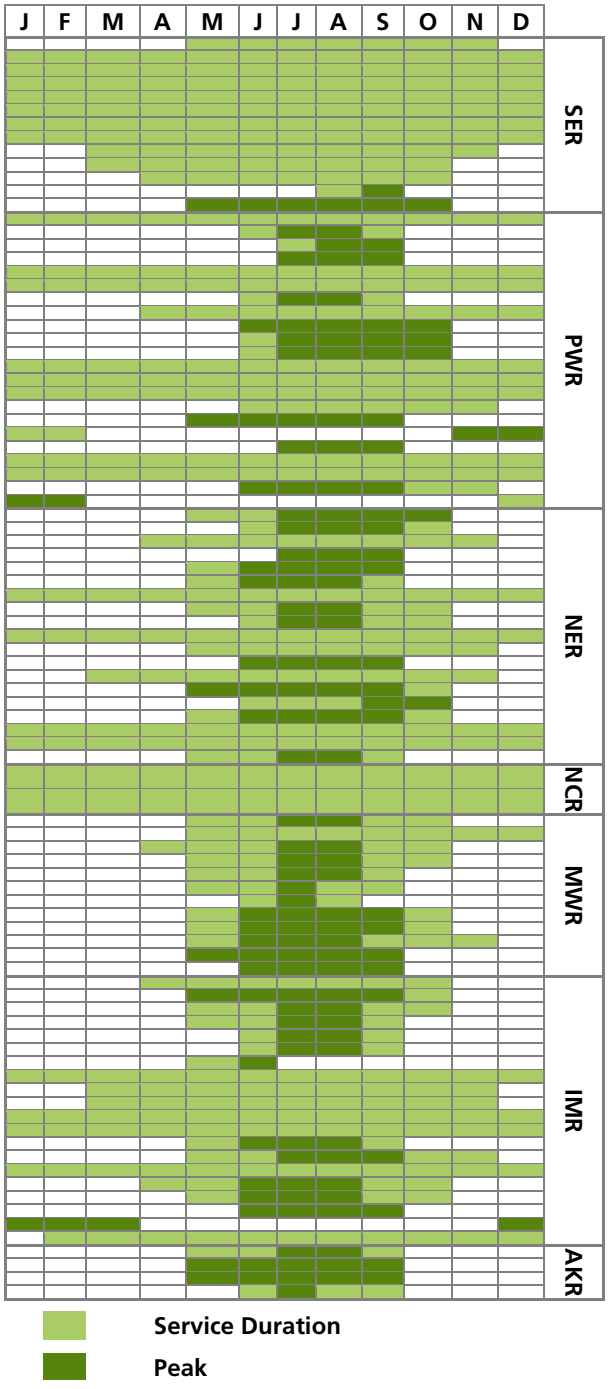
wide range of climates in the Pacific West Region—from Yosemite to Hawaii—leads to a wide range of schedules.

Figure 7. Distribution of Service Duration by Number of Months

Note: N=92 systems

Source: 2023 NPS transit inventory data

Figure 8. Distribution of Service Duration by Month



Note: N=92 systems

Source: 2023 NPS transit inventory data

Vehicles and Vessels

Vehicle Fleets

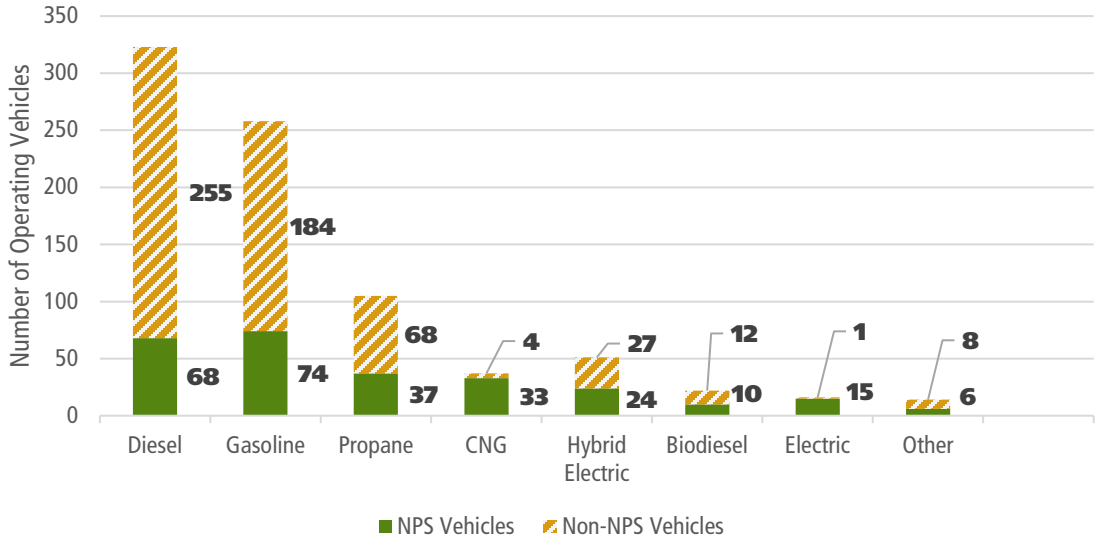
Including operating and nonoperating systems, half of the transit systems (51 systems, or 50%) were under concession contracts, of which 8 used fleets owned by the National Park Service and 2 used fleets of mixed ownership (both NPS owned and non-NPS owned). The National Park Service owned and operated 19 transit systems (18.6%); these tend to be small and provided critical access, interpretive tours, or mobility to or within the park in ways not easily provided by a private operator. Systems managed through cooperative agreements account for 17 of the systems (16.7%). The remaining 15 transit systems (14.7%) operate under service contracts; of these, most use vehicle fleets owned by the National Park Service, including the large systems at Grand Canyon National Park and Zion National Parks.

The following data are for the operating fleet reporting in 2023:

- NPS owned:
    - 17 operating systems used NPS-owned fleets; 2 systems with NPS-owned fleets did not operate.
    - 272 vehicles were reported to the inventory. Of those, 267 vehicles were operated. Of the operating systems with NPS-owned fleets, 3 systems had a capacity for no more than 10 passengers, 8 systems had a capacity for 11–20 passengers, 15 systems had a capacity for 21–40 passengers, and 14 systems had capacities for more than 40 passengers.[14]
- Non-NPS owned:
    - 55 systems had non-NPS-owned and 2 mixed-ownership fleets.
    - 590 vehicles were reported to the inventory. Of those, 559 vehicles operated, and 54 vehicles did not operate. Of the operating systems with non-NPS-owned or mixed-ownership fleets, 13 systems had a capacity for no more than 10 passengers, 12 systems had a capacity for 11–20 passengers, 20 systems had a capacity for 21–40 passengers, and 36 systems had capacities for more than 40 passengers.[15]

14. The capacity for 11 NPS vehicles was not reported in 2023.
15. Glacier National Park uses some vehicles in multiple systems, and they may have been counted twice.

Figure 9. Number of Vehicles by Fuel Type



Notes: N=826 active vehicles and vessels; CNG=compressed natural gas

Source: 2023 NPS transit inventory data

Table 5. Number of Vehicles That Operated in 2023 by Fuel Type

Fuel Type	NPS Owned	Non-NPS Owned	Total
Diesel	53	255	**308**
Gasoline	73	184	**257**
Propane	37	68	**105**
CNG	33	4	**37**
Hybrid electric	24	27	**51**
Biodiesel	10	12	**22**
Electric	15	1	**16**
Other	6	8	**14**
Total	**251**	**559**	**810**
% Alt Fuel	**45%**	**20%**	**28%**

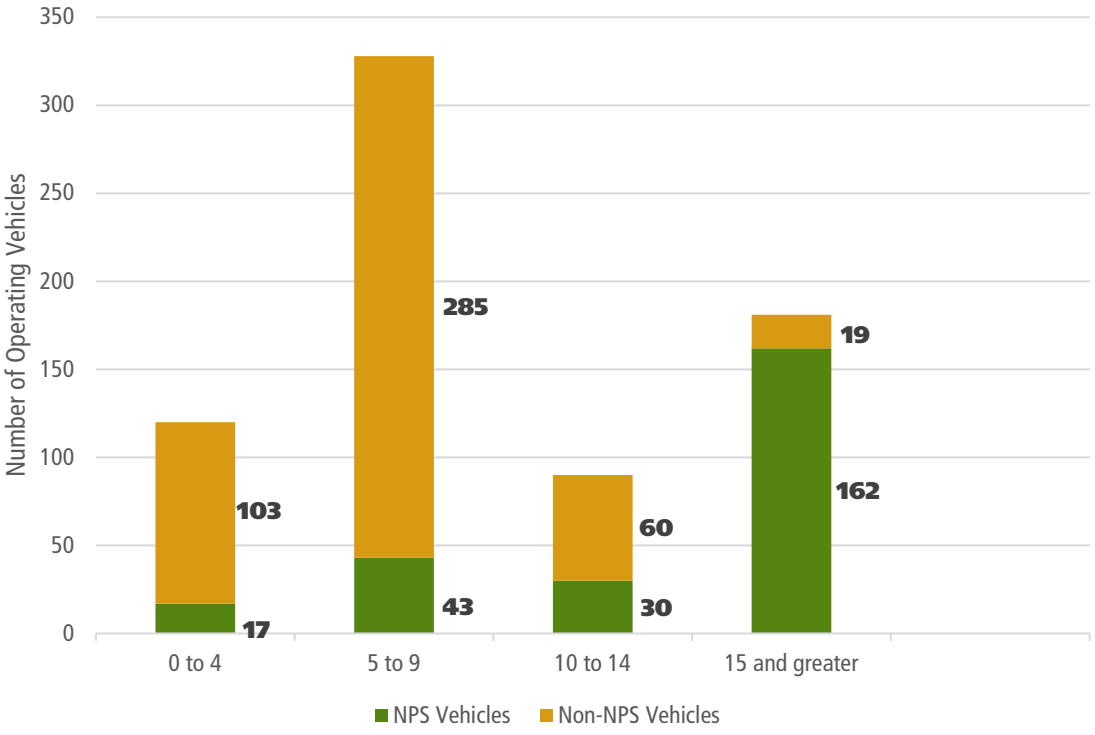
Notes: N=810 active vehicles and vessels; CNG=compressed natural gas

Source: 2023 NPS transit inventory data

Age of Vehicles

Vehicle age data was provided by 252 NPS-owned vehicles and 467 non-NPS-owned vehicles. The age analysis excludes the 33 Red Bus Tour vehicles (Glacier National Park), which have been retrofitted using the original 1936 exteriors and newer chassis. Given these parameters, the age analysis includes 719 vehicles (87% of reported vehicles).

Figure 10. On-Road Vehicles by Age Class (Years)



Note: N=829 vehicles and vessels

Source: 2023 NPS transit inventory data

Table 6. On-Road Vehicle Ownership by Age Class

Vehicle Type Vehicle Ownership	0–4 Years Old (percent)	5–9 Years Old (percent)	10–14 Years Old (percent)	15 Years and Older (percent)	Total (percent)
Heavy-duty transit	51 (7.1%)	87 (12.1%)	28 (3.9%)	41 (5.7%)	207 (28.8%)
NPS vehicles	8 (1.1%)	7 (1%)	10 (1.4%)	40 (5.6%)	65 (9%)
Non-NPS vehicles	43 (6%)	80 (11.1%)	18 (2.5%)	1 (0.1%)	142 (19.7%)
Medium-duty transit	11 (1.5%)	32 (4.5%)	16 (2.2%)	24 (3.3%)	83 (11.5%)
NPS vehicles	7 (1%	–	8 (1.1%)	24 (3.3%)	39 (5.4%)
Non-NPS vehicles	4 (0.6%)	32 (4.5%)	8 (1.1%)	–	44 (6.1%)
School bus	2 (0.3%)	97 (13.5%)	1 (0.1%)	5 (0.7%)	105 (14.6%)
NPS vehicles	–	–	–	3 (0.4%)	3 (0.4%)
Non-NPS vehicles	2 (0.3%)	97 (13.5%)	1 (0.1%)	2 (0.3%)	102 (14.2%)
Medium-duty shuttle	15 (2.1%))	24 (3.3%)	10 (1.4%)	51 (7.1%)	100 (13.9%)
NPS vehicles	–	17 (2.4%)	3 (0.4%)	50 (7%)	70 (9.7%)
Non-NPS vehicles	15 (2.1%)	7 (1%)	7 (1%)	1 (0.1%)	30 (4.2%)
Light-duty shuttle	28 (3.9%)	10 (1.4%)	4 (0.6%)	17 (2.4%)	59 (8.2%)
NPS vehicles	1 (0.1%)	7 (1%)	4 (0.6%)	17 (2.4%)	29 (4%)
Non-NPS vehicles	27 (3.8%)	3 (0.4%)	–	–	30 (4.2%)
Passenger van	3 (0.4%)	67 (9.3%)	27 (3.8%)	22 (3.1%)	119 (16,6%)
NPS vehicles	–	3 (0.4%)	1 (0.1%)	16 (2.2%)	20 (2.8%)
Non-NPS vehicles	3 (0.4%)	64 (8.9%)	26 (3.6%)	6 (0.8%)	99 (13.8%)
Van	1 (0.1%)	3 (0.4%)	2 (0.3%)	–	6 (0.8%)
NPS vehicles	–	1 (0.1%)	2 (0.3%)	–	3 (0.4%)
Non-NPS vehicles	1 (0.1%)	2 (0.3%)	–	–	3 (0.4%)
Tram/golf cart	9 (1.3%)	8 (1.1%)	2 (0.3%)	1 (0.1%)	20 (2.8%)
NPS vehicles	1 (0.1%)	8 (1.1%)	2 (0.3%)	–	11 (1.5%)
Non-NPS vehicles	8 (1.1%)	–	–	1 (0.1%)	9 (1.3%)
Snowmobile/snowcoach	–	–	–	20 (2.8%)	20 (2.8%)
NPS vehicles	–	–	–	12 (1.7%)	12 (1.7%)
Non-NPS vehicles	–	–	–	8 (1.1%)	8 (1.1%)
Total	**120 (16.7%)**	**328 (45.6%)**	**90 (12.5%)**	**181 (25.2%)**	**719 (100%)**
NPS vehicles	**17 (2.4%)**	**43 (6%)**	**30 (4.2%)**	**162 (22.5%)**	**252 (35%)**
Non-NPS vehicles	**103 (14.3%**	**285 (39.6%)**	**60 (8.3%)**	**19 (2.6%)**	**467 (65%)**

