



Day Use Visitor Access Plan and Environmental Assessment

October 2023



This page intentionally blank.

CONTENTS

Chapter 1: Purpose and Need	1-1
Introduction	1-1
Background	1-1
Purpose and Need for the Day Use Visitor Access Plan	1-2
Purpose of the Plan	1-2
Need for the Plan	1-2
Project Context	1-2
Planning Issues for Day Use Visitor Access	1-5
Natural and Cultural Resources Issues	1-5
Visitor Experience Issues	1-5
Staff and Visitor Safety Issues	1-5
Facilities and Operations Issues	1-6
Relationship to the Park Planning Portfolio	1-6
Visitor Use Management	1-6
Chapter 2: Alternatives	2-1
Introduction	2-1
Strategies Common to All Alternatives	2-1
Visitor Information, Orientation, and Enforcement	2-1
Technology Improvements	2-1
Shuttles	2-1
Transit Partnerships	2-2
Tribal Nation Access	2-2
Private Landowner Access	2-2
Commercial Visitor Services	2-2
Temporary Area Closures for High-Demand Areas	2-2
Alternative A: No Action, Return to Pre-2020 Pilot Management	2-2
Strategies Common to Action Alternatives B, C, and D	2-3
Adopt Zoning and Desired Conditions	2-3
Adopt Indicators and Thresholds	2-5
Timed Entry Reservations for the Bear Lake Road Corridor	2-5
Reservation Systems	2-6
Fees	2-8
Identify Visitor Capacities	2-8

Alternative B: Timed Entry Reservations for Rest of Park and Bear Lake Road Corridor (Proposed Action and NPS Preferred Alternative)	2-9
Alternative C: Daily Reservations for Rest of Park and Timed Entry for Bear Lake Road Corridor	2-10
Alternative D: Temporary Entrance Station Closures for Rest of Park and Timed Entry for Bear Lake Road Corridor	2-11
Alternatives and Actions Considered but Dismissed	2-12
Alternatives Summary Table	2-13
Chapter 3: Affected Environment and Environmental Consequences	3-1
Introduction	3-1
Methodology	3-1
Visitor Access, Use, and Experience	3-1
Affected Environment	3-1
Environmental Consequences	3-9
Comparative Conclusion Across Alternatives	3-16
Socioeconomics	3-18
Affected Environment	3-18
Environmental Consequences	3-26
Comparative Conclusion Across Alternatives	3-30
Alpine Tundra	3-31
Affected Environment	3-31
Environmental Consequences	3-36
Comparative Conclusion Across Alternatives	3-40
Lakeshore and Streamside Vegetation	3-41
Affected Environment	3-41
Environmental Consequences	3-43
Comparative Conclusion Across Alternatives	3-49
Wilderness Character	3-50
Opportunities for Solitude or Primitive and Unconfined Recreation	3-52
Affected Environment	3-52
Environmental Consequences	3-53
Comparative Conclusion Across Alternatives	3-56
Wilderness Character: Natural	3-57
Affected Environment	3-57
Environmental Consequences	3-58

Chapter 4: Consultation and Coordination	4-1
Appendix A: History of Day Use Visitor Management at Rocky Mountain National Park	A-1
Appendix B: Desired Conditions and Zoning.....	B-1
Appendix C: Indicators and Thresholds.....	C-1
Appendix D: Visitor Capacity	D-1
Appendix E: Actions and Alternatives Considered but Dismissed	E-1
Appendix F: Impact Topics Considered But Dismissed from Detailed Analysis.....	F-1
Appendix G: Public Involvement and Consultation	G-1
Appendix H: References	H-1

FIGURES

Figure 1. Rocky Mountain National Park Visitation 1990–2022	1-3
Figure 2. Park Overview	1-4
Figure 3. The VUM Framework (IVUMC 2016).....	1-7
Figure 4. Proposed Day Use Zones	2-4
Figure 5. Bear Lake Road Corridor.....	2-6
Figure 6. Beaver Meadows Entrance Hourly Counts by Year (NPS pers. comm. 2023)	3-4
Figure 7. Rocky Mountain National Park Recreational Visitation by Month	3-8
Figure 8. Projected Vehicle Entries to Beaver Meadows Entrance Station by Alternative, with the Y-Axis Displaying Percentage of Daily Vehicles and X-Axis Displaying Time of Day. The Dashed Lines Represent Projected Patterns and Volumes.....	3-17
Figure 9. Annual Visitor Spending in the Estes Park Local Marketing District from 2012 to 2021 (Dean Runyan Associates 2022)	3-20
Figure 10. Annual Sales Tax Revenue in Grand Lake, Colorado (Town of Grand Lake, Colorado 2023).....	3-21
Figure 11. Number of Annual Visitors Participating in Commercial Services and Number of Commercial Use Authorizations, by Year (CUA Annual Reports).....	3-23
Figure 12. Annual Percentage of Visitors Participating in Guided Activities Compared to Annual Visitation (CUA Annual Reports)	3-23
Figure 13. Rocky Mountain National Park Ecoregions	3-34
Figure 14. Alpine Visitor Center Parking Lot Occupancy	3-36
Figure 15. Average Hourly Count of Visitors at Colorado River Trailhead	3-47

TABLES

Table 1. Visitor Use Management Framework and the Planning Process	1-8
Table 2. Summary of Indicators, Thresholds, and Related Triggers	2-5
Table 3. Identified Visitor Capacities.....	2-9
Table 4. Estimated Number of Daily Reservations for Private Vehicles in Alternative B	2-10
Table 5. Projected Number of Daily Reservations for Private Vehicles in Alternative C	2-11
Table 6. Alternatives Summary	2-13

Chapter One Purpose and Need

1



This page intentionally blank.

