

The National Parks Michigan Mobility Challenge (NPMMC)

Area of Innovation: Small-Scale Electric Shuttles and Automated Driving Systems (ADS)

The Michigan Office of Future Mobility and Electrification (OFME) and the National Park Service (NPS) are exploring options for piloting multi-passenger transit services, such as small-scale electric shuttles (either human-operated or automated driving systems (ADS)-operated). Concepts related to this area of innovation could provide visitors with a greater variety of transportation options, enable them to navigate in and around NPS sites more easily, replace private motor vehicle trips, and reduce the environmental impact of their travel.

OFME and NPS are interested in learning how the next generations of these technologies may perform in a park setting, for connecting visitors to park destinations and surrounding communities, reducing the environmental impact of visitation, alleviating parking and roadway congestion in busy areas, and improving access for persons with disabilities.

What are Small-Scale Electric Shuttles and Automated Driving Systems (ADS)?

Small-scale electric shuttles are aimed to improve the rider experience and offer a cleaner alternative to internal combustion fueled vehicles. These shuttles can be operated on fixed routes and schedules. They have been used to provide first/last-mile service to help expand the reach of fixed-route public transportation services, or to provide service in closed environments. However, in recent years, they have also been operating in mixed-traffic environments, as well. Small-scale electric shuttles may be either human-operated or may use ADS.

Nationwide, the transportation industry has deployed small-scale electric shuttles (both human-operated and ADS-operated) in a variety of settings. ADS-operated shuttles have typically included an on-board human operator as a safety backup. [The National Park Service piloted low speed ADS shuttles in 2021](#) at the Wright Brothers National Memorial and Yellowstone National Park, which allowed NPS to test the suitability of ADS on public lands and in remote locations. These two pilots produced numerous lessons learned that could be applied to other future deployments.

Electric shuttle and ADS technologies continue to evolve, with improvements that may allow them to perform more effectively in a recreational park setting and to meet the needs of a broader section of the population, including persons with disabilities and residents of traditionally underserved communities.

Wanted: Innovators up to the Challenge

OFME and NPS are soliciting submissions from innovative leaders in the industry regarding the feasibility of deploying a small-scale electric shuttle (human-operated or ADS-operated) or other emerging, technology-enabled shared mobility options for visitor transportation on Pierce Stocking Scenic Drive located at South Dunes Highway in Empire, Michigan 49630 within [Sleeping Bear Dunes National Lakeshore \(SLBE\)](#). The aim of this initiative is to explore, demonstrate, and evaluate technologies and innovative service models that can support improved mobility, especially shared mobility, in a recreational park setting. Michigan - a hub for transportation innovation and manufacturing - is in an optimal position to embrace these trends and offer its residents and visitors more accessible and sustainable transportation.

Submissions should describe the technologies and service delivery models that are available for this use case and how they could be integrated to provide safe, accessible, reliable, and sustainable mobility for visitors to this area.

Where do we want to Innovate?

Pierce Stocking Scenic Drive, a popular visitor activity at Sleeping Bear Dunes National Lakeshore, is 7.4 miles, through Beech-Maple forests and sand dunes, offering spectacular overlooks of the Glen Lake, the Sleeping Bear Dunes, and Lake Michigan and providing insight to the history of the area, as well as several ecological communities found within SLBE. The drive is signed at 20 miles per hour (MPH) and is shared by motorized vehicles, bicycles, and pedestrians. Sections of the drive include steep terrain, sharp curves, and heavy traffic. While most of Pierce Stocking Scenic Drive operates as a one-way loop, there is a loop-back cut about halfway through that could be used to make the loop shorter. A small parking area is located at the start of the loop and additional parking areas are located at the four (4) overlooks along the route. The Cottonwood Trail and Sleeping Bear Heritage Trail both connect to the scenic drive and the Windy Moraine Trailhead is nearby across M-109. A Park pass is required for Pierce Stocking Scenic Drive at the Pierce Stocking Entrance Station (Fee Area). The Philip A. Hart Visitors Center and the Park Headquarters are both located in the nearby gateway community of Empire, MI. **Figure 1** outlines the existing Pierce Stocking Scenic Drive route. **Figure 2** illustrates Pierce Stocking Scenic Drive proximate to its gateway communities of Empire, MI and Glen Arbor, MI.