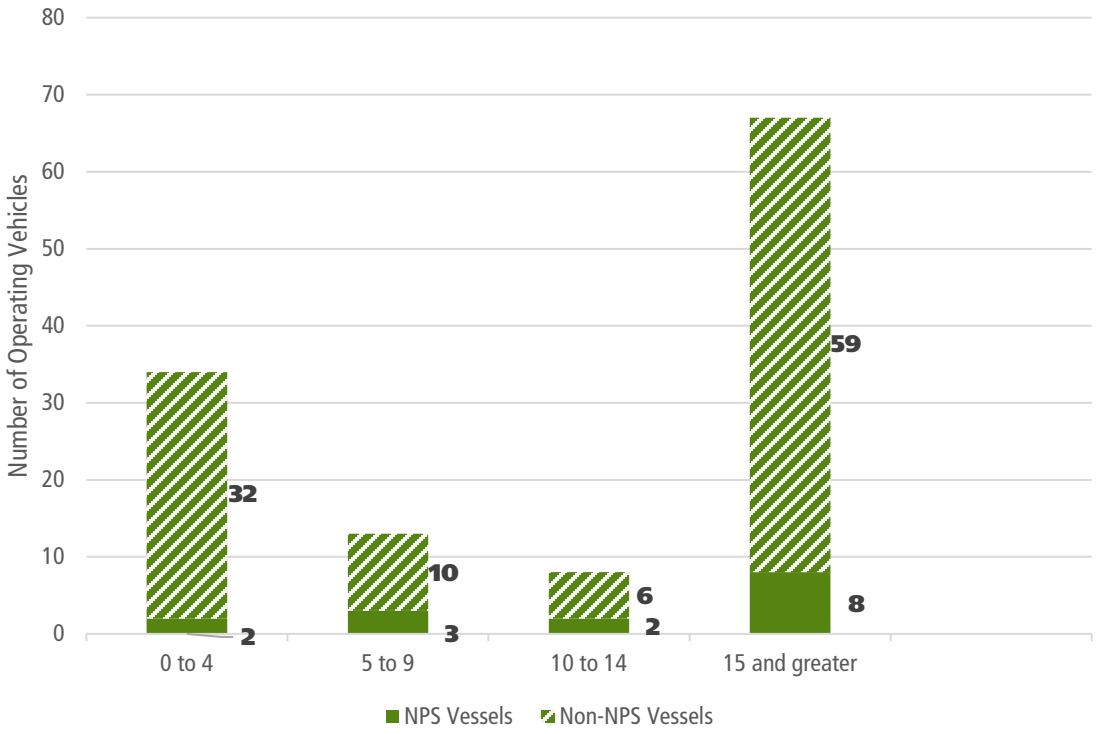
Of the NPS-owned fleet, 27% is 10 years or older, and many of the vehicles are in the latter portion of their service lives. In previous years, more than 80% of the NPS fleet was 10 years or older. While vehicle replacements have occurred, there is still a need for vehicle replacements in the next 10 years. In addition, parks must invest in the maintenance of older vehicles to not only keep them operating but extend their service life.

The non-NPS fleet is decidedly newer. A larger proportion of newer non-NPS vehicles suggests that older vehicles have been retired at a higher rate in recent years. The replacement of older vehicles may reflect contract language requiring vehicles to be within a certain age range.

Transit vehicles operating in the parks are not used in the same way as transit vehicles used in a municipal context. Park transit vehicles are typically not used for the entire year, nor are they used as intensively as vehicles operated in an urban environment. As a result, they may be in service for considerably longer lifespans, and recapitalization estimates should rely on park-specific estimates that depend on their specific use (see the "Asset Management" section and Appendix D).

Vessels and Off-Road Vehicles

Figure 11. Vessels by Age Class (Years)



The National Park Service had 33 operating systems that use ferries or boats: 11 are for critical access to park sites, 14 are for interpretive tours, 5 are transportation features, and 3 provide mobility to or within the park. The National Park Service owns 15 of these vessels, and there are 99 non-NPS-owned ferries or boats. Vessels typically have a life cycle of 40–50 years.

Table 7. Vessels and Off-Road Vehicle Ownership by Age Class

Vehicle Type Vehicle Ownership	0–4 Years Old (percent)	5–9 Years Old (percent)	10–14 Years Old (percent)	15 Years and Older (percent)	Total (percent)
Ferry/Boat	28 (19.6%)	12 (8.4%)	7 (4.9%)	67 (46.9%)	114 (79.7%)
NPS vehicles	2 (1.4%)	3 (2.1%)	2 (1.4%)	8 (5.6%)	15 (10.5%)
Non-NPS vehicles	26 (18.2%)	9 (6.3%)	5 (3.5%)	29 (41.3%)	99 (69.2%)
Train/Streetcar	13 (9.1%)	–	–	10 (7%)	23 (16.1%)
NPS vehicles	–	–	–	5 (3.5%)	5 (3.5%)
Non-NPS vehicles	13 (9.1%)	–	–	5 (3.5%)	18 (12.6%)
Seaplane	6 (4.2%)	–	–	–	6 (4.2%)
NPS vehicles	–	–	–	–	–
Non-NPS vehicles	6 (4.2%)	–	–	–	6 (4.2%)
Total	**47 (32.9%)**	**12 (8.4%)**	**7 (4.9%)**	**77 (52.8%)**	**143 (100%)**
NPS vehicles	**2 (1.4%)**	**3 (2.1%)**	**2 (1.4%)**	**13 (9.1%)**	**20 (14%)**
Non-NPS vehicles	**45 (31.5%)**	**9 (6.3%)**	**5 (3.5%)**	**64 (44.8%)**	**123 (86%)**

PERFORMANCE MEASURES

The National Park Service's Multimodal Strategy and Innovation Program (MS&I) seeks to use meaningful, reliable data. The objective is to use measurable, applicable, and achievable performance measures and metrics to guide and support decision-making and the management of NPS transit systems.

The performance measures below are split into the following sections that correspond to MS&I goals and the NPS National Long Range Transportation Plan:[16] visitor experience, operations, environmental impact, and asset management.

Visitor Experience

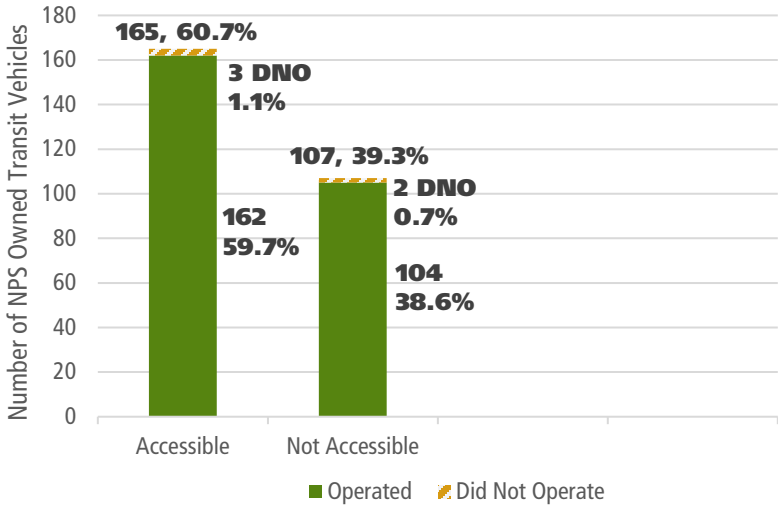
This performance area addresses how park transportation systems enhance the visitor experience. For 2023, the visitor experience performance measure includes accessibility for mobility-impaired park visitors.

16. The long-range transportation plan can be accessed at https://parkplanning.nps.gov/document.cfm?parkID=551&documentID=82749.

Accessibility for Visitors with Disabilities

In 2023, 60.7% of 267 operating, NPS-owned vehicles and vessels were accessible for people with mobility impairments (Figure 12). This number is similar to what was reported in 2022. Overall, 60.7% of the 272 NPS-owned vehicles and vessels are accessible.

Figure 12. Accessibility of NPS-Owned Transit Vehicles (Entire Fleet)



Notes: N=274 vehicles and vessels; DNO=did not operate

Source: 2023 NPS transit inventory data

Operations

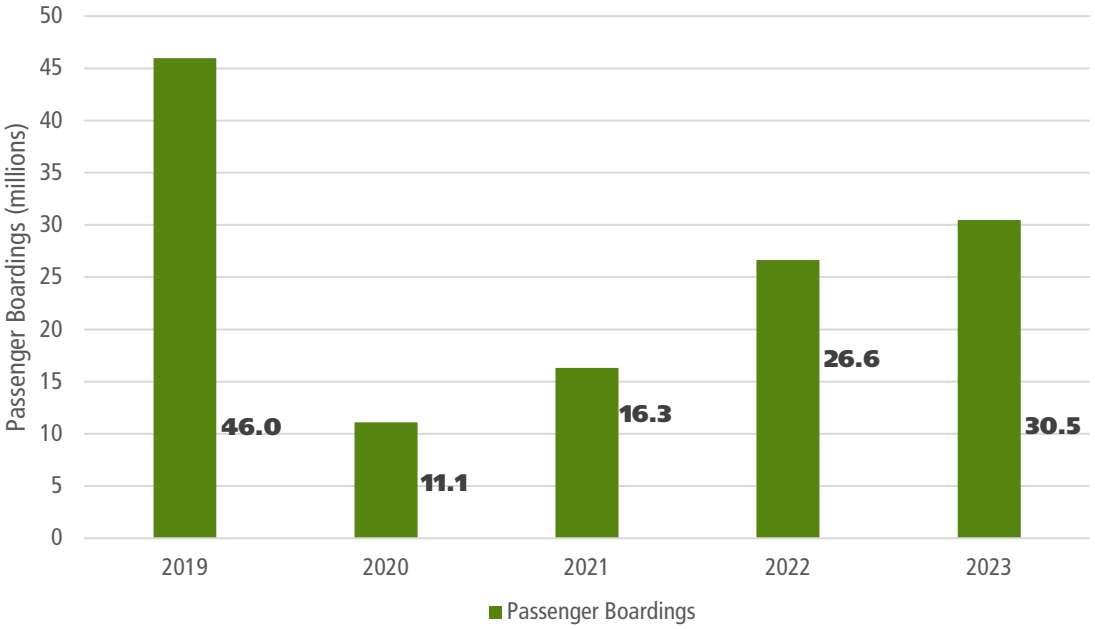
This section evaluates the operational performance of the NPS transit systems by measuring the annual percent change in boardings over the last five years. In 2020 and 2021, the reduced number of boardings is attributed to park closures and limited or no transit system operations due to the COVID-19 pandemic. While boardings are continuing to increase, transit use has not returned to pre-pandemic numbers.

Year-to-Year Trends in Boardings

Figure 13 shows the percent change in boardings from 2019 to 2023. Passenger boardings reached an all-time high in 2019. Due to the pandemic, ridership declined dramatically in 2020 but has shown steady increases as more systems come back online and visitors feel more comfortable riding transit. However, not all systems have returned or are fully operational. The rate of increase for passenger boardings decreased by almost 50%.

In 2023, the National Park Service received 325 million recreation visits, up 13.5 million visits (4%) from 2022. Servicewide visitation is higher than in 2021 and 2022 and has essentially recovered to pre-pandemic levels. Visitation in 2023 is similar to the years immediately before the NPS centennial in 2016 and is only 6% lower than the record year (331 million visitors in 2016). Overall, 28 parks set new visitation records in 2023, 5 of which have transit systems. Two of the parks that set records are within the same park unit, National Mall and Memorial Parks.

Figure 13. Percent Change in Boardings (2019–2023)



Source: 2019–2023 NPS transit inventory data

Table 8. Comparison of Systems and Boardings (2019–2023)

Metrics	2019	2020	2021	2022	2023
Number of systems in inventory (and % change from previous year)	97 (2.1%)	96 (-1%)	97 (1%)	101 (4.1%)	104 (2.9%)
Number of systems operating (and % change from previous year)	97 (2.1%)	66 (-32%)	63 (-4.5%)	81 (28.6%)	92 (13.5%)
Number of systems new to inventory	2	1	1	4	3
Boardings (and % change from previous year)	45,967,894 (8.6%)	11,098,633 (-75.9%)	16,300,849 (46.9%)	26,644,865 (63.5%)	30,468,988 (14.4%)

Source: 2019–2023 NPS transit inventory data

Safety

The 2023 survey of transit system operators included questions regarding safety at the system level. Visitor and workforce safety are among the highest NPS priorities, and transportation, including transit systems and privately owned vehicles, presents a safety risk to staff and visitors. Collecting safety and crash information for transit systems informs the National Park Service's transportation safety goals and performance metrics.

In 2023, the number of NPS transit systems that reported safety incidents decreased from 6 parks (14 accidents) in 2022 to 3 parks (3 accidents). None of the accidents reported in 2023 had passengers on board, involved pedestrians or bicyclists, or resulted in an injury or fatality (Table 9). One system reported minor vehicle damage and property damage in which another NPS-owned maintenance vehicle was scratched.