CHAPTER 1: PURPOSE AND NEED

INTRODUCTION

Rocky Mountain National Park (the park) is a place of inspiration, reflection, wonder, history, and wilderness adventure. Park visitors from across the United States and the world discover a wide variety of experiences that are found only in this incredible place.

Visitation to Rocky Mountain National Park grew dramatically in recent years, increasing from fewer than 3 million visits in 2010 to a peak of 4.6 million visits per year in 2019, with a rapid increase that began during the park’s centennial in 2015. In 2020, visitation dropped to 3.3 million, primarily due to access changes during the COVID-19 pandemic and two major wildfires during which the park was closed to visitation. In 2021, visitation rebounded to 4.4 million. When not actively managed, visitor use in the park is concentrated midday, with specific visitor experiences, like the Bear Lake Road Corridor and the Alpine Visitor Center, seeing the highest demand.

Day use visitation has grown rapidly. During this time of growth, staff observed negative impacts on natural and cultural resources, diminished quality of the visitor experience, increased visitor and staff safety concerns, and a heavy strain on the park’s facilities and the staff’s ability to perform daily operations. The high-use visitor season at the park no longer coincides with summer but extends into the fall and starts earlier in the spring. During winter, park facilities above tree line are not accessible to vehicle-based visitors, which condenses park visitors in frontcountry areas that can be accessed by plowed roads. On winter weekend days and holidays, park visitation spikes, and with fewer places to go, results in visitor densities that are comparable to peak summer weekdays.

The National Park Service (NPS) is proposing to implement a day use visitor access plan for Rocky Mountain National Park to ensure quality visitor experiences in a way that preserves the natural, cultural, wilderness, and recreational resources of the park in the long term.

BACKGROUND

Rocky Mountain National Park was established in 1915. The foundation document describes the 265,761-acre park's purpose, significance, and fundamental resources and values. As part of this day use visitor access planning process, park staff reviewed zoning and established desired conditions that incorporate the park’s fundamental resources and values.¹

Rocky Mountain National Park Land Acknowledgement Statement:

Rocky Mountain National Park acknowledges, with respect, Native people have been successful stewards of this land since time immemorial. We understand that the park is located within the ancestral and traditional homeland of the Ute, Arapaho, and Cheyenne. Many other Tribes used this land including the Comanche, Shoshone, and Dakota/Lakota. The park continues to work with Tribes today.

1. For more information on zoning and desired conditions, see “Chapter 2: Alternatives” and appendix B. The foundation document can be found at https://www.nps.gov/romo/learn/management/upload/ROMO_Foundation_Document.pdf.

PURPOSE AND NEED FOR THE DAY USE VISITOR ACCESS PLAN

The purpose and need statement set the parameters for the development of a proposed action and alternatives.

Purpose of the Plan

The purpose of the day use visitor access plan is to provide day use visitor access in a way that protects and enhances the fundamental resources and values for which the park was designated and to achieve and maintain desired conditions.

Desired conditions are defined as “a park’s natural and cultural resource conditions that the National Park Service aspires to achieve and maintain over time, and the conditions necessary for visitors to understand, enjoy, and appreciate those resources” (NPS *Management Policies* 2006).

Need for the Plan

This plan is needed to provide park managers with a comprehensive and long-term approach to manage day use visitor access to the park in a way that protects natural and cultural resources, maintains positive visitor experiences, promotes visitor and staff safety, and supports the ability of park staff to maintain facilities and perform daily operations. The plan is needed to allow park managers to maintain desired conditions throughout the park, including the 95% of the park area that is managed as wilderness, and manage day use visitation temporally and spatially.

PROJECT CONTEXT

The overwhelming majority of park visitors are day use rather than overnight users. The park has no lodges inside the park boundary. Overnight visitation is available in one of the park’s 570 campground sites or through a wilderness camping permit for more than 260 wilderness campsites. A snapshot of park visitor use shows that in the summer, only 1% of overnight visitors staying in the local area are camping in the backcountry (Cullinane, Flyr, and Koontz 2022).

A socioeconomic research report surveyed visitors to Rocky Mountain National Park and identified numerous visitor use characteristics that are pertinent to this plan (Cullinane, Flyr, and Koontz 2022). Results from the report provide information on where visitors travel from and why they visit the park:

- About a quarter of respondents (a combined 23%) stated that they were either permanent or seasonal residents of the local area around Rocky Mountain National Park.
- A large concentration (26%) of visitors is from Colorado (where the park is located).
- Most visitors also indicated that they viewed wildlife (90%) and hiked (79%).
- Most visitors chose “to view wildlife or natural scenery” (66%) and “to spend time with family/friends” (62%) as extremely important reasons for their trip to the park. Other important reasons were “to relax” and “to hear sounds of nature/quiet.”
- The plurality of respondents (41%) reported hiking as their primary activity, followed by viewing scenery, natural features, and other features (38%). Horseback riding,

running/jogging, road cycling, and technical climbing were all uncommon activities (reported by 5% or fewer of respondents).