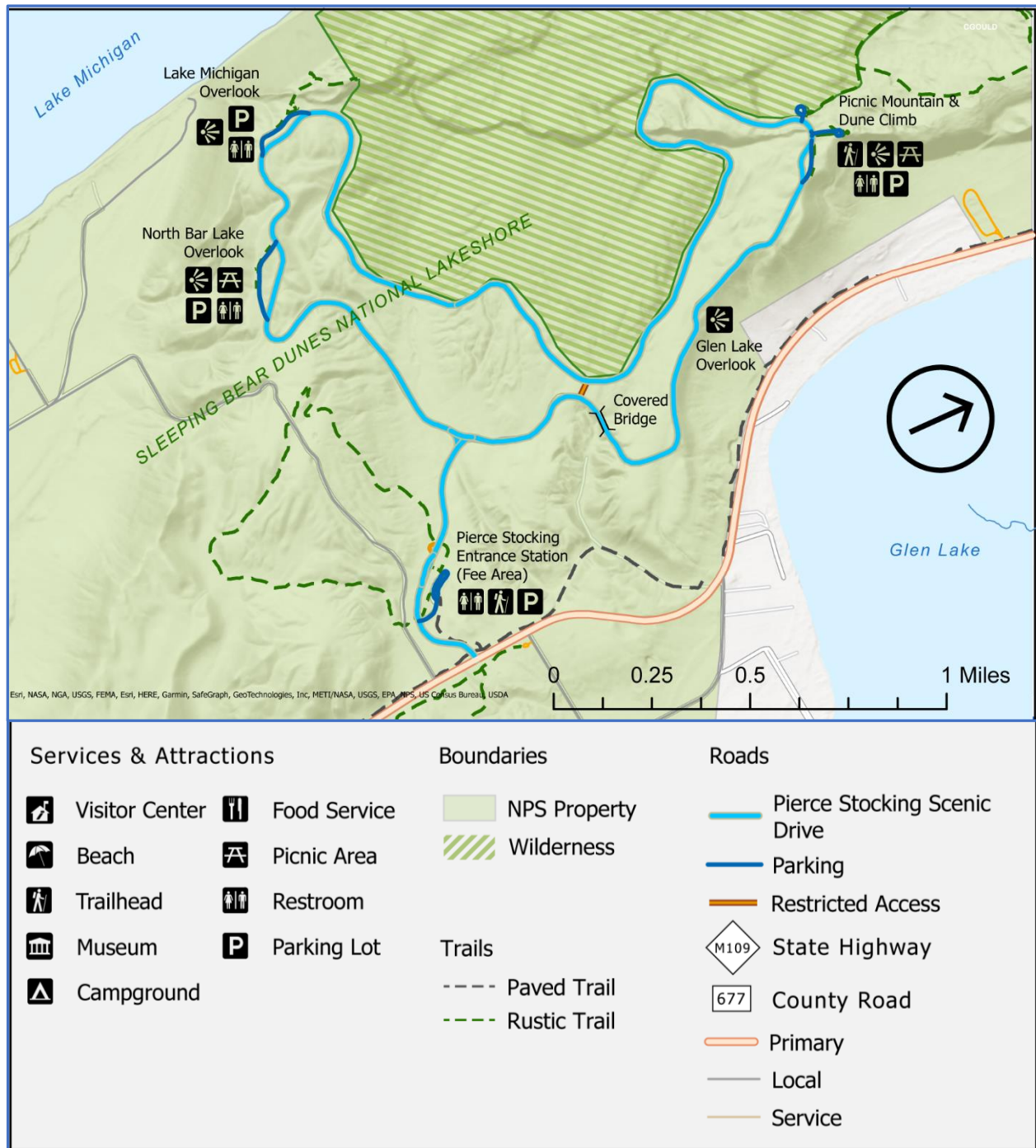


Figure 1: [SLBE Pierce Stocking Scenic Drive](#) Route Map.
 Created by the Western Transportation Institute for the National Park Service, April 2023.

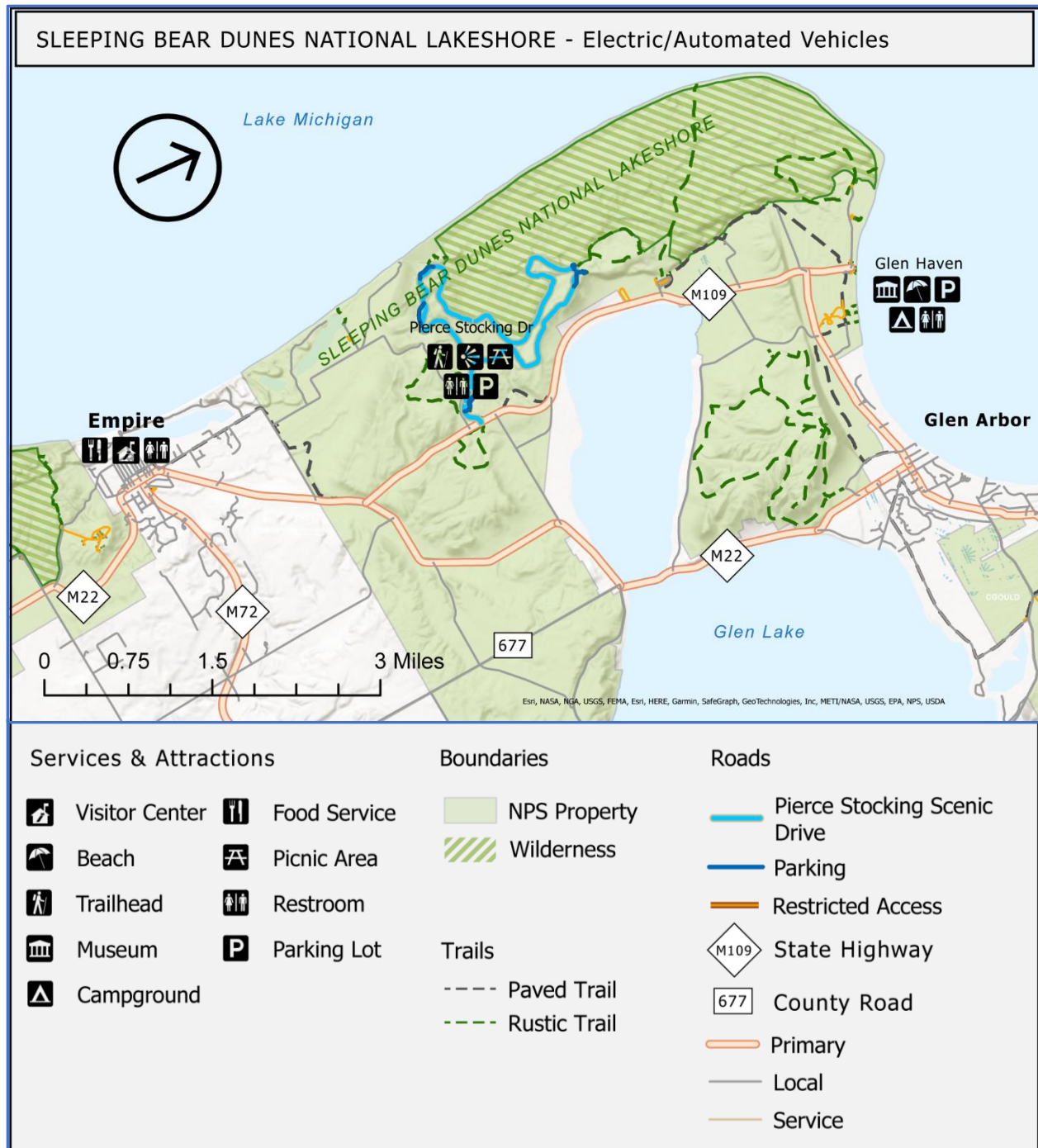


Figure 2: SLBE Pierce Stocking Scenic Drive Route Map and Gateway Communities.
Created by the Western Transportation Institute for the National Park Service, April 2023.

Come Innovate with Us!

Michigan is ready to take on the challenge and welcome visitors to NPS sites across the State with emerging mobility innovations! OFME and NPS are initiating a call for submissions of any concepts, proposals, or general information which may help inform how Small-Scale Electric and ADS can improve the visitor experience at Michigan NPS sites.

OFME and NPS request that any responses to this call for submissions be no longer than five (5) pages and submitted electronically to the Application Portal. The following criteria, while not required for submissions, serves as an overview of the type of information being solicited by the reviewing committee.

Vehicle Type: The EV Shuttles must be electric powered. The vehicle may be either human-operated or ADS-operated. Submissions must include vehicle specifications, including passenger capacity, operating speeds, safety features, and the ability to operate in various environments ranging from rural to urban settings.

The EV Shuttles must be certified to operate in typical weather conditions experienced in the proposed locations, including cold winter conditions with potentially high precipitation and hot/humid summer conditions. Submissions must also describe the vehicles' performance in various environmental or weather conditions, including rain, water on the roadway, windblown leaves, vegetation, sand, snow, and snowbanks.

Compliance with Federal Regulations: Submissions must demonstrate that the EV Shuttles and vendors can comply with Federal regulations, including Americans with Disabilities Act (ADA) accessibility, [Federal Motor Vehicle Safety Standards](#) (FMVSS), and Build America Buy America Act, as well as all relevant State and local guidelines. Submissions must address any concerns or potential issues operating on Federal land. The EV Shuttles must have a National Highway Traffic Safety Administration (NHTSA) certification or a waiver to operate on public roads. Submissions must describe the vehicle's status in regards to the [USDOT NHTSA 15-point safety assessment](#) and whether it has undergone the assessment yet or not.

Automated Driving System (ADS) Compliance: If the EV Shuttles are equipped with ADS, submissions must demonstrate that the ADS can reasonably comply with local, State, and Federal driving laws, regulations, ordinances, licenses, and certifications.

Safety Operator Standards: Submissions must include safety operator standards required for the technologies. Submissions must also describe the insurance/liability approach.

Ownership, Operation, and Maintenance: Submissions must describe who will own, operate, and maintain the EV Shuttles' technologies and associated infrastructure. Please attach letters of intent from all parties with an ownership or operations role.

Required Infrastructure: Submissions must include the required infrastructure for the EV Shuttles, including facilities for vehicle storage and charging stations. The submissions must note any charging infrastructure or system infrastructure necessary to operate the vehicle within both rural and urban settings. Submissions must also include the geolocational equipment required, and any additional components that need to be procured.

Location: The EV Shuttles will operate within a remote park setting. The proposed shuttle routes should be developed to facilitate visitor access to key amenities within the park. Proposed routes should be established in collaboration with park staff and provide safe, accessible, and efficient transportation options.

Proposed Route Designs and Feasibility: Submissions must include proposed route designs and their feasibility. The proposals must address the potential impacts to traffic flows, feasibility of short and longer operating seasons, and specific vehicle capabilities required for the route(s). Submissions must describe how the proposed system will integrate with existing transportation infrastructure and services in the area and how it will address accessibility and equity concerns.

Submissions may also address whether the system could expand to serve nearby areas of the region. Though this pilot is specific to Pierce Stocking Scenic Drive, submissions should also consider the potential for expansion to serve nearby areas of the park, such as the Dune Climb, Glen Haven, D.H. Day Campground, and Glen Arbor, MI. If such a service were established and the park wanted to expand it to nearby areas, submissions must consider whether the system would be able to perform at higher speeds on a full speed 55 MPH+ highway.

Data Management: The pilot project will be evaluated using various data that will be collected throughout the project. The collected data will aid in the evaluation of the EV Shuttles' performance and include ridership, on-time performance, number of trips, battery performance, and the frequency of manual operation by the safety operator. Submissions should include a data management system that can collect and store data on the operation of the EV Shuttles. The data management system should be capable of providing data to the park management team. Submissions should also outline how data will be shared with NPS and stakeholders. Providers should describe how data will be used to improve the shuttle system over time.

Payments: Submissions should describe the intended rate structure for the use of electric vehicle shuttles. The proposed rate structure should be affordable and competitive with other transportation options within the park. Providers should consider offering discounted rates for local residents or individuals with low incomes. Submissions should also outline how payments for the use of the EV Shuttles will be collected.

Costs: Submissions should provide a range of likely costs to set up and operate the EV shuttle system over various timelines, including 30, 60, and 90 days. Providers should describe any potential cost savings that could be realized through economies of scale if the shuttle system were expanded to serve other areas within the region.

Scalability: Submissions should describe the proposed EV Shuttle technology and design and how scalable it is. Providers should outline how the proposed technology can be expanded to serve other areas within the region. Submissions should consider potential economies of scale that could be realized if the EV shuttle system were expanded to other locations within the park or the region.