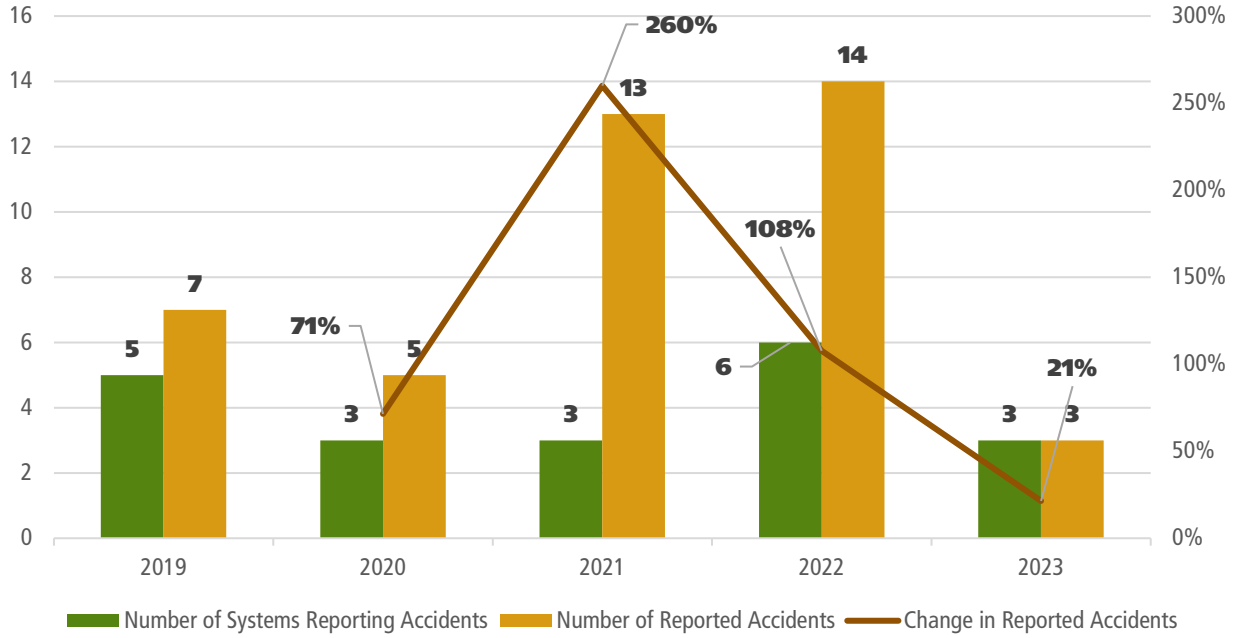
Table 9. Response to Safety and Operational Questions

Park	System Name	Number of Incidents	Passengers on Board	Injuries or Fatalities	Bicycles or Pedestrians	Accident Occurred on Route	Result of Driver Error	Real Property Damaged
ADAM	Adam Trolley	1	No	No	No	Yes	Yes	No
HOFR	FDR Tram	1	No	No	No	Yes	Yes	No
SHEN	Rapidan Camp Bus	1	No	No	No	No	No	No

Park key: ADAM=Adams National Historical Park; HOFR=Home of Franklin D. Roosevelt National Historic Site; SHEN=Shenandoah National Park

Source: 2023 NPS transit inventory data

Figure 14. Year-to-Year Comparison of Reported Incidents



Source: 2019–2023 NPS transit inventory data

Environmental Impact

Since 2017, the transit inventory has used the US Environmental Protection Agency's Motor Vehicle Emissions Simulator (MOVES) for estimating NPS transit vehicle emissions.[17] The Motor Vehicle Emissions Simulator is a state-of-the-science emissions modeling software that uses preloaded measurement data to estimate emissions rates for different vehicle types, model years, fuel types, and road types across several Clean Air Act criteria pollutants "from the bottom-up" for both on- and off-road vehicles, including waterborne vessels. MOVES software is also the regulatory

17. This national transit inventory uses version MOVES4, which was released in August 2023.

standard for emissions inventory analyses under the Clean Air Act and related legislation.[18] MOVES software bases emissions estimates on observations of actual vehicle operations.

This section describes the results of the 2023 emissions analysis with respect to carbon dioxide (CO_2). The results for the other criteria pollutants—nitrogen oxides, volatile organic compound, and particulate matter—as well as a detailed description of the analysis methodology, are presented in Appendix F

The COVID-19 pandemic had a significant impact on passenger vehicle miles traveled and transit system operation in parks in 2020 and 2021. However, transit system activity started to rebound in 2022. Vehicle miles traveled across all regions decreased 74% from 2022 from improvements in data collection and increased 3.5% from 2021 levels. The increased emissions level is directly related to the number of operational systems and increased operations of systems nationwide.

Table 10. Comparison of Emission Results

Metrics	2021	2022	2023	Change 2023 vs. 2022 (percent)	Change 2023 vs. 2021 (percent)
Number of operating systems	63	81	91	10.9%	30.7%
Count of vehicles	803	817	807	-1.7%	-.5%
Miles traveled	4,925,288	19,953,523	5,102,180	-74%[19]	3.5%
Ferry hours	38,409	43,857	63,041	-43.7%	39%
Carbon dioxide emissions	22,491	54,291.98	39,180.1	-38.6%	42.6%

Source: 2021–2023 NPS transit inventory data

Annual CO_2 Emissions

Figure 15 shows the results of MOVES CO_2 emissions modeling for 2023 NPS transit system activity, aggregated to the regional level. The results are separated by ownership (NPS vs. non-NPS systems). Across all regions, NPS transit fleets emitted 4,211 metric tons of CO_2 in 2023 (compared with 24,163 metric tons in 2022 and 4,567 in 2021). The Intermountain Region has the highest vehicle miles traveled (VMT) of all the regions, thus resulting in the highest CO_2 emissions for NPS vehicles. For non-NPS vehicles, the Pacific West Region experienced the highest number of ferry miles (distinct from ferry hours), resulting in the highest CO_2 emissions.

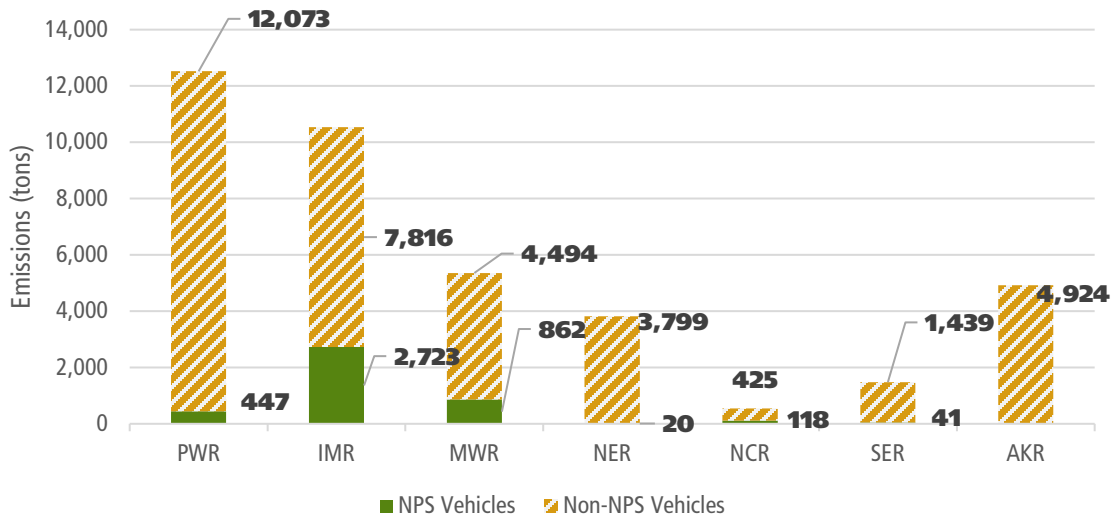
18. "Official Release of the MOVES2014 Motor Vehicle Emissions Model for SIPs and Transportation Conformity." *Federal Register* 79:194 (October 7, 2014), p. 60343. Available from the Government Publishing Office at https://www.gpo.gov/fdsys/pkg/FR-2014-10-07/pdf/2014-23258.pdf.
19. In previous inventories collections, some parks reported odometer readings instead of annual miles travelled.

Table 11. Distribution of Miles and CO_2 Emissions by Vehicle Ownership

Ownership	Vehicles (number)	Vehicles (percent)	Miles Traveled	Miles (percent)	CO_2 (metric tons)	CO_2 (percent)
NPS owned	254	31%	2,635,072	52%	4,210.61	11%
Non-NPS owned	553	69%	2,467,108	48%	34,969.46	89%
Total	**807**	**100%**	**5,102,180**	**100%**	**39,180.08**	**100%**

Source: 2023 NPS transit inventory data

Figure 15. Annual CO_2 Emissions



Region key: PWR=Pacific West; IMR=Intermountain; MWR=Midwest; NER=Northeast; NCR=National Capital; SER=Southeast; AKR=Alaska

Source: 2023 NPS transit inventory data

Diverted Passenger Vehicle Trips and CO_2 Emissions Avoided

The benefits of using transit include

- a reduction of the number of vehicle trips in parks,
- congestion relief on park roads by carrying more people per square foot of road space,
- the elimination of associated fuel-inefficient driving behaviors such as extended idling and stop-and-go,
- the potential to influence how visitors spend their time in the park, and
- the removal of long lines of cars from viewsheds.

Servicewide, an estimated 11.5 million private vehicle trips were eliminated in 2023, a reduction of nearly 61,331 metric tons of CO_2 emissions. Private vehicle would have driven an additional 151 million miles without transit service. As stated previously, regions with high transit use and more boardings divert more personal vehicles from the road.

Asset Management

Performance measurement for assets helps support the long-term financial viability of the transit systems through tracking the age of NPS-owned vehicle fleets and estimating fleet recapitalization costs. In this context, "vehicles" refers only to on-road motorized vehicles and excludes nonroad transportation, such as ferries, locomotives, snowmobiles, snowcoaches, and aircraft. Any of those described in Table 12 are shown only for reference and were not analyzed for recapitalization estimates.

Average Age of NPS Vehicles

Table 12 reports the aggregate average age for NPS-owned transit vehicles servicewide and includes all NPS-owned vehicles regardless of whether they operated or not in 2023. The average age of each NPS vehicle type is below the service life for most vehicle types, but many categories include vehicles older than their typical lifespan. In the case of medium-duty transit, the average age is the anticipated service life. Notably, 69 vehicles will exceed their service life in next five years; of these, 37 are heavy-duty transit or medium-duty shuttles. On average, heavy- and medium-duty shuttle buses are the newest vehicles in the NPS-owned fleet, which is reflective of the fleet replacements occurring at Glacier, Grand Canyon, Yosemite, and Zion National Parks.

Table 12. Vehicle Age for NPS Transit Vehicle Types

Vehicle Type	Average Age	Number of Vehicles	Service Life (years)	Number of Vehicles Beyond Service Life*	Number of Vehicles Exceeding Service Life in Next 10 Years*
Tram/golf cart	7	11	11	2	9
Passenger van	16	20	10	17	3
Light-duty shuttle	13	29	15	17	11
Medium-duty shuttle	12	41	15	17	20
Medium-duty transit	18	39	18	24	8
Heavy-duty transit	14	65	18	20	30
Ferry/boat	27	15	N/A	N/A	0
Train/streetcar	56	5	N/A	N/A	0
School bus	26	3	18	1	2
Snowmobile/snowcoach	55	12	N/A	N/A	0
Van	10	3	5	3	0
Total	**–**	**239**	**–**	**101**	**83**

* Number of vehicles beyond service life in the next 10 years is a total of 184 vehicles. This includes 101 vehicles that are operating beyond their estimated service life in 2023 and 84 vehicles exceeding service life in the next 1–10 years (2024–2033). These columns are calculated using the vehicle's age and estimated service life.

Notes: N=239 vehicles and vessels.[20] The 2020 recategorization of the NPS fleet vehicles resulted in new categories and shifting vehicles to more appropriate vehicle type categories compared to past inventories. See Appendix D for more information.

Source: 2023 NPS transit inventory data

Transition to Electric Vehicles and Estimated Vehicle Recapitalization Needs

Executive Order 14008, "Tackling the Climate Crisis at Home and Abroad," requires federal agencies to establish a plan that will enable government motor vehicle fleets to transition to clean and-zero emission vehicles. Additionally, Executive Order 14057, "Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability," establishes a goal of 100% zero-emission light-duty vehicle acquisitions by 2027 and 100% zero-emission vehicle acquisitions by 2035. The National Park Service is working towards this goal through vehicle recapitalization, battery electric demonstrations, and feasibility studies with the National Renewable Energy Laboratory.

The National Park Service reviews the replacement of fleet vehicles with battery electric, as feasible, for system needs and location. Estimates of NPS-owned vehicle replacement needs begin with vehicle ages, along with the associated replacement costs and service life assumptions shown in Appendix E. Each park is responsible for determining when a vehicle needs to be replaced, which is dependent on funding availability and other factors. Service life is highly dependent on vehicle use,

20. The Glacier National Park Red Bus Tours vehicles were excluded from this analysis, as they have been extensively retrofitted during their 80-plus years in service.

in addition to vehicle age; therefore, more detailed information is needed before determining if a vehicle is truly due for replacement.

Based on an analysis using the methodology outlined in Appendix E, the National Park Service is facing a large fleet replacement need of 204 vehicles over the next 10 years and an estimated $196 million in NPS-owned transit vehicle capital costs.[21] These fleet replacements include legacy transit systems at Acadia, Yosemite, and Grand Canyon National Parks. The 10-year estimated cost does not include the ongoing fleet replacement at Zion National Park or electric vehicle service equipment and other infrastructure upgrades to accommodate transitioning to electric vehicles. Projected costs and escalation are calculated based on 2023 dollars and may vary from year to year as vehicles from different systems are replaced or rehabilitated to extend their service life.

NEXT STEPS

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 under which these systems operate, and performance measures (including emissions).

The transit inventory collects annual operational information to supplement other data initiatives that focus on NPS fixed real property assets. This effort provides a consistent platform to efficiently gather information that can be compared through time and enables the National Park Service to examine disparate transit systems as a whole and evaluate their benefits and impacts. As visitation at national parks increases, transit systems remain important assets for reducing resource impacts from personal vehicles while improving access and enhancing the visitor experience.

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

- **Promote Continued Coordination with Relevant NPS Stakeholders:** Continue sharing data and identifying ways the transit data can be used to support program missions, goals, and outcomes across the National Park Service. Consider stronger coordination with concessions and service contracts 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 moved to the Microsoft PowerApps platform in 2019. A limitation of this tool is that it is restricted to NPS users only, and concessioners are not able to access the tool. The National Park Service anticipates updating the data collection tool and data storage for performance enhancements for the 2024 data collection.

21. The estimated vehicle replacement costs assume an eligible Green Fleet vehicle base model cost. Often, purchase price exceeds the base model cost because of selected vehicle options. In addition, costs do not include electric vehicle charging equipment and associated infrastructure needs.