Colorado’s population grew by nearly 16% between 2010 and 2022, from 5 million in 2010 to about 5.8 million in 2022 (US Census Bureau 2023). Most of that population growth occurred along Colorado’s Front Range region (e.g., greater metropolitan areas of Denver, Fort Collins, and Boulder). Park visitation has increased from fewer than 3 million visits in 2010 to a peak of 4.6 million visits per year in 2019.

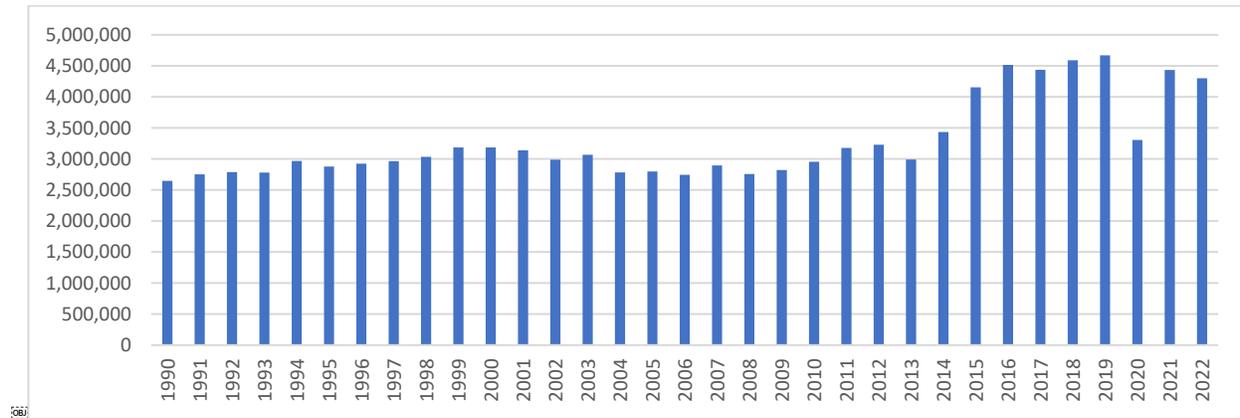


FIGURE 1. ROCKY MOUNTAIN NATIONAL PARK VISITATION 1990–2022

Managing visitor use has a long history at Rocky Mountain National Park. In 2016, park leadership began piloting several management strategies to assess their potential for alleviating issues created by rapidly increasing visitation. These pilot programs informed the development of the day use visitor access plan.²

2. For more information on pilots, see appendix A.



Park Overview Map

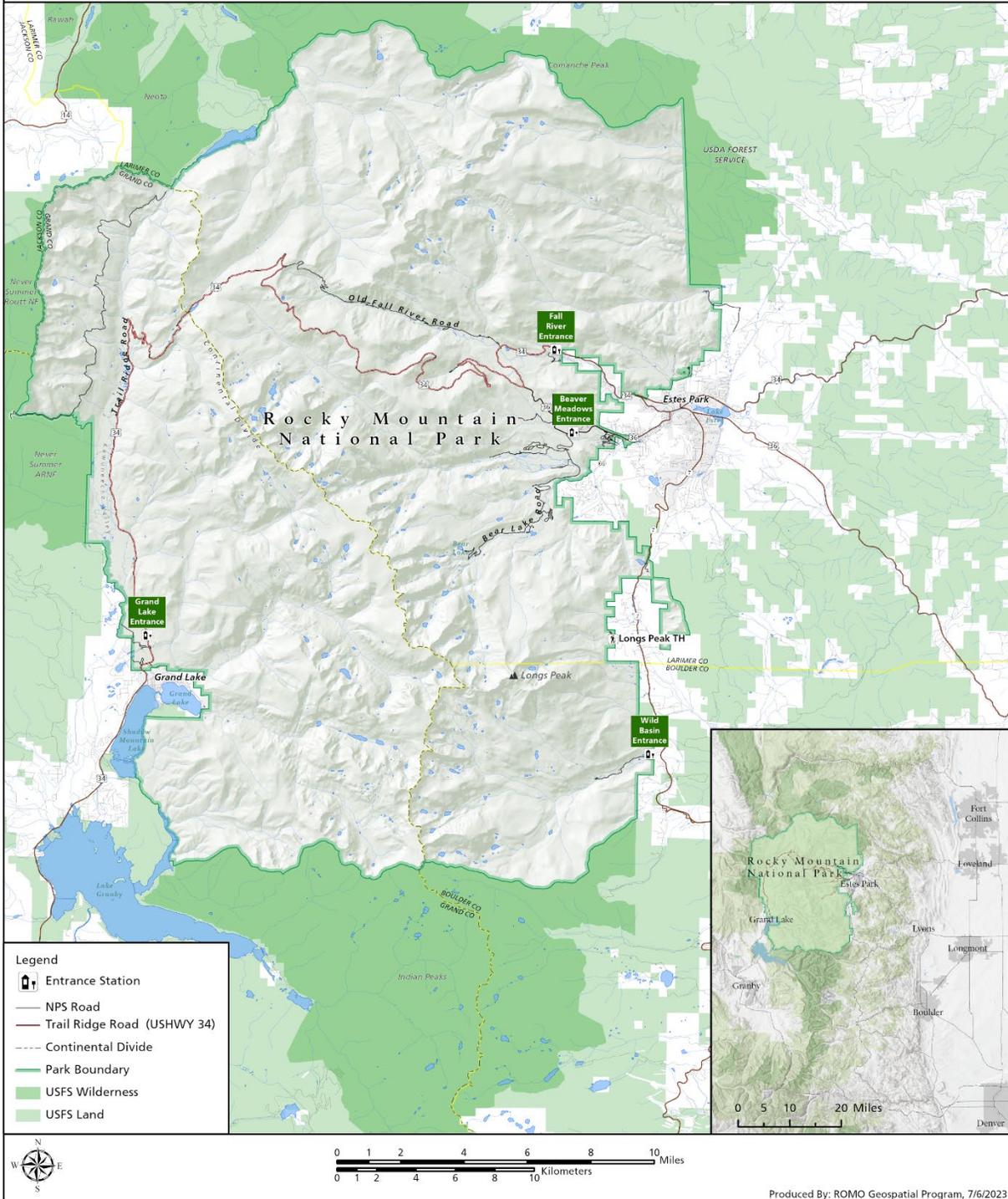


FIGURE 2. PARK OVERVIEW

PLANNING ISSUES FOR DAY USE VISITOR ACCESS

Park staff have observed a wide range of issues when visitor use is concentrated temporally and spatially. Issues that arise from concentrated use impact four primary objectives that this plan is trying to address.

Natural and Cultural Resources Issues

Highly concentrated visitor use in key destinations leads to the development of visitor-created trails, widening of existing trails, and impacts on soil, vegetation, and water quality. These impacts lead to natural and cultural resource damage such as impacts on sensitive environments (e.g., alpine tundra), soil compaction, and erosion. Nonrenewable resources, such as culturally significant archeological sites, are located throughout the park and are not always obvious to the public. Visitor impacts on these sites through visitor-created trails can result in historic and cultural resources being permanently lost for future generations.

Congestion on roadways and in parking areas leads to illegal roadside parking that causes resource damage to soil and vegetation. Furthermore, concentrated vehicle use impacts historic resources, particularly the historic road networks and landscapes that were designed for much lower volumes of use. For example, constant two-way traffic on narrow gravel roads can impact roadside vegetation, contribute to soil compaction, and damage historic resources. Relatedly, concentrated volume of vehicles is frequently observed, causing air quality concerns and the deposition of heavy metals and other environmental contaminants from exhaust.

Visitor Experience Issues

Visitors and staff have observed that the quality of visitor experience is diminished when vehicular and visitor use levels concentrate in key areas in the park. Vehicle volume leads to traffic delays and greater demand than is available for parking at popular destinations. Higher visitation rates increasingly impact the quality of a variety of recreational uses, such as hiking, fishing, rock climbing, scenic driving, and other activities. Frequently hearing or seeing other visitors in the wilderness can impede the ability of visitors to experience the solitude quality of wilderness character, detract from wildlife viewing, and affect natural soundscapes.

During times of higher, concentrated visitation, rangers focus more on managing crowds and congestion. As a result, the opportunities for visitors to interact positively with rangers, including for ranger-led educational programs and orientation, has been decreasing. Visitors do not have the opportunity to receive important educational and safety messages; basic visitor services, such as daily maintenance of park bathrooms; and roving interpretation, as they are impeded by the roadway traffic. All of these factors degrade visitors' ability to experience the park's fundamental resources and values.

Staff and Visitor Safety Issues

Increased visitation, congestion, and crowding have led to delayed emergency response times, visitor-to-visitor and visitor-to-staff conflicts, blocked vehicle egresses, and impacted shuttle bus routes because of increased vehicle presence on the roads. Congestion and roadside parking inhibit traffic flow and create unsafe conditions. Increased visitation impacts staff's ability to move around the park, respond to emergencies, access worksites, and resolve conflicts. These impacts lead to more occurrences of illegal activity, including fires, graffiti and vandalism, traffic

violations, and wildlife feeding. Visitor frustration about the diminished visitor experience—including long waits at the gates and scarcity of parking—leads to hostile interactions between visitors and park staff, impacting visitor and staff safety.

Facilities and Operations Issues

Park staff cannot provide a range of educational opportunities for visitors, perform natural and cultural resource protection, conduct restoration activities, and perform basic maintenance on roads and other park facilities due to traffic and parking volumes in developed areas because staff either cannot access areas or are pulled from their duties to manage congestion.³ Increased use of roads, trails, and facilities speeds up deterioration and increases replacement and repair times. In many cases, facilities were simply not constructed to handle current visitation levels, and components like septic systems cannot handle the increased waste without supplemental pumping and maintenance.

RELATIONSHIP TO THE PARK PLANNING PORTFOLIO

The plan will complement the park's Backcountry/Wilderness Management Plan and environmental assessment (2001) and Final Master Plan (1976). As part of the park's planning portfolio, this plan will help the park meet general management plan statutory requirements identified in the National Parks and Recreation Act of 1978 (54 United States Code [USC] 100502), including identifying carrying capacities and implementation commitments for areas of the park and the types and intensities of development.⁴

VISITOR USE MANAGEMENT

The National Park Service strives to optimize access, opportunities, and benefits for visitors in a particular area while achieving and maintaining desired conditions for resources and visitor experience, and ultimately, preventing impairment of park resources and values. This plan applies the visitor use management (VUM) framework (figure 3 (IVUMC 2016)) to align decisions about visitor access to the park with protecting and maintaining desired conditions for resources and experiences.⁵

3. Since 2013, the park has seen a decrease (-13%) in the number of permanent and seasonal employees. Base funding is one factor that influences staffing, but available housing, supervisor ratios, and the federal hiring process also impact the number of employees that are hired each year. While increasing staffing could help alleviate some issues identified in this plan, overall objectives could not be met with additional staffing alone. For example, adding more staff to a location would not alleviate crowding and congestion or provide opportunities for solitude along wilderness trails. Staffing levels are a condition that the park manages within, not a condition that can be solved through a planning process alone. Park managers are undertaking separate planning efforts to help staffing issues, including rebuilding housing lost to the East Troublesome Fire.

4. A park planning portfolio is the collection of planning documents that guides decision-making and satisfies law and policy.

5. Additional information on the VUM Framework and supporting guidebooks can be found at <https://visitorusemanagement.nps.gov/>.

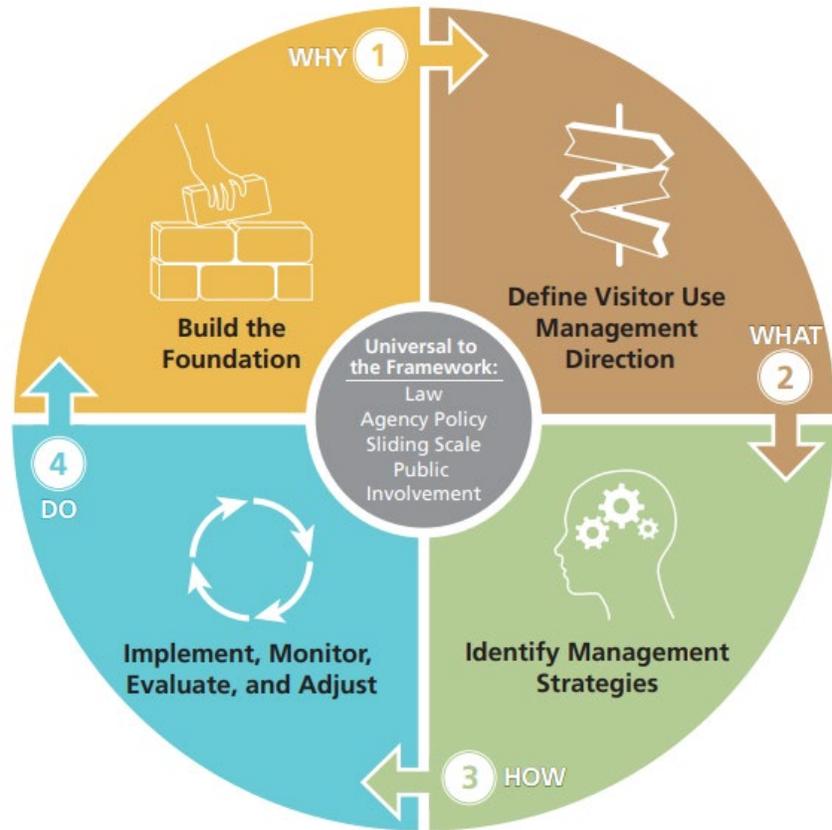


FIGURE 3. THE VUM FRAMEWORK (IVUMC 2016)

See table 1 for the elements of this process and where you can find each element of the VUM framework in this plan.

Table 1. Visitor Use Management Framework and the Planning Process

Visitor Use Management Framework Elements	Framework Steps and Corresponding Environmental Assessment Chapter Location
<p>Element 1: Build the Foundation</p> <p>Building the foundation is the first of the four elements of the visitor use management framework. The purpose of this element is to help managers understand what needs to be done, how to organize the plan, and how to define the resources needed to complete the plan.</p>	<ol style="list-style-type: none"> 1. Clarify the plan purpose and need (chapter 1). 2. Review the area’s purpose and applicable legislation, agency policies, and other management direction (chapter 1). 3. Assess and summarize existing information and current conditions (e.g., current conditions of natural, cultural, and recreation resources and visitor experience opportunities in the area) (chapter 3). 4. Develop a plan strategy (chapter 1).
<p>Element 2: Define Visitor Use Management Direction</p> <p>The purpose of this element is to answer critical questions about what the planning effort is trying to achieve and the acceptable levels of impacts from visitor use.</p>	<ol style="list-style-type: none"> 5. Define desired conditions for the planning area (chapter 2; appendix B). 6. Define appropriate visitor activities, facilities, and services (chapter 2; appendix B). 7. Select indicators and establish thresholds (chapter 2; appendix C).
<p>Element 3: Identify Management Strategies</p> <p>This element is intended to help managers identify management strategies and actions to achieve and maintain the desired conditions of the plan area. This element also identifies visitor capacity. The goal of element 3 is to define how visitor use would be managed to achieve desired conditions.</p>	<ol style="list-style-type: none"> 8. Compare and document the differences between existing and desired conditions; for visitor use-related impacts, clarify the specific links with visitor use characteristics (chapter 3). 9. Identify visitor use management strategies and actions to achieve desired conditions (chapter 2). 10. Where necessary, identify visitor capacities and strategies to manage use levels within capacities (chapter 2; appendix D). 11. Develop a monitoring strategy (chapter 2; appendix C).
<p>Element 4: Implement, Monitor, Evaluate, and Adjust</p> <p>This element focuses on implementing management actions, monitoring, evaluating monitoring results, and adjusting management strategies and actions based on monitoring results. This phase of the planning process focuses on making progress toward meeting desired conditions, as well as evaluating potential unintended consequences of the actions for visitors or resources.</p>	<ol style="list-style-type: none"> 12. Implement management actions. 13. Conduct and document ongoing monitoring and evaluate the effectiveness of management actions in achieving desired conditions. 14. Adjust management actions, if needed, to achieve desired conditions and document rationale.

Chapter Two Alternatives

2



This page intentionally blank.

CHAPTER 2: ALTERNATIVES

INTRODUCTION

This chapter describes in detail four alternatives for managing day use visitation at Rocky Mountain National Park. It includes a description of the no-action alternative (alternative A), which would be a return to the management of the park before the timed entry reservation pilots in 2020–2023, and while this alternative does not meet the purpose and need for this plan, it provides a basis for comparing the impacts of other alternatives. The chapter also describes three additional alternatives (alternatives B, C, and D) to achieving the purpose and need for the plan (see several actions that would be common to these alternatives below).

STRATEGIES COMMON TO ALL ALTERNATIVES

The following strategies are common to all alternatives (including the no-action alternative). The National Park Service places strong emphasis on avoiding, minimizing, and mitigating potentially adverse environmental impacts. Therefore, the National Park Service would implement mitigation measures and best management practices, as described in this section, to protect the natural and cultural resources that plan implementation could affect and minimize potential adverse impacts on the fundamental resources and values of Rocky Mountain National Park. Unless otherwise specified, the authority for these mitigations comes from the NPS Organic Act and *NPS Management Policies 2006*.

Visitor Information, Orientation, and Enforcement

Park staff would continue to provide seasonally focused educational materials for trip planning, orientation, Leave No Trace outdoor ethics, and park information. The materials would explain shuttles and other visitor use strategies to help visitors decide what opportunities best meet their desired experience and to build park stewards. Staff would continue to use signage to delineate roads, trails, and parking areas to prevent resource damage and improve the visitor experience. Staff would continue to manage signage on trails in accordance with the Backcountry/Wilderness Management Plan. Enforcement of existing parking restrictions would continue.

Technology Improvements

Information about congestion and parking availability would be monitored and disseminated as practicable for the available technology and infrastructure (e.g., using live web cameras, variable message signs, and navigation apps).

Shuttles

Park staff would maintain a shuttle system as funding allows and ridership supports. Shuttle buses would continue to operate in the Bear Lake Road Corridor during the summer season.⁶ Shuttle buses allow visitors to leave their car at the Park & Ride parking lot and take the shuttle to key trailheads and destinations in the road corridor. In conjunction, visitors would continue to have

6. For additional information on shuttles, see <https://www.nps.gov/romo/playourvisit/shuttle-buses-and-public-transit.htm>.

the opportunity to ride the shuttle bus from Estes Park into the park and transfer to the park shuttle as funding allows.

Transit Partnerships

The National Park Service would continue to seek partnerships, like the one with the Colorado Department of Transportation's Bustang seasonal service, to provide access to the park from cities in Colorado's Front Range. These services enhance connectivity between urban areas and the park, which may benefit individuals without access to private transportation or those who prefer not to drive their personal vehicle. Partnerships would be managed to meet desired conditions across all alternatives.

Tribal Nation Access

Rocky Mountain National Park is situated in the ancestral and traditional homeland of the Ute, Arapaho, and Cheyenne. Many other Tribes used this land. Members of Associated Tribal Nations would continue to have access for traditional uses.

Private Landowner Access

Privately owned lands exist inside Rocky Mountain National Park. These property owners would continue to have access to their properties.

Commercial Visitor Services

Commercial visitor services would continue to be reviewed and approved through concessions contracts and/or commercial use authorizations.

Temporary Area Closures for High-Demand Areas

Across all alternatives, park staff would implement temporary (less than one day) area closures based on monitoring indicators to ensure that desired conditions for resources and experiences are being maintained and achieved. These closures would be in addition to other closure actions that are in place for longer time periods (e.g., area closures for raptor nesting). Staff would implement temporary closures when an unexpected change occurs in visitor use (e.g., a social media post makes a previously minimally used area suddenly popular) until staff can implement other management strategies to achieve desired conditions. The temporary closures to parking lots or roadway corridors would use a metering approach, allowing access until a threshold is met (indicating that many, if not all, parking lots are full) and reopening when traffic and parking congestion is alleviated. When reservations are also used, these closures would likely be infrequent and short in duration. Without reservations, this action becomes a primary mechanism to manage use, and, therefore, these closures would be more frequent and longer in duration (see alternatives A and D).

ALTERNATIVE A: NO ACTION, RETURN TO PRE-2020 PILOT MANAGEMENT

Under this alternative, park staff would manage visitor use in a similar way to how it was managed before implementing the pilot timed entry reservation systems (i.e., before 2020). The park would be accessed on a first-come, first-served basis and the National Park Service would close areas of the park when visitor demand for parking lots exceeds supply.

Park managers would continue to manage the wilderness area in accordance with the classes and indicators and standards described in the Backcountry/Wilderness Management Plan.

Under this alternative, visitor use would continue to be concentrated spatially and temporally, meaning that popular destinations would receive the most use during peak times (e.g., from 9:00 a.m. to 3:00 p.m.). To maintain roadway safety and necessary egress, park staff would close the area to vehicles from entering corridors or areas once they reach parking capacity (e.g., Bear Lake Road, Wild Basin, and/or the Alpine Visitor Center) until the area could accommodate more visitor use. Temporary area closures would be unpredictable in range and duration depending on the level of visitation and generally would last for hours each day. Parking capacity would be reached on an almost daily basis in the summertime, with fewer temporary area closures during winter months. Rangers would manage traffic as staffing allows and as congestion spreads to new park areas requiring new closures. Staff interactions with visitors would be limited and focused largely on traffic management activities. The use of area closures to protect sensitive resources (e.g., protection of rare plants or meadow closures to protect wildlife) may also increase as park capacity for restoration and patrol would not be able to accommodate the need.

STRATEGIES COMMON TO ACTION ALTERNATIVES B, C, AND D

The following management strategies are practical approaches to manage day use in the park and, therefore, do not vary by action alternative.

Adopt Zoning and Desired Conditions

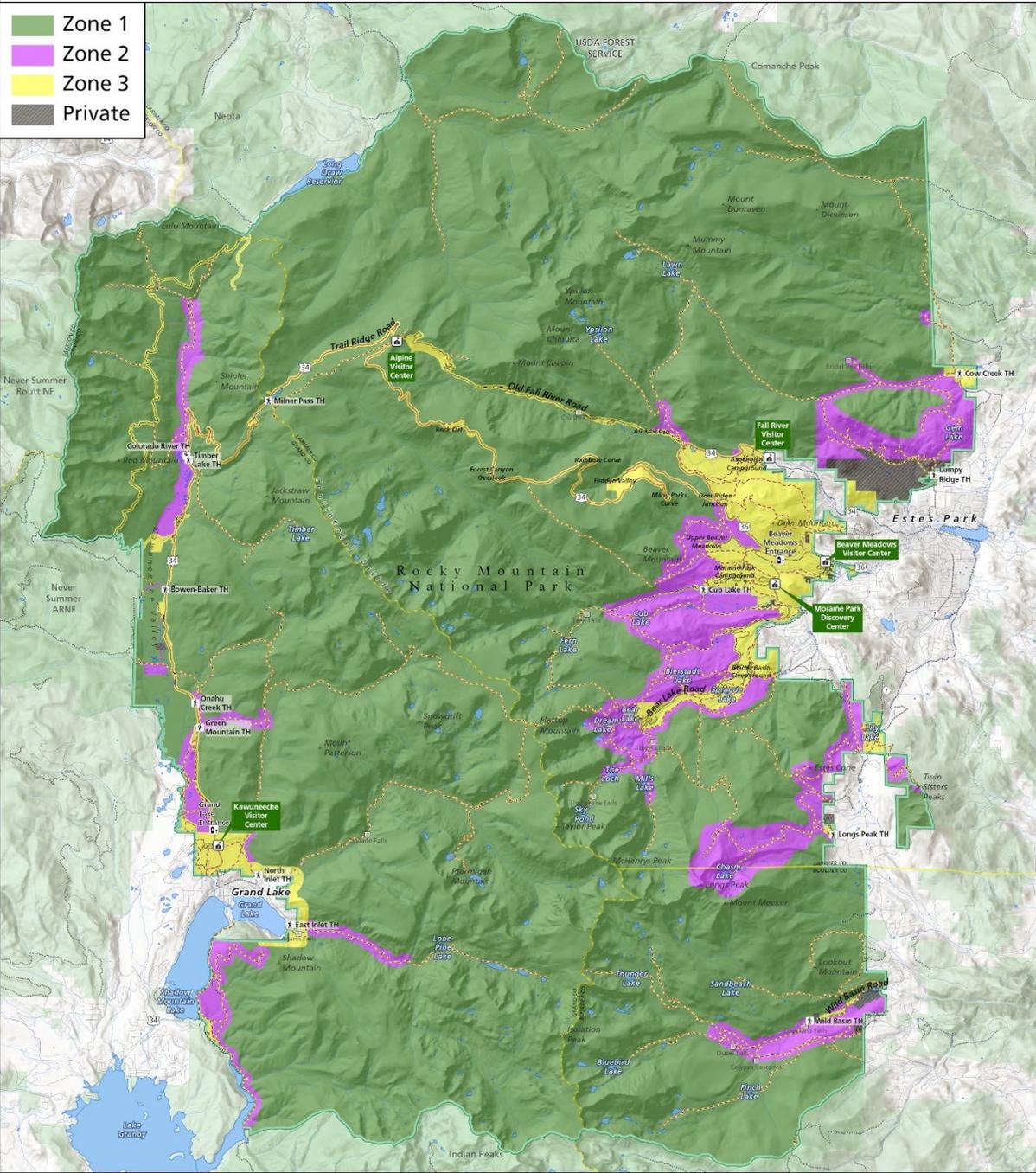
Across all action alternatives, this plan would establish management zones for day use and desired conditions in those zones.⁷ The zoning and desired conditions from this plan complement the park's Backcountry/Wilderness Management Plan (NPS 2001). Park staff identified zones and desired conditions to clarify the answer to the question, "what are we managing for?" in terms of day users in each area of the park. Each alternative was developed to be compatible with attaining these desired conditions, as well as meeting the purpose and need for the plan. Common to all action alternatives, the park would start managing to three day-use zones. Proposed day use zones are described in appendix B and shown in figure 4.

7. For more information on zones and desired conditions, see appendix B.



Day Use Zones

- Zone 1
- Zone 2
- Zone 3
- Private



Produced By: ROMO Geospatial Program, 7/6/2023
Projection: NAD 1983 (2011) UTM Zone 13N

FIGURE 4. PROPOSED DAY USE ZONES

Adopt Indicators and Thresholds

Under any action alternative, indicators and thresholds would be established. This iterative practice of monitoring, implementing management strategies, and then continuing to monitor to gauge the effectiveness of those actions would allow park managers to maximize the benefits for visitors while achieving and maintaining desired conditions for resources and visitor experiences in a dynamic setting. These indicators, along with other recurring and ongoing monitoring at the park, will inform if and when reservation system adaptations are needed.⁸

Table 2. Summary of Indicators, Thresholds, and Related Triggers

Indicator	Threshold
Visitor encounters on zone 1 trails	<p>Low-use areas: no more than two group encounters per hour 90% of the time</p> <p>Moderate-use areas: no more than four encounters per hour 90% of the time</p> <p>High-use trails: no more than seven group encounters per hour 90% of the time</p>
People per viewscape (PPV) at key visitor use sites	<p>No more than the following PPV amount for each location below, 90% of the sampled time:</p> <ul style="list-style-type: none"> - Alluvial Fan Trail: 17 PPV - Gem Lake Trail: 11 PPV - Lumpy Ridge Trail: 11 PPV - Glacier Gorge Trail: 7 PPV - Alberta Falls (at base of falls): 24 PPV - Dream Lake: 7 PPV - Emerald Lake: 15 PPV - Ouzel Falls: To be determined (TBD) - Sun Valley Trail: TBD - Colorado River Trail: TBD - Longs Peak Trail: TBD
Vehicle use levels in Bear Lake Road Corridor	<p>Days during the reservation season: Vehicles per day and vehicles at one time do not exceed the design capacity of the corridor more than 20% of the time.</p> <p>Days outside of the reservation season: Vehicles per day and vehicles at one time do not exceed the design capacity of the corridor (i.e., parking lots, roadway and authorized roadside parking areas) more than 20% of the time.</p>
Frequency of unendorsed parking	Unendorsed parking occurs no more than 20% of the sampling events per location
Ecological disturbance in congregation areas	Objective: Total bare ground, per day use zone, should decrease over the duration of the plan until standards are met.

Timed Entry Reservations for the Bear Lake Road Corridor

Across all action alternatives, park staff would require visitors in private vehicles and on the Hiker Shuttle to obtain a timed entry reservation to access the Bear Lake Road Corridor and other areas of the park. For purposes of this plan, this corridor is defined as the northern point on

8. For a full explanation of indicators and thresholds, see appendix C.

Bear Lake Road at the intersection with Beaver Meadows Road (Highway 36) and all associated roads that branch off Bear Lake Road in the corridor to the Bear Lake parking area at the end of the road (figure 5). The reservation system would allow for visitor arrivals within a distinct block of time (e.g., from 12:00 p.m. to 2:00 p.m.) on the day of the reservation. Upon initial implementation of this plan, this system would be in place from May through October from 5:00 a.m. to 6:00 p.m. each day.



FIGURE 5. BEAR LAKE ROAD CORRIDOR

Reservation Systems

Across all action alternatives, park staff would adaptively manage both the timed entry reservation for the Bear Lake Road Corridor and any reservation system described in the subsequent alternatives and based on monitoring indicators to ensure that desired conditions for resources and visitor experiences are being maintained and achieved (see “Adopt Zoning and Desired Conditions” and appendix B). Park staff may adjust a reservation or timed entry system if the following occur:

- a change is occurring (based on the monitoring of indicators), and it is of a magnitude and direction (approaching thresholds) for which park managers need to take action; and
- the change in conditions is likely a result of the amount of use occurring, and a change in visitor use levels will prevent unacceptable resource impacts.

The following components of a reservation or timed entry system may shift annually, depending on factors including, but not limited to, visitor use patterns, staff availability, and shuttle operations. Any changes to the reservation system would be within the range of adaptive

management strategies listed below and would be communicated with the public before implementation.

- **Seasonality.** All reservation systems would initially be implemented during the summer season and summer shoulder months, May through October. However, changing visitor use patterns (e.g., an increased interest in winter recreation) or climate change effects (e.g., later snowfalls in fall/early winter) may lead to increased visitation during historically lower-use seasons. Consequently, park staff may expand the number of days or weeks when a reservation system would be implemented should the monitoring of relevant indicators show this to be necessary. The following modifications to reservation system seasonality may result:
 - a need for reservations to start earlier in the spring,
 - a need for reservations to go later into the fall, and/or
 - a need for reservations to be implemented for winter weekends and/or holidays.
- **Time of Day.** Times when reservations would be required are described in each alternative. Changing visitor use patterns (e.g., visitors arriving earlier or more visitors using the afternoