

# The Future of E-Bikes on Public Lands – Research Synopsis

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The Federal Highway Administration Western Federal Lands Highway Division and the U.S. DOT Volpe Center developed a forthcoming report on the topic of electric “e-bikes” in a public lands context. This research synopsis highlights key findings and area for further research (knowledge gaps) from the report. Findings and gaps are grouped under four research focus areas:

Resources | Safety | Social | Process

Additional details about the study, including information regarding an ongoing e-bikes field experiment, are available online: <https://highways.dot.gov/federal-lands/programs-planning/studies/e-bikes>

## Ecological, Cultural, and Historical Resources

### Key Findings

- One primary study was conducted on e-bike impacts—e-mountain bike (eMTB) specifically—on natural surface trails, which demonstrated no significant difference in soil displacement between eMTBs and conventional mountain bikes.
- Research on conventional bike impacts shows that their presence can disturb wildlife and impact ecosystems but less than other activities; e-bike impacts are expected to be similar but limited research is available.
- E-bikes may serve as an effective alternative to motor vehicles and reduce tailpipe emissions; installing charging stations in public lands could power e-bikes using renewable energy sources.

### Areas for Further Research

- There is only one significant study on the impacts of eMTBs on natural surface trails. Additional experimental research is needed to better understand the impacts e-bikes may have on such trails and whether and how they differ from other trail uses.
- There is little research on whether e-bikes have different impacts on cultural and historical resources when compared to conventional bicycles.
- Prior research on mountain bikes could inform the methodologies researchers use to focus on future eMTBs studies.



## Safety

### Key Findings

- Overall e-bike injury and conventional bike injury patterns are similar, though e-bikers tend to be older and have a higher rate of brain trauma injuries.
- A recent study found that e-bike and powered scooter injury patterns differ from conventional bicycles. E-bike related injuries were more than three times as likely to involve a collision with a pedestrian than either pedal bicycles or powered scooters.
- Research suggests that crash risk is similar between Class 3 and Class 1 e-bikes; however, injury severity tends to be higher among Class 3 e-bikers.
- E-bikes may help to fill an important role as emergency response vehicles and support search-and-rescue teams operating in remote areas.

### Areas for Further Research

- Further research could examine the safety differences between conventional bicycles and different classes of e-bikes.
- Further research could study the difference in safety risks between e-bike classifications. Specifically, research could examine whether the presence of a throttle on Class 2 e-bikes has an impact on safety for users.
- Additional research could consider typical pre-crash conditions on natural surface trails to determine whether they differ from conditions on paved surfaces.

## Social

### Key Findings

- E-bikes require less physical exertion than conventional bicycles and have the potential to support independent mobility for older populations and individuals with mobility impairments.
- The high upfront cost of e-bikes is a barrier to e-bike ownership and ridership.
- Surveys demonstrate that some public lands users fear interactions with e-bikes on public lands, based on perceived risks.
- E-bikes allow people to ride more miles and/or over a longer period, increasing potential benefits and impacts of bicycle use in public lands.
- E-bikes provided by rental companies may encourage use by novice riders who are unfamiliar with e-bike operation and safety.

### Areas for Further Research

- Further research is needed to examine if and how e-bikes change visitor use patterns on public lands. This research could address how increased e-bike use in public lands may affect resources and other recreational activities and users.
- Additional research may focus on what educational resources could be disseminated to public land users to promote proper etiquette.

## Process Management

### Key Findings

- Bicycle advocacy organization People for Bikes asserts that e-bikes are similar enough to conventional bikes that they do not warrant different trail design standards. They refer to industry standards for sustainable mountain bike trail design and trail building process as a resource for land managers.
- There is limited published information on agency coordination of managing e-bike use. However, conversations with existing land managers demonstrate the value of frequent and recurring coordination to effectively manage e-bike use in public lands.

### Areas for Further Research

- Further research is needed to determine if trail design standards need to be modified to accommodate the unique characteristics and rider behaviors on e-bikes.
- Additional research is needed to determine how land management agencies coordinate management of e-bikes with other governments and private enterprise. This includes studying best practices in how Federal and State regulations can better align with one another.