- **Expand Performance Measures Analysis and Performance Metrics:** Include additional performance measures to track the progress of NPS transit systems over time and include in this report, including the following actions:
    - Collaborate with other NPS planning efforts to provide measurable data.
    - Shift safety questions to a quantitative input and collaborate with the transportation safety program manager for reporting.
    - Develop environmental metrics, including an emissions-avoided metric and a clean energy (electric) vehicle conversion metric, per the draft National Transportation Strategy.
    - Develop a fleet replacement metric. A vehicle lifecycle metric derived from vehicle type, vehicle age, and expected service life.
    - Develop financial metrics that are internal to the National Park Service and system specific, derived from transit system costs, miles travelled, passenger boardings, and runs completed showing cost per boarding, cost per route mile, and passenger per route mile for the large surface systems where the National Park Service uses fees to operate.
    - Develop a real property metric based on the Alternative Transportation Lifecycle Asset Management data proportioned to transit systems and Facility Condition Index.
- **Communicate the 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 emissions from private vehicles. The positive impacts of transit use could be communicated in a variety of ways, 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 include connections to transportation trails.[22] Considering opportunities 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.
- **Explore Count Methodology Standardization:** Eighty-five percent of boardings are attributed to 10 systems. Understand the count methodology for these 10 systems and develop standardization in count methodology. Consider developing standard operating procedures/business practices for the remaining types of count methodologies or consider automating manual counts, where appropriate.

22. NPS definition of a "transportation trail": Multimodal trail that accommodates pedestrians and/or bicycles and connects to a larger transportation system, including land- and water-based transit and/or regional trail systems or direct connections to a community (not solely recreational trails).

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APPENDIX A: ACKNOWLEDGMENTS

The National Park Service would like to thank the numerous NPS transit system contacts who graciously provided their time, knowledge, and guidance in the development of this inventory and new web application.

Special thanks to each park and park contact who provided data for the 2023 inventory year. A list of each park contact is included in Appendix C.

National Capital Region

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Southeast Region

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APPENDIX B: DEFINITION OF TRANSIT

The National Park Service Multimodal Strategy & Innovation Program (MS&I) developed a definition for an "NPS transit system" prior to conducting the first transit inventory in 2012. Only parks with systems that met each of the following three criteria were considered for the inventory:

1. Moves people by motorized vehicle on a regularly scheduled service[23]
2. Operates under one of the following business models: concession contract; service contract; partner agreement including memorandum of understanding, memorandum of agreement, or cooperative agreement (commercial use agreements are not included) or is NPS owned and operated[24]
3. All routes and services at a given park 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 Servicewide Maintenance Advisory Committee. In response to challenges encountered during the course of the inventory, small changes were made to the original draft definition to improve clarity. The definition was uniformly applied to all potential systems to determine whether each should be included in the inventory.

The National Park Service investigated several potential criteria that stemmed from existing MS&I documents and conversations with MS&I stakeholders, as follows.

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 information, the National Park Service 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 Multimodal Strategy and Innovation Program (MS&I), 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 National Park Service has a financial stake or has a formal contract or agreement in place, the answer seems clear: because the National Park Service has made an effort to provide the service, the service is assumed to be important to

23. This criterion includes services with a posted schedule that have standard operating seasons/days of week/hours. Services that 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.
24. For the purposes of this inventory, no distinction was drawn between a memorandum of understanding, memorandum of agreement, or cooperative agreement. All were recorded as "cooperative agreement."

the mission. Other services, particularly those that operate under a commercial use agreement (CUA), are not as clearly essential to the mission. Thus, the National Park Service 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 included); or NPS owned and operated systems."** The National Park Service 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 National Park Service. Commercial use agreements are not included because prospective CUA operators request permission from the National Park Service to operate. These agreements are not initiated by the National Park Service, and the resulting services are inherently not "NPS" systems.

Commercial use agreements were not included because these services are owned and operated by private operators, and the National Park Service only provides oversight to ensure that the services are operated in accordance with NPS policies and requirements. Hundreds of commercial use agreement exist servicewide that provide visitors tours and transportation. Collecting and reporting information on all these systems could be burdensome to parks 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 commercial use agreement is important versus nonessential to the NPS mission? This effort found only one subcategory of commercial use agreement that could be considered objective: services that provide sole access to an NPS resource. Second, should the National Park Service represent as its own services for which it has no role in the acquisition, operations, or maintenance activities? Even for commercial use agreements that provide sole access, this effort suggests not. This determination is not to suggest that the service is not important to the National Park Service but rather to acknowledge that the service is not the responsibility of the National Park Service—in other words, the service 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): In theory, reducing vehicle miles traveled 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 National Park Service 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: 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 that provide critical access meet other likely criteria of a definition, such as the National Park Service having a financial stake. Thus, this criterion would not contribute toward a simple, clear definition.

Tours Versus Transportation: A distinction exists 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 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 National Park Service sought not to prioritize one over the other. Although in daily life, a transportation trip (often thought to be mandatory (e.g., to the grocery store) might be more important than a tour trip (often thought to be discretionary—e.g., a historical tour of a battlefield), in a recreational setting, such as a 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 servicewide in counting the number of transit systems, the National Park Service investigated methods for defining where one transit system stops and another starts and tested these with candidate NPS transit systems, particularly at parks thought to have more than one system. Based on this investigation, the National Park Service proposed a final criterion: **"all routes and services operated by the same operator under the same business model at a given park 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 Servicewide 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."

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APPENDIX C: 2023 NPS NATIONAL INVENTORY SYSTEM LIST

NORTHEAST REGION

Park Code	System Name	Vehicle Type	2023 Passenger Boardings	Vehicle Ownership	Agreement Type	Purpose	NPS Contact Name
ACAD	Island Explorer & Bicycle Express	Shuttle/bus/van/tram	451,032	Non-NPS	Cooperative agreement	Mobility to or within park	John Kelly
ACAD	Isle au Haut Ferry	Ferry/boat	5,290	Non-NPS	Cooperative agreement	Critical access	John Kelly
ADAM	Adams Trolley	Shuttle/bus/van/tram	Did not operate	NPS	Service contract	Critical access	Kevin Kelly
BOHA	Boston Light Tour	Ferry/boat	963	Non-NPS	Cooperative agreement	Interpretive tour	John Curwen
BOHA	Thompson Island Ferry	Ferry/boat	3,301	Non-NPS	Cooperative agreement	Mobility to or within park	John Curwen
CACO	Coastguard Beach Shuttle	Shuttle/bus/van/tram	61,831	NPS	NPS owned and operated	Critical access	John DeFoe
DEWA	DEWA Hiker Shuttle	Shuttle/bus/van/tram	15,039	Non-NPS	Cooperative agreement	Critical access	Zach Piotrowski
EISE	EISE Shuttle	Shuttle/bus/van/tram	2,203	Non-NPS	Concession contract	Critical access	Jana Friesen McCabe
FIIS	Sailors Haven Ferry	Ferry/boat	31,384	Non-NPS	Concession contract	Critical access	Sonia Taiani
FIIS	Watch Hill Ferry	Ferry/boat	17,301	Non-NPS	Concession contract	Critical access	Sonia Taiani
HOFR	FDR Tram	Shuttle/bus/van/tram	5,500	NPS	NPS owned and operated	Mobility to or within park	Adam Millington
HOFR	Val-Kill Tram	Shuttle/bus/van/tram	Did not operate	NPS	NPS owned and operated	Mobility to or within park	Adam Millington

Park Code	System Name	Vehicle Type	2023 Passenger Boardings	Vehicle Ownership	Agreement Type	Purpose	NPS Contact Name
JOFL	Lakebed Tours	Shuttle/bus/van/tram	162	NPS	NPS owned and operated	Interpretive tour	Douglas Bosley
LOWE	Canal Tours	Ferry/boat	3,468	NPS	NPS owned and operated	Interpretive tour	Micheal Curran
LOWE	LOWE Historic Trolley	Train/trolley	24,097	NPS	NPS owned and operated	Mobility to or within park	Michael Curran
MABI	Full Circle Trolley	Train/trolley	225	NPS	NPS owned and operated	Critical access	Christina Marts
SHEN	Rapidan Camp Bus	Shuttle/bus/van/tram	2,061	NPS	NPS owned and operated	Interpretive tour	Christopher Cabral
STEA	Scranton Limited & Live Steam Excursions	Train/trolley	20,000	NPS	NPS owned and operated	Interpretive tour	James Hicks
STLI	Statue of Liberty Ferries	Ferry/boat	8,780,307	Non-NPS	Concession contract	Critical access	Ben Hanslin
VAFO	History of Valley Forge Trolley Tour	Shuttle/bus/van/tram	8,929	Non-NPS	Cooperative agreement	Interpretive tour	Pamela Zesotarski

Park key: ACAD=Acadia National Park; BRCA=Bryce Canyon National Park; GOGA=Golden Gate National Recreation Area; GRCA=Grand Canyon National Park; PERL=Pearl Harbor National Memorial; ROMO=Rocky Mountain National Park; SEKI=Sequoia & Kings Canyon National Parks; STLI=Statue of Liberty National Monument; YOSE=Yosemite National Park; ZION=Zion National Park

NATIONAL CAPITAL REGION

Park Code	System Name	Vehicle Type	2023 Passenger Boardings	Vehicle Ownership	Agreement Type	Purpose	NPS Contact Name
HAFE	HAFE Shuttle Transport	Shuttle/bus/van/tram	419,343	NPS	Service contract	Mobility to or within park	Larry Moore
NAMA	Big Bus Tours Washington DC	Shuttle/bus/van/tram	200,686	Non-NPS	Concession contract	Interpretive tour	Karl Gallo
NAMA	DC Circulator	Shuttle/bus/van/tram	27,508	Non-NPS	Cooperative agreement	Transportation feature	Yue Li
WOTR	Fairfax Connectors Wolf Trap Express	Shuttle/bus/van/tram	8,965	Non-NPS	Service contract	Mobility to or within park	Janette Lemons

SOUTHEAST REGION

Park Code	System Name	Vehicle Type	2023 Passenger Boardings	Vehicle Ownership	Agreement Type	Purpose	NPS Contact Name
BLRI	Sharp Top Mountain Shuttle	Shuttle/bus/van/tram	4,058	Non-NPS	Concession contract	Transportation feature	Gail Fox
CALO	CALO Ferry Service	Ferry/boat	100,600	Non-NPS	Concession contract	Critical access	Katherine Cushinberry
CARL	Visitor Shuttle	Shuttle/bus/van/tram	Did not operate	NPS	NPS owned and operated	Visitor accessibility	Pauline Angelakis
CUIS	CUIS Ferry Service	Ferry/boat	39,506	Non-NPS	Concession contract	Critical access	Sarah Koenen
CUIS	Land and Legacies Tour	Shuttle/bus/van/tram	4,441	NPS	Concession contract	Interpretive tour	Sarah Koenen
DRTO	DRTO Ferry Service	Ferry/boat	57,423	Non-NPS	Concession contract	Critical access	Philip Arrington

Park Code	System Name	Vehicle Type	2023 Passenger Boardings	Vehicle Ownership	Agreement Type	Purpose	NPS Contact Name
DRTO	Key West Seaplane Adventures	Aircraft	18,248	Non-NPS	Concession contract	Interpretive tour	Philip Arrington
FOMA	FOMA Ferry Service	Ferry/boat	42,756	NPS	NPS owned and operated	Critical access	Andrew Rich
FOSU	FOSU Ferry Service	Ferry/boat	290,531	Non-NPS	Concession contract	Critical access	Michelle Haas
GUIS	Ship Island Ferry	Ferry/boat	43,376	Non-NPS	Concession contract	Transportation feature	Richard Devenney
GUIS	Fort Pickens Tram Service	Shuttle/bus/van/tram	105	NPS	NPS owned and operated	Transportation feature	Richard Devenney
GUIS	GUIS Ferry Service	Ferry/boat	15,180	NPS	Concession contract	Transportation feature	Richard Devenney
KEMO	KEMO Shuttle Bus	Shuttle/bus/van/tram	1,056	NPS	Service contract	Transportation feature	Amanda Corman
MACA	Cave Tours Bus Shuttle	Shuttle/bus/van/tram	Did not report	NPS	Concession contract	Interpretive tour	
MACA	Green River Ferry	Ferry/boat	Did not report	NPS	NPS owned and operated	Transportation feature	

MIDWEST REGION

Park Code	System Name	Vehicle Type	2023 Passenger Boardings	Vehicle Ownership	Agreement Type	Purpose	NPS Contact Name
APIS	Excursion boat	Ferry/boat	47,550	Non-NPS	Concession contract	Interpretive tour	Lisa Maass
CUVA	Cuyahoga Valley Scenic Railroad	Train/trolley	87,534	Non-NPS	Cooperative agreement	Mobility to or within park	Jennifer Vasarhelyi
ISRO	MV Isle Royale Queen IV	Ferry/boat	15,634	Non-NPS	Concession contract	Critical access	Chris Amidon
ISRO	MV Voyageur II and Sea Hunter III	Ferry/boat	10,428	Non-NPS	Concession contract	Critical access	Chris Amidon
ISRO	Royale Air Service Inc. float plane	Aircraft	8,356	Non-NPS	Concession contract	Critical access	Chris Amidon
ISRO	MV Sandy Tour	Ferry/boat	4,648	Non-NPS	Concession contract	Interpretive tour	Chris Amidon
ISRO	MV Ranger III	Ferry/boat	5,624	NPS	NPS owned and operated	Critical access	Chris Amidon
OZAR	Akers Ferry	Ferry/boat	Did not operate	NPS	Concession contract	Transportation feature	Peggy Tarrence
PIRO	Pictured Rocks Cruises	Ferry/boat	155,523	Non-NPS	Concession contract	Interpretive tour	Joseph Hughes
SCBL	SCBL Free Shuttle Service	Shuttle/bus/van/tram	62	NPS	NPS owned and operated	Mobility to or within park	Justin Cawiezel
SLBE	Manitou Island Transit	Ferry/boat	9,673	Non-NPS	Concession contract	Transportation feature	Phil Akers
TAPR	TAPR Bus Tours	Shuttle/bus/van/tram	1,209	Non-NPS	Service contract	Interpretive tour	Heather Brown
VOYA	VOYA Tour Boat	Ferry/boat	7,435	NPS	NPS owned and operated	Interpretive tour	Candy Braton

INTERMOUNTAIN REGION

Park Code	System Name	Vehicle Type	2023 Passenger Boardings	Vehicle Ownership	Agreement Type	Purpose	NPS Contact Name
BAND	Bandelier National Monument	Shuttle/bus/van/tram	Did not operate	Non-NPS	Cooperative agreement	Critical access	Dennis Milligan
BRCA	Bryce Canyon Shuttle and Rainbow Point Shuttle	Shuttle/bus/van/tram	666,911	Non-NPS	Service contract	Mobility to or within park	Kevin Poe
DINO	Tram Transit	Shuttle/bus/van/tram	126,257	Non-NPS	Service contract	Critical access	Dan Johnson
GLAC	Glacier Park Boat Company interpretive boat tours	Ferry/boat	194,188	Non-NPS	Concession contract	Interpretive tour	Hayley Bahr
GLAC	Sun Tours	Shuttle/bus/van/tram	4,700	Non-NPS	Concession contract	Interpretive tour	Hayley Bahr
GLAC	Red Bus Tours	Shuttle/bus/van/tram	49,411	NPS	Concession contract	Interpretive tour	Hayley Bahr
GLAC	GLAC Hiker Shuttle	Shuttle/bus/van/tram	2,607	NPS	NPS owned and operated	Mobility to or within park	Patrick Glynn
GLAC	Visitor Transportation System	Shuttle/bus/van/tram	218,910	NPS	NPS owned and operated	Mobility to or within park	Patrick Glynn
GLCA	Antelope Point	Ferry/boat	13,582	Non-NPS	Concession contract	Interpretive tour	Nichelle Rich
GLCA	Boat Tours	Ferry/boat	29,877	Non-NPS	Concession contract	Interpretive tour	Nichelle Rich
GLCA	Flatwater Tour	Ferry/boat	30,266	Non-NPS	Concession contract	Interpretive tour	Nichelle Rich
GLCA	SR276 Passenger Ferry	Ferry/boat	Did not operate	Non-NPS	Service contract	Transportation feature	Nichelle Rich

Park Code	System Name	Vehicle Type	2023 Passenger Boardings	Vehicle Ownership	Agreement Type	Purpose	NPS Contact Name
GRCA	South Rim Bus Tours	Shuttle/bus/van/tram	Did not operate	Non-NPS	Concession contract	Interpretive tour	Franklin Dunfree
GRCA	Grand Canyon Railway	Train/trolley	177,629	Non-NPS	Concession contract	Mobility to or within park	Franklin Dunfree
GRCA	South Rim Shuttle Service	Shuttle/bus/van/tram	4,745,966	NPS	Service contract	Mobility to or within park	Franklin Dunfree
GRTE	Jenny Lake Shuttle Boat	Ferry/boat	245,082	Non-NPS	Concession contract	Mobility to or within park	Patrick McGaugh
LIBI	LIBI Bus Tours	Shuttle/bus/van/tram	245	Non-NPS	Concession contract	Interpretive tour	Kelly Peacock
MEVE	Long House Trailhead tram and half-day ranger guided	Shuttle/bus/van/tram	Did not operate	Non-NPS	Concession contract	Interpretive tour	Allan Loy
ROMO	Rocky Mountain National Park Visitor Shuttle	Shuttle/bus/van/tram	561,716	Non-NPS	Service contract	Mobility to or within park	John Hannon
YELL	Xanterra Parks & Resorts interpretive snow coaches tours	Snowmobile/ snowcoach	7,618	Non-NPS	Concession contract	Interpretive tour	James Lewis
YELL	Historic Yellow Bus Tours	Shuttle/bus/van/tram	13,739	NPS	Concession contract	Interpretive tour	James Lewis
YELL	YELL Boat	Ferry/boat	16,676	NPS	Concession contract	Interpretive tour	James Lewis
YELL	Xanterra Parks & Resorts interpretive bus tours	Shuttle/bus/van/tram	11,383	NPS; non-NPS	Concession contract	Interpretive tour	James Lewis

Park Code	System Name	Vehicle Type	2023 Passenger Boardings	Vehicle Ownership	Agreement Type	Purpose	NPS Contact Name
YELL	YELL Snow Coaches	Snowmobile/ snowcoach	21,904	NPS; non-NPS	Concession contract	Interpretive tour	James Lewis
ZION	Zion Shuttle	Shuttle/bus/ van/tram	5,730,436	NPS	Service contract	Critical access	Lisa Ogden

PACIFIC WEST REGION

Park Code	System Name	Vehicle Type	2023 Passenger Boardings	Vehicle Ownership	Agreement Type	Purpose	NPS Contact Name
CHIS	Island Packers	Ferry/boat	85,041	Non-NPS	Concession contract	Critical access	John Hansen
CRLA	Crater Lake Boat Tour	Ferry/boat	5,499	Non-NPS	Concession contract	Interpretive tour	Sean Denniston
CRLA	Rim Drive Trolley Tour	Shuttle/bus/van/tram	9,373	Non-NPS	Concession contract	Interpretive tour	Sean Denniston
DEPO	Reds Meadow Shuttle Bus	Shuttle/bus/van/tram	29,896	Non-NPS	Cooperative agreement	Critical access	Rebecca Wong
EUON	NPS Shuttle	Shuttle/bus/van/tram	1,189	NPS	NPS owned and operated	Critical access	Kristen Merino
GOGA/ALCA	Alcatraz Cruises Ferry	Ferry/boat	1,412,817	Non-NPS	Concession contract	Critical access	Alice Young
MUWO	Muir Woods Shuttle	Shuttle/bus/van/tram	96,420	Non-NPS	Cooperative agreement	Mobility to or within park	Darren Brown
NOCA/ LACH	Concession Shuttle	Shuttle/bus/van/tram	5,412	Non-NPS	Service contract	Interpretive tour	Annelise Sirguy
NOCA/ ROLA	Rainbow Falls Tours	Shuttle/bus/van/tram	1,173	NPS	Concession contract	Interpretive tour	Annelise Sirguy

Park Code	System Name	Vehicle Type	2023 Passenger Boardings	Vehicle Ownership	Agreement Type	Purpose	NPS Contact Name
NOCA/ ROLA	Ross Lake Hiker Shuttle	Shuttle/bus/van/tram	370	Non-NPS	Concession contract	Transportation feature	Annelise Sirguy
PERL	Ford Island Bus Tour	Shuttle/bus/van/tram	2,808	Non-NPS	Service contract	Interpretive tour	David Kilton
PERL	Missouri/ PHAM Shuttle	Shuttle/bus/van/tram	440,916	Non-NPS	Cooperative agreement	Transportation feature	David Kilton
PERL	USS Arizona Memorial Tour	Ferry/boat	1,388,632	Non-NPS	Cooperative agreement	Interpretive tour	David Kilton
PINN	Pinnacle Shuttle	Shuttle/bus/van/tram	35,980	NPS	NPS owned and operated	Mobility to or within park	Adam Leavy
PORE	Headlands Shuttle	Shuttle/bus/van/tram	Did not operate	Non-NPS	Service contract	Critical access	Brannon Ketcham
SEKI	Gateway Shuttle	Shuttle/bus/van/tram	1,155	Non-NPS	Cooperative agreement	Critical access	Jason Deger
SEKI	Giant Forest Shuttle	Shuttle/bus/van/tram	290,070	Non-NPS	Cooperative agreement	Critical access	Jason Deger
SEKI	Winter Giant Forest Shuttle	Shuttle/bus/van/tram	6,610	Non-NPS	Cooperative agreement	Critical access	Jason Deger
YOSE	Tram Tours and Hiker Shuttle	Shuttle/bus/van/tram	Did not operate	Non-NPS	Concession contract	Interpretive tour	Jim Donovan
YOSE	Winter Ski Shuttle	Shuttle/bus/van/tram	1,439	Non-NPS	Concession contract	Mobility to or within park	Jim Donovan
YOSE	YARTS: Yosemite Area Regional Transportation System	Shuttle/bus/van/tram	54,747	Non-NPS	Cooperative agreement	Mobility to or within park	Jim Donovan
YOSE	Mariposa Grove Transportation Service	Shuttle/bus/van/tram	677,739	NPS	Service contract	Critical access	Jim Donovan
YOSE	Yosemite Valley Shuttle	Shuttle/bus/van/tram	1,595,104	NPS	Concession contract	Mobility to or within park	Jim Donovan

ALASKA REGION

Park Code	System Name	Vehicle Type	2023 Passenger Boardings	Vehicle Ownership	Agreement Type	Purpose	NPS Contact Name
DENA	Bus tours and shuttle service	Shuttle/bus/van/tram	382,728	Non-NPS	Concession contract	Critical access	Krista Lichneckert
GLBA	Day boat tour	Ferry/boat	4,942	Non-NPS	Concession contract	Interpretive tour	Whitney Rapp
GLBA	Airport shuttle	Shuttle/bus/van/tram	8,425	Non-NPS	Concession contract	Transportation feature	Whitney Rapp
KATM	KATM Bus Tour	Shuttle/bus/van/tram	1,859	Non-NPS	Concession contract	Interpretive tour	Alex Maki

APPENDIX D: CHANGE IN VEHICLE TYPES

Table 13. Categorization of Vehicle Types

Vehicle Type	2022 Vehicles	2023 Vehicles	Difference
Ferry/boat	**106**	**115**	**-9**
NPS owned	18	16	-2
Non-NPS owned	88	99	+11
Van/SUV/sedan	**18**	**6**	**-12**
NPS owned	3	3	0
Non-NPS owned	15	3	-12
Passenger van	**121**	**119**	**-2**
NPS owned	21	20	-1
Non-NPS owned	100	99	-1
Light-duty shuttle	**42**	**59**	**+17**
NPS owned	20	29	+9
Non-NPS owned	22	30	+8
Medium-duty shuttle	**106**	**100**	**-6**
NPS owned	74	70	-4
Non-NPS owned	32	30	-2
Medium-duty transit (bus)	**78**	**83**	**+5**
NPS owned	34	39	+5
Non-NPS owned	44	44	0
Heavy-duty transit (bus)	**216**	**207**	**-9**
NPS owned	68	65	-3
Non-NPS owned	148	142	-6
School bus	**119**	**115**	**-4**
NPS owned	7	7	0
Non-NPS owned	112	108	-4
Snowmobile/snowcoach	**20**	**20**	**0**
NPS owned	12	12	0
Non-NPS owned	8	8	0
Tram/golf cart	**24**	**20**	**-4**
NPS owned	12	11	-1
Non-NPS owned	12	9	-3

Vehicle Type	2022 Vehicles	2023 Vehicles	Difference
Train/trolley/streetcar	**22**	**22**	**0**
NPS owned	5	5	0
Non-NPS owned	17	17	0
Aircraft	**2**	**2**	**0**
NPS owned	0	0	0
Non-NPS owned	2	**6**	**+4**
Total	**874**	**862**	**-12**
NPS owned	**274**	**272**	**-2**
Non-NPS owned	**600**	**590**	**-10**

Note: Includes all fleet data regardless of 2023 active operational status

Sources: 2022–2023 NPS transit inventory data

APPENDIX E: VEHICLE REPLACEMENT ASSUMPTIONS

Uniform vehicle replacement costs and expected service lives were used to provide servicewide 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[25] to reflect the usage and operating characteristics of NPS vehicles (Tables 10 and 11). National Park Service vehicles are not used in the same way that city transit vehicles are used; they are typically not used for the entire year and are not used as intensively as transit vehicles in an urban environment. Vehicle cost estimates were mostly taken from the General Service Administration's AutoChoice Database.

In January 2022, the National Park Service requested an updated expected service life for vehicles on public lands and a discussion on shuttle bus versus transit bus configurations from the Volpe Center (US Department of Transportation).

SHUTTLE BUS VERSUS TRANSIT BUS CONFIGURATIONS AND EXPECTED SERVICE LIFE

The on-road vehicle types common to the NPS transit systems are passenger vehicles, passenger vans, light- and medium-duty shuttle buses, medium- and heavy-duty transit buses, and school buses. Table 12 shows common transit vehicle types and essential information on size, cost, and life expectancy. The general information and delineations between categories discussed below are generic descriptions for vehicle type classification.

A key distinction among light- and medium-duty buses are the "shuttle" versus "transit" configuration.

SHUTTLE BUS CONFIGURATION

A shuttle bus is built of a mass-produced "stripped chassis" or "cutaway" platform that is derived from a domestic truck or van chassis (such as Dodge, Ford, General Motors). These chassis include a cab, powertrain, frame, suspension, wheels, brakes, and driveline but do not have a typical truck or van body built over the back of the frame. Instead, a specialty manufacturer will build a shuttle bus passenger compartment on the stripped chassis. Shuttle buses are sometimes referred to as "high floor buses" or "cutaways" due to having the passenger compartment built on top of the stripped chassis.

The raised passenger compartment requires steps to enter and exit, and accessibility compliance is commonly achieved with a wheelchair lift at the back of the vehicle. The shuttle bus typically has a shorter rated life expectancy than an equivalent capacity transit bus option. However, the shuttle bus options are less expensive to build and buy, offering an economical choice for transit systems.

25. 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.

TRANSIT BUS CONFIGURATION

The transit bus is built as a dedicated platform by the vehicle manufacturer for transit operations. Typical manufacturers include Build Your Dream, El Dorado, Gillig, Bluebird, New Flyer, NA Bus Industries, and Proterra. The frame, engine, drivetrain, suspension, brakes, and other Significant components, like the frame, engine, drivetrain, suspension, and brakes, and detail components, like doors and electronics, are built to a more robust standard to survive operations in urban, continuous transit environments.

The frame and chassis are more costly to build due to their lower volume,[26] dedicated design, robust construction, and a "low floor" configuration. The lower floor provides access to the vehicle for most uses, and most vehicles have a deployable accessible ramp. As a result of their construction, transit buses are nearly twice as expensive as an equivalently sized shuttle bus. However, transit buses have a longer rated life expectancy and can survive harder more continuous use.

Some vehicles may cross boundaries between categories. For example, some passenger vans are built with a transit chassis, and configurations and smaller "light-duty" shuttle bus categories are built with transit-style features and even dedicated chassis for battery-electric options.

BATTERY-ELECTRIC BUSES

Given the new nature of battery-electric configurations in shuttle bus and transit bus applications, there remain critical unknowns as they pertain to long-term performance, durability, reliability or "uptime," and their expected life. Electric vehicle manufacturers promise lower maintenance requirements and longer life expectancies than an internal combustion engine-powered vehicle.

However, battery-electric transit buses have only become available within the past decade, and most in operation are yet to reach their rated lifespans. Foothill Transit has operated battery-electric buses since 2010, partnering with the National Renewable Energy Laboratory to evaluate the performance of their buses, for which a final report was published in 2021.[27] Unfortunately, the transit operator has contacted the Federal Transit Administration requesting to retire several buses early due to costly repairs and poor reliability, stating their buses were not able to achieve their rated life of 12 years.[28]

Given the uncertainties surrounding component replacement costs and the long-term durability of battery-electric buses, their expected life in public lands applications is equivalent to their rated lifespan. A longer life expectancy for public lands use is not anticipated at this time, as it is often achieved with traditionally fueled vehicles.

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26. Lower production volumes compared to commercial trucks.
27. Foothill Transit Battery Electric Bus Evaluation: Final Report: https://www.nrel.gov/docs/fy21osti/80022.pdf.
28. With 34% of its electric buses inoperable, Foothill Transit searches for fixes, Daily Bulletin: https://www.dailybulletin.com/2021/07/22/with-50-of-its-buses-inoperable-foothill-transit-searches-for-a-way-to-fix-its-fleet/.

Table 14. Summary of Vehicles on Public Lands

Vehicle Type	Purchase Cost	Rated Life	Expected Life in Public Lands (years)	Capacity	Fuels
Electric/small tram	$25,000 – $35,000	N/A	3–5	6–12	Electric (battery), gas small engine
Passenger van, car, truck, SUV	$25,000 – $85,000	5 years 100,000 miles	5–10 (gas/diesel) 5–7 (electric)	6–15	Diesel, gas, electric
Light-duty shuttle	$75,000 – $120,000	7 years 200,000 miles	7–10 (gas/diesel, hybrid) 7 (electric)	12–28	Diesel, gas, hybrid
Light-duty low-floor	$400,000 – $475,000	7 years 200,000 miles (anticipated)	8–10 (electric) (8-year warranty on bus and batteries)	25–31	Electric
Medium-duty shuttle	$100,000 – $175,000	7 years 200,000 miles	7–10 (gas/diesel, hybrid) 7 (electric)	28–36	Diesel, gas, hybrid
Medium-duty transit	$200,000 – $300,000	10 years 350,000 miles	15–20 (diesel, gas, propane)	28–40	Diesel, gas, hybrid
Heavy-duty transit	$475,000 – $1,200,000	12 years 500,000 miles	20+ (diesel, CNG, hybrid) 12 (electric)	35–45	CNG, diesel, hybrid, electric

Note: CNG=compressed natural gas
Source: Transit standards[29] updated to reflect NPS typical usage and operating characteristics

Concurrently, a review of vehicle costs on the General Services Administration was completed to look for current actual costs of vehicles. A comparison with Volpe's findings was completed, and the conservative life expectancies and costs were used in the national transit inventory and are included in the following tables.

Table 15. Vehicle Replacement Costs (in 2023 Dollars) and Expected Life for Nonelectric Vehicles

Vehicle Type	Gas/Diesel/ Biodiesel/ Propane Replacement Cost	Gas/Diesel/ Biodiesel/ Propane Expected Life (years)	CNG Replacement Cost	CNG Expected Life (years)
Passenger van, car, truck, and SUV	$44,550	5–10	N/A	N/A
Light-duty shuttle	$144,450	7–10	$128,000	10
Medium-duty shuttle	$198,450	7–10	$168,000	10
Medium-duty transit	$371,450	15–20	$392,000	20

29. Ibid.

Vehicle Type	Gas/Diesel/ Biodiesel/ Propane Replacement Cost	Gas/Diesel/ Biodiesel/ Propane Expected Life (years)	CNG Replacement Cost	CNG Expected Life (years)
Heavy-duty transit	$645,300	20+	$1,750,500	20
School bus	$170,775	15–20	N/A	N/A
Tram/golf cart	N/A	3–5	N/A	11

Note: CNG=compressed natural gas

Source: Transit standards[30] updated to reflect NPS typical usage and operating characteristics

Table 16. Vehicle Replacement Costs (in 2023 Dollars) and Expected Life for Electric Vehicles

Vehicle Type	Electric-Hybrid Replacement Cost	Electric-Hybrid Expected Life (years)	Electric Replacement Cost	Electric Expected Life[31] (years)
Passenger van, car, truck, and SUV	$28,000 – $95,000	5–7	$123,000	10
Light-duty shuttle	$282,240	7	$252,000	12
Medium-duty shuttle	$560,000	7	$878,000	12
Medium-duty transit	$784,000	15	$1,200,000	12
Heavy-duty transit	$1,562,500	12	$1,568,000	12
School bus	N/A	8–10	$560,000	12
Tram/golf cart	$27,000 – $44,800	3–5	$27,000 – $44,800	11

Source: Transit standards[32] updated to reflect NPS typical usage and operating characteristics

A major recapitalization baselining effort was undertaken as part of the 2019 transit inventory. The National Park Service vehicle data was exported from the inventory to determine a calculated replacement year based on the life expectancy and age of each vehicle. From there, the Parks Transportation Allocation and Tracking System and Project Management Information System was reviewed for planned replacement and/or refurbishment projects (Tables 12 and 13). Regional coordinators reviewed the plan and consulted on the draft recapitalization plan presented in this report.

30. Ibid.
31. The batteries will need to be replaced prior to the end of the expected life.
32. 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.

Table 17. Recapitalization Totals by Year

Year	Total Vehicles	Cost
2024	45	$76,740628.89
2025	38	$21,774,797.60
2026	25	$26,160,116.07
2027	22	$21,882,652.24
2028	15	$16,316,100.75
2029	15	$10,428,923.44
2030	17	$7,793,556.30
2031	3	$2,150,263.43
2032	13	$13,473,550.68
2033	11	$17,685,199.99
2034	7	$12,417,949.85
Total	**204**	**$135,543,820**

Sources: Estimated recapitalization needs based on transit inventory data, transit standards, Project Management Information System, Parks Transportation Allocation and Tracking System, and region and park input.

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APPENDIX F: AIR QUALITY AND EMISSIONS

Since 2017, the transit inventory has used an updated methodology to analyze the air quality and greenhouse gas impacts of NPS transit systems. The analysis relies primarily on the US Environmental Protection Agency's Motor Vehicle Emissions Simulator (MOVES)[33] for estimating emissions by transit vehicles. MOVES is a state-of-the-science emissions modeling software that estimates airborne emissions from a range of vehicle types at very fine scales. MOVES uses direct measurements collected over many years to account for how different vehicles, fuel types, road types (e.g., urban vs. rural, highways vs. local streets), and emission processes (e.g., running, starting, and idling) contribute to air pollution. This process allows MOVES to calculate emissions from both on-road vehicles, such as transit buses, and off-road vehicles, such as waterborne vessels and trams. Emissions from trams were estimated by mapping the transit vehicle to similar on-road engines in MOVES. Emissions from ferries and boats were estimated using appropriate emissions rates from the MOVES Non-Road model. The analysis used the latest version of MOVES, MOVES4, was released in August 2023.

Since MOVES is the Environmental Protection Agency's regulatory standard for emissions analysis, NPS units may use the results 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. For a discussion of the differences between the emissions modeling methods used in years prior to 2017, please see the *NPS Transit Inventory and Performance Report 2017*.[34]

POLLUTANTS

The following pollutants are included in the 2024 air quality analysis:

Carbon Dioxide (CO_2)[35]

Carbon dioxide is a colorless gas produced through chemical combustion, including burning fuels to power automobiles and homes. Typically, gasoline combustion emits more carbon dioxide than other fuels.

Nitrogen Oxides (NO_X) and Volatile Organic Compounds

Nitrogen oxides are a collection of gaseous molecules containing one nitrogen atom and several oxygen atoms. As with the other pollutants described here, fuel combustion emits nitrogen oxides. While upper-atmospheric nitrogen oxides can counteract the warming effects of greenhouse gases, ground-level NO_X molecules react with other airborne chemicals to become particles that can cause respiratory conditions in humans.[36]

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33. The latest version of MOVES is available at https://www.epa.gov/moves/latest-version-motor-vehicle-emission-simulator-moves.
34. The 2017 national transit inventory may be accessed at https://rosap.ntl.bts.gov/view/dot/37306.
35. Intergovernmental Panel on Climate Change 2021, "Climate Change: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change."
36. US Environmental Protection Agency, "NO_X: How Nitrogen Oxides Affect the Way We Live and Breathe." September 1998.

Volatile organic compounds 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 volatile organic compounds. State, local, and federal institutions tightly regulate volatile organic compounds, as they are easily absorbed into human tissue and can have harmful health effects.[37]

Nitrogen oxides and volatile organic compounds are precursors to ozone (O_3), a highly reactive gas. Stratospheric ozone forms the protective ozone layer, which deflects harmful solar radiation away from Earth's surface. However, nitrogen oxides and volatile organic compounds can combine at the surface to produce ground-level ozone, which causes a variety of adverse health effects and can also harm plants and wildlife. Since ozone can travel long distances by wind, rural areas may experience high levels even with minimum local NO_X and volatile organic compound (VOC) pollution.[38]

Carbon Monoxide (CO)[39]

Carbon monoxide is a colorless and odorless gas released through burning fossil fuels, though the emissions quantities vary by fuel type. In large quantities, carbon monoxide can be extremely dangerous 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 summer.

Particulate Matter (PM)[40]

Particulate matter (PM) encompasses solid and liquid particles emitted into the air, including dust, soot, and aerosolized chemicals. Particulate matter can be emitted as fugitive dust in industrial areas and construction sites, from asphalt, brakes, and tires as heavy vehicles move over road surfaces, and in tailpipe exhaust from fuel combustion. Diesel fuel generally produces more PM than other fuels, and driving over unpaved surfaces can emit large quantities of particles 10 micrometers and smaller (PM_{10}). The Environmental Protection Agency and state regulatory agencies have established standards for both PM_{10}, as well as particles 2.5 micrometers and smaller ($PM_{2.5}$) to reduce negative impacts on respiratory health. Exposure to PM can cause and aggravate respiratory conditions such as asthma. $PM_{2.5}$ particles are also a major contributor to smog, which can obscure views and damages natural resources.

37. Ibid.
38. US Environmental Protection Agency, "Basic Information about Ozone | Ozone Pollution | US EPA."
39. US Environmental Protection Agency, "Basic Information about Carbon Monoxide (CO) Outdoor Air Pollution | Carbon Monoxide (CO) Pollution in Outdoor Air | US EPA."
40. Ibid.

Data Gaps and Discrepancies

The transit activity data used for this analysis had the following gaps compared to previous comparison years:

1) No entries for NPS transit vehicle activity data were recorded for the Alaska Region.
2) Ferry activity increased by 319%, 522%, and 107% in the Intermountain, Northeast, and Pacific West Regions in 2023 compared 2022. This increase is likely due to systems such as Watch Hill Ferry and the Glacier Park Boat Company operating in 2023, which did not operate in prior years.
3) Certain vehicle data reports lack horsepower data, which impacts the analysis of Ferry emissions. These entries were ignored in this analysis.
4) Certain vehicle data reports listed fuel types as "other." These entries were also ignored in this analysis.

Emissions data for trains, seaplanes, and snowcoaches were also lacking. As such, these vehicle types were also ignored in this analysis.

Results

The COVID-19 pandemic had a significant impact on passenger vehicle miles traveled and transit system operation in parks in 2020 and 2021; however, transit system activity started to rebound in 2022. However, on-road vehicle activity decreased substantially in 2023. Total VMT across all regions decreased by 74%, as compared with 2022 levels.[41] Total VMT accounts for a 4% increase compared to 2021 levels. In 2023, 83 of 91 transit systems in the national emissions inventory were operational, compared with 81 of 101 systems in 2022 and 62 of 97 systems in 2021.[42]

Table 18 shows transit system VMT and ferry hours by region in 2023. The sections below describe passenger vehicle trips avoided as a result of transit use, as well as individual pollutant emissions from transit system fleets by region.

41. The large decrease in total VMT may have been caused by more accurate reporting of miles traveled by NPS-owned vehicles. For example, some parks reported vehicle odometer readings instead of total system route mileage during previous collections.
42. Operational systems reflect those with boardings >0 in the inventory and that were included in the emissions analysis. Systems lacking enough data for an emissions analysis are not reflected in these metrics. In 2020, 74 of 96 systems operated; VMT in 2023 increased 781% compared with 2020 levels.

Table 18. Total Transit System Vehicle Miles Traveled and Ferry Hours by Region

Region	Vehicle Miles Traveled	Ferry Hours
Intermountain	2,985,081	23,896
National Capital	325,239	–
Midwest	70,055	5,781
Southeast	36,278	13,861
Alaska	698,701	817
Northeast	473,664	7,934
Pacific West	513,162	16,569
Total	**5,102,180**	**63,041**

Diverted Passenger Vehicle Trips and CO_2 Emissions Avoided

Although transit systems contribute to emissions, transit in NPS units typically has a net positive effect on air quality, as well as the visitor experience. Transit use reduces the number of vehicle trips in parks—for example, transit buses carry more people per square foot of road space, relieving congestion on park roads and eliminating associated fuel-inefficient driving behaviors, such as extended idling and stop-and-go. In addition to the air quality benefits of reduced fuel use per visitor, expanded transit use influences how visitors spend their time in the park and removes long lines of cars from viewsheds.

Figure 16 shows the estimated number of vehicle trips eliminated as a result of transit use in each region. The number of passenger vehicle trips diverted is calculated by dividing the total number of passenger boardings by the average occupancy of visitors' personal vehicles (assumed to be 2.6). The emissions avoided are calculated as the VMT avoided[43] multiplied by a composite passenger vehicle emissions factor (EF_p)[44] for a given pollutant, assuming that the passenger vehicles use conventional gasoline fuel.

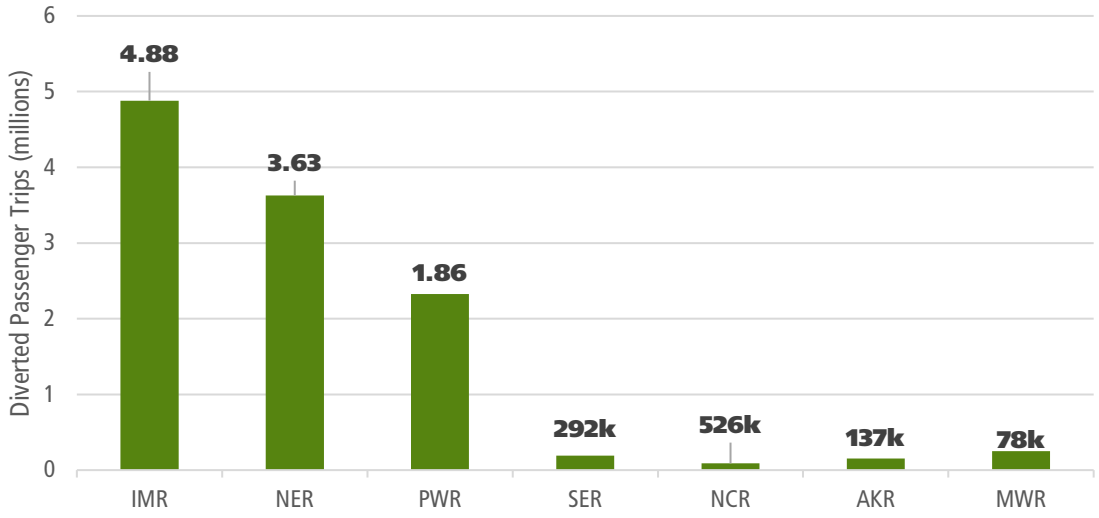
$$Emissions\ Avoided = EF_p * \frac{\left(\frac{total\ transit\ VMT}{total\ transit\ runs}\right) * total\ transit\ boardings}{2.6\ occupants\ per\ vehicle}$$

National Park Service transit services eliminated an estimated 11.5 million passenger vehicle trips in 2023, which equates to 151 million fewer miles driven and a reduction in CO_2 emissions of 61,331 metric tons.[45] Regions with higher transit use and more boardings, namely the Intermountain and

43. Total transit VMT is calculated as the on-road VMT only, while total transit runs includes runs for all vehicle types.
44. The passenger vehicle emission factor is derived from a MOVES fleetwide average of passenger vehicle types and model years.
45. Transit systems helped divert nearly 213,656 metric tons of CO_2 in 2022 and 47,000 metric tons of CO_2 in 2021.

Northeast Regions, experience more personal vehicles diverted from the road. Figure 17 shows the CO_2 emissions avoided per region.[46]

Figure 16. Vehicle Trips (In Millions) Avoided Because of NPS Transit Systems



Region key: IMR=Intermountain; NER=Northeast; PWR=Pacific West; SER=Southeast; NCR=National Capital; AKR=Alaska; MWR=Midwest

Source: 2023 NPS transit inventory data

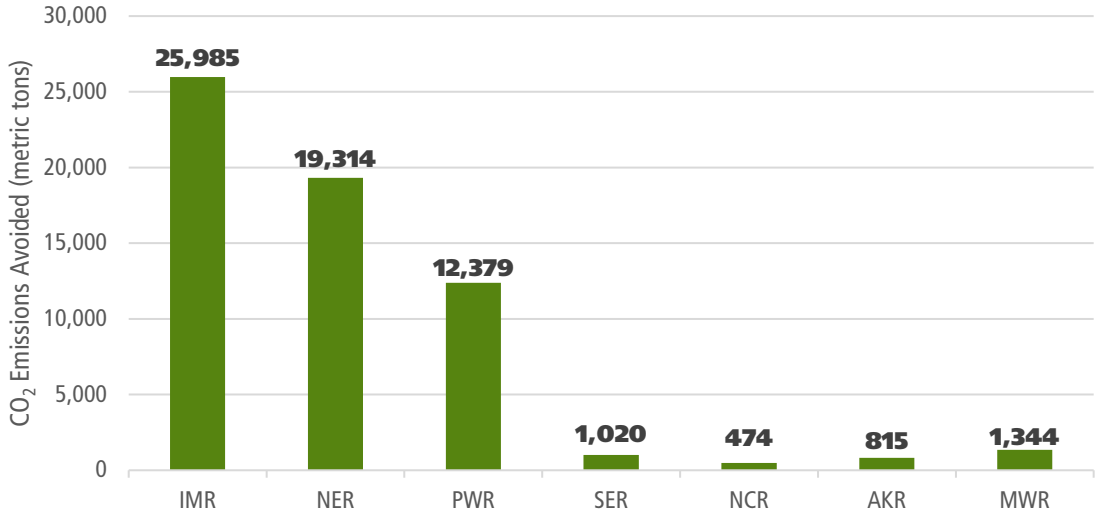
Table 19. Diverted Passenger Trips and CO_2 Emissions Avoided

Factor	IMR	NER	PWR	SER	NCR	AKR	MWR
Diverted passenger vehicle trips	4,881,336	3,628,113	2,235,373	191,628	89,125	153,059	252,501
CO_2 emissions avoided (metric tons)	25,985	19,314	12,379	1,020	474	815	1,344

Region key: IMR=Intermountain; NER=Northeast; PWR=Pacific West; SER=Southeast; NCR=National Capital; AKR=Alaska; MWR=Midwest

46. The average VMT per run across all regions was used to calculate region-specific CO_2 emissions avoided.

Figure 17. Carbon Dioxide Emissions Avoided (in Metric Tons) Per Regions



Region key: IMR=Intermountain; NER=Northeast; PWR=Pacific West; SER=Southeast; NCR=National Capital; AKR=Alaska; MWR=Midwest

Source: 2023 NPS transit inventory data

Criteria Pollutant Emissions Inventories

The following section details the emissions inventories for criteria pollutants and their precursors across the fleets operating in national parks. Vehicle fuel type and terrain type were observed to influence the emissions results. Diesel use results in 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 and generate more road dust from brake and tire wear compared to paved roads. However, fewer vehicles burning fuel has a net positive effect on local air quality in national parks.

Table 20. Comparison of Emission Results

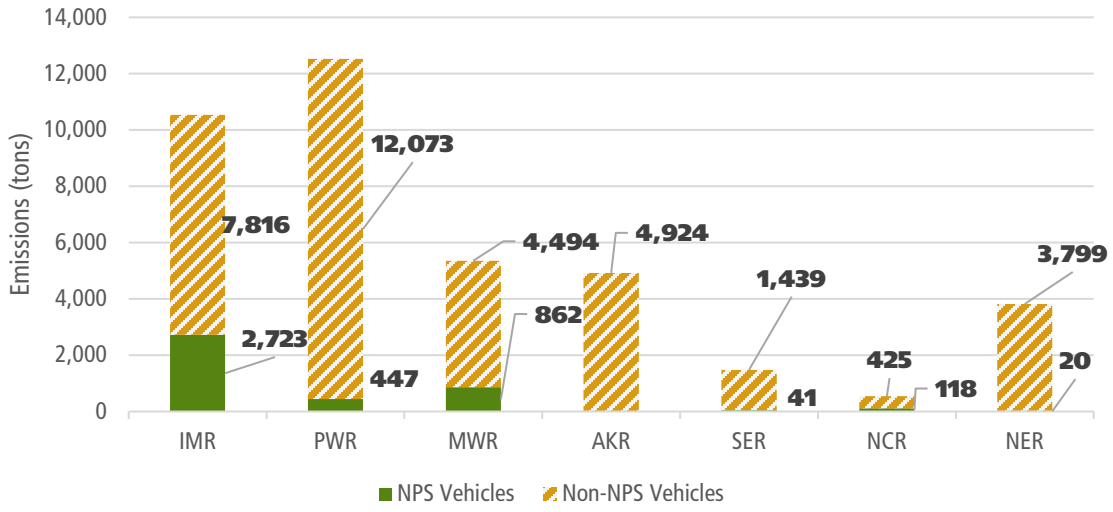
Metrics	2021	2022	2023	Change 2023 vs. 2022 (percent)	Change 2021 vs. 2023 (percent)
Number of operating systems	63	81	91	11%	31%
Count of vehicles	803	817	807	-1%	.5%
Miles traveled	4,925,288	19,953,523	5,102180	-74%	4%
Ferry hours	38,409	43,857	63,041	44%	64%
Carbon dioxide emissions	22,491	54,291.98	39,180.1	-28%	74%
Nitrogen oxide emissions	187.68	319.8	327.8	3%	75%
Volatile organic compound emissions	20.60	35.40	34.5	-3%	68%

Metrics	2021	2022	2023	Change 2023 vs. 2022 (percent)	Change 2021 vs. 2023 (percent)
Carbon monoxide emissions	183.27	370.10	196.1	-47%	7%
Particulate matter 2.5	3.81	6.26	6.8	-9%	79%
Particulate matter[10]	4.29	8.08	7.3	-9%	71%

Source: 2021–2023 NPS transit inventory data

Figure 18 shows the results of MOVES CO_2 emissions modeling for 2023 NPS transit system activity, aggregated to the regional level. The results are separated by ownership (NPS vs. non-NPS systems). Across all regions, NPS transit fleets emitted 4,211 metric tons of CO_2 in 2023 (compared with 24,163 metric tons in 2022 and 4,567 in 2021). The Intermountain Region has the highest VMT of all the regions, thus resulting in the highest CO_2 emissions for NPS vehicles. For non-NPS vehicles, the Pacific West experienced the highest number of ferry miles (distinct from ferry hours), resulting in the highest CO_2 emissions.

Figure 18. NPS Transit System Carbon Dioxide Emissions

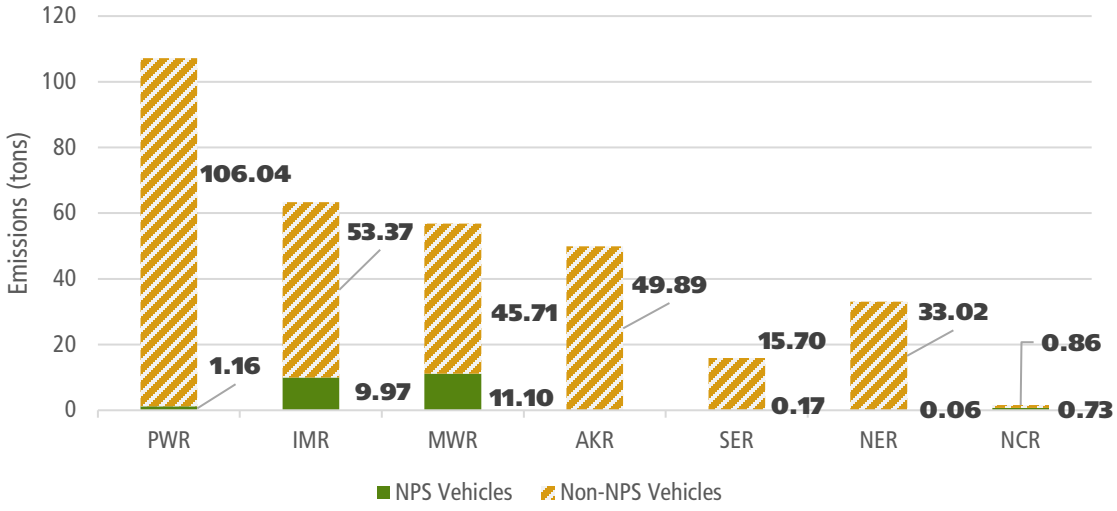


Region key: IMR=Intermountain; PWR=Pacific West; MWR=Midwest; AKR=Alaska; SER=Southeast; NCR=National Capital; NER=Northeast

Source: 2023 NPS transit inventory data

Figure 19 shows the results of MOVES NO_X emissions modeling for 2023 NPS transit system activity, split by ownership. Across all regions, NPS transit fleets emitted 23.18 metric tons of NO_X in 2023. The Pacific West had the highest NO_X emissions due to the large number of ferries operating in the region.

Figure 19. NPS Transit System Nitrogen Oxide Emissions



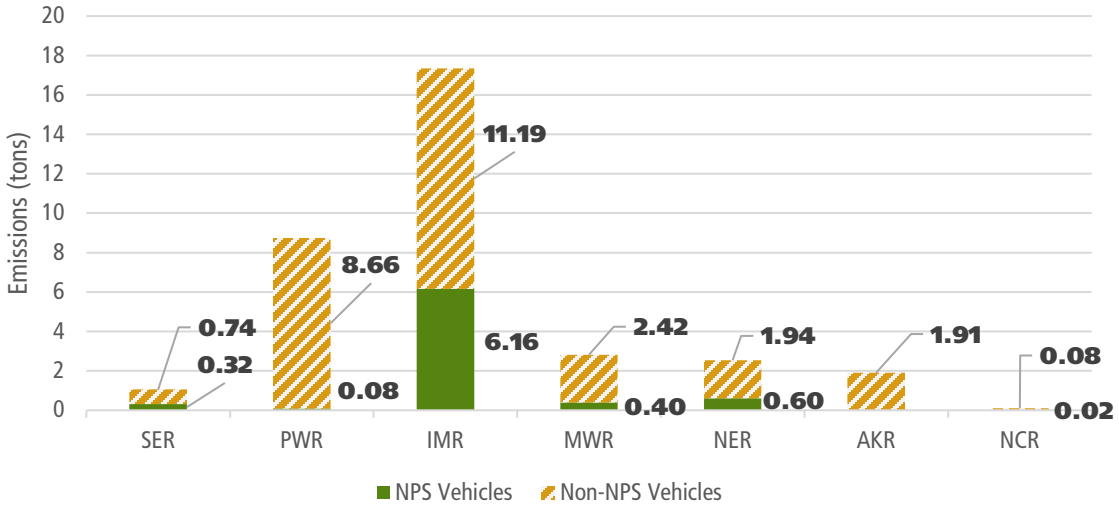
Region key: PWR=Pacific West; IMR=Intermountain; MWR=Midwest; AKR=Alaska; SER=Southeast; NER=Northeast; NCR=National Capital

Source: 2023 NPS transit inventory data

Figure 20 shows the results of MOVES volatile organic compound emissions modeling for 2023 NPS transit system activity, split by vehicle ownership. Across all regions, NPS transit fleets emitted 7.64 metric tons of volatile organic compounds in 2023. Volatile organic compounds combine with other airborne compounds, including NO_X, to produce ozone and photochemical smog.

The NPS fleet in the Intermountain Region emits the highest amounts of volatile organic compounds, as this region has a substantial proportion of vehicles powered by diesel or marine diesel and on-road vehicles powered by propane. Note that the heavy use of propane fueled vehicles in the Intermountain NPS fleet, as well as the decreased efficiency of propane combustion at higher altitudes (i.e., where there is less oxygen), results in greater VOC emissions in this region.

Figure 20. NPS Transit System Volatile Organic Compound Emissions



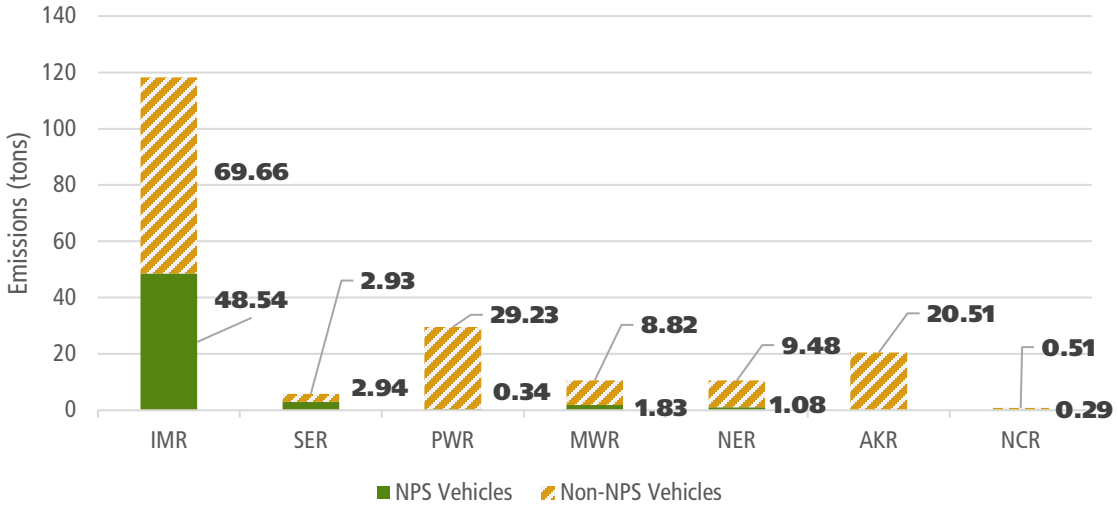
Region key: PWR=Pacific West; IMR=Intermountain; MWR=Midwest; AKR=Alaska; SER=Southeast; NER=Northeast; NCR=National Capital

Source: 2023 NPS transit inventory data

Figure 21 shows the results of MOVES CO_2 emissions modeling for 2023 NPS transit system activity, split by ownership. Across all regions, NPS transit fleets emitted approximately 55.02 metric tons of CO_2 in 2023. The Grand Canyon's heavy use of compressed natural gas (CNG)-fueled buses and shuttles contributes significantly to the Intermountain Region's high relative CO_2 emissions. Compressed natural gas buses emit substantially more CO_2 than conventional fuels but 50% less NO_X.[47] Since NO_X is an ozone precursor, CNG-fueled vehicles are ideal for minimizing smog—a key consideration in parks with long-distance viewsheds. The large number of propane-powered transit vehicles operated at higher altitudes in the Intermountain Region also contributes to increased CO_2 emissions.

47. US Department of Energy, National Renewable Energy Laboratory. 2000. NREL/FS-540-28377.

Figure 21. NPS Transit System Carbon Monoxide Emissions



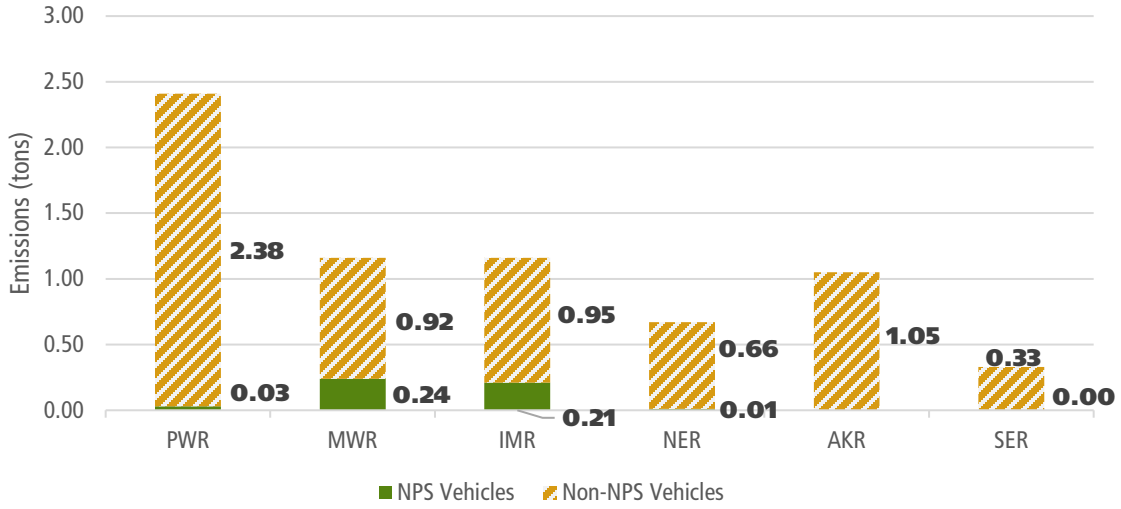
Region key: PWR=Pacific West; IMR=Intermountain; MWR=Midwest; AKR=Alaska; SER=Southeast; NER=Northeast; NCR=National Capital

Source: 2023 NPS transit inventory data

Figure 22 shows the results of MOVES $PM_{2.5}$ emissions modeling for 2023 NPS transit system activity, separated by ownership. Across all regions, NPS transit fleets emitted approximately 0.51 metric tons of $PM_{2.5}$ in 2023. Breathing air with high levels of $PM_{2.5}$ can result in adverse health impacts, including an increased risk of cardiovascular disease and asthma.

Ferries that run on marine diesel, as well as buses fueled by propane, emit significantly more PM than vehicles powered by other fuels. Several parks in the Pacific West Region include exclusively marine transit fleets. In the Intermountain Region, ferries and the propane bus fleet at Glacier National Park contribute to higher PM emissions.

Figure 22. NPS Transit System $PM_{2.5}$ Emissions

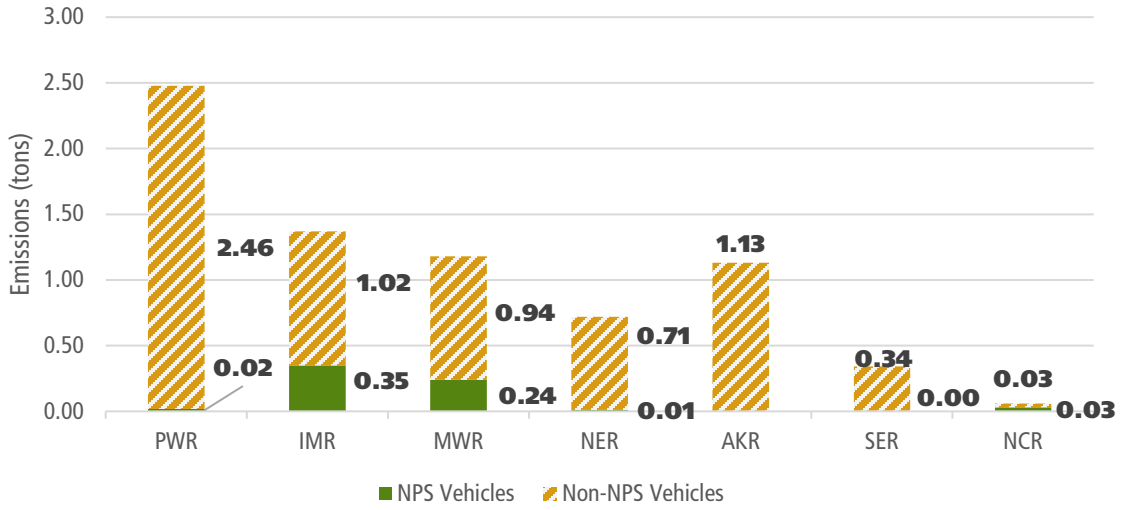


Region key: PWR=Pacific West; IMR=Intermountain; MWR=Midwest; AKR=Alaska; SER=Southeast; NER=Northeast; NCR=National Capital

Source: 2023 NPS transit inventory data

Figure 23 shows the results of MOVES PM_{10} emissions modeling for 2023 NPS transit system activity, split by ownership. Across all regions, NPS transit fleets emitted about 0.70 metric tons of PM_{10} in 2023. Some regions (e.g., Intermountain, Pacific West) produce more PM_{10} than $PM_{2.5}$ in part due to transit systems operating on unpaved roads, which can result in the release of larger particles as fugitive dust.

Figure 23. NPS Transit System PM_{10} Emissions



Region key: PWR=Pacific West; IMR=Intermountain; MWR=Midwest; AKR=Alaska; SER=Southeast; NER=Northeast; NCR=National Capital

Source: 2023 NPS transit inventory data

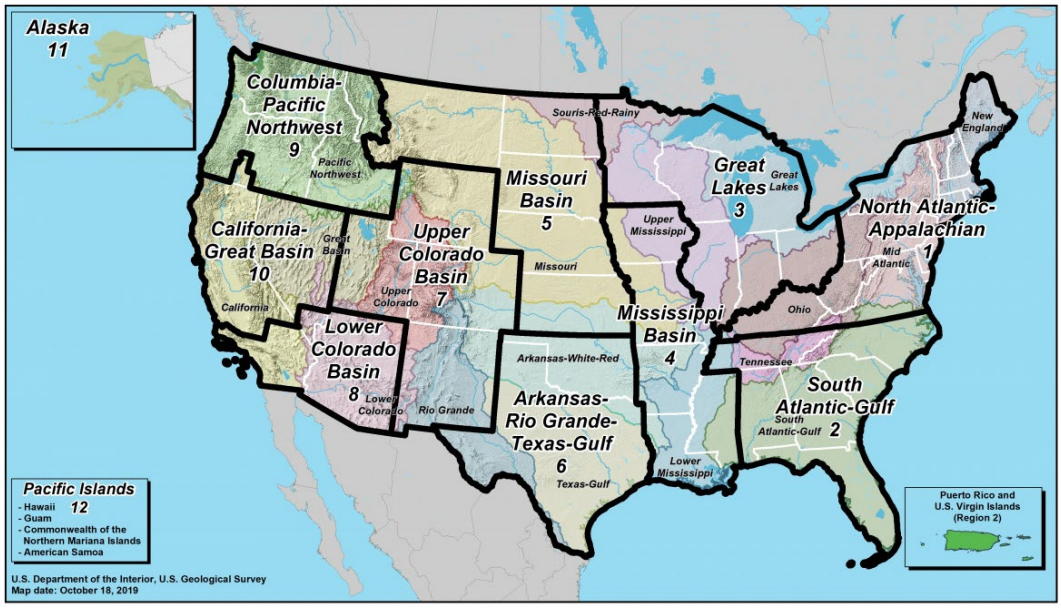
Across all pollutant types, the majority of emissions can be attributed to non-NPS vehicles rather than NPS vehicles. In 2023, new ferry activity contributed to higher emissions in the Intermountain, Northeast, and Pacific West Regions across all pollutants compared to other regions. Carbon dioxide emissions were significantly greater than any of the other pollutants on a mass basis, which is consistent with the Environmental Protection Agency's 2020 National Emissions Inventory.[48] However, emissions from NPS vehicles in 2023 had a minimal impact on the national inventory. In particular, VOC, $PM_{2.5}$, and PM_{10} emissions from NPS vehicles were negligible compared to any other sector and major emitting source in the National Emissions Inventory (e.g., agriculture, power generation).

48. US Environmental Protection Agency. 2020 National Emissions Inventory Data: https://www.epa.gov/air-emissions-inventories/2020-national-emissions-inventory-nei-data.

APPENDIX G: 12 UNIFIED INTERIOR REGIONS AND CORRESPONDING "LEGACY" REGIONAL NAMES

A reorganization of the Department of the Interior to 12 Unified Interior Regions was completed on August 22, 2018. The National Park Service is part of the Department of Interior, and its regions fully align with the new Unified Interior Region boundaries. The following table shows how the 7 "legacy" NPS regions align with the 12 Unified DOI Regions.

12 Interior Region Names Based on Watersheds



"Legacy" NPS Regions	DOI Unified Regions
Alaska (AKR)	Alaska (Region 11)
Intermountain (IMR)	Upper Colorado Basin, Lower Colorado Basin, Arkansas- Rio Grande-Texas-Gulf (Regions 6, 7, and 8)
Midwest (MWR)	Mississippi (Regions 3, 4, and 5)
National Capital (NCR)	North Atlantic-Appalachian (Region 1), National Capital Area only
Northeast (NER)	North Atlantic-Appalachian (Region 1), excluding the National Capital Area
Pacific West (PWR)	Columbia-Pacific Northwest, California-Great Basin and Pacific Islands (Regions 9, 10 and 12)
Southeast (SER)	South Atlantic-Gulf (Region 2)
Alaska (AKR)	Alaska (Region 11)

"Legacy" NPS Regions	DOI Unified Regions
Intermountain (IMR)	Upper Colorado Basin, Lower Colorado Basin, Arkansas- Rio Grande-Texas-Gulf (Regions 6, 7, and 8)
Midwest (MWR)	Mississippi (Regions 3, 4, and 5)
National Capital (NCR)	North Atlantic-Appalachian (Region 1), National Capital Area only
Northeast (NER)	North Atlantic-Appalachian (Region 1), excluding the National Capital Area
Pacific West (PWR)	Columbia-Pacific Northwest, California-Great Basin and Pacific Islands (Regions 9, 10 and 12)
Southeast (SER)	South Atlantic-Gulf (Region 2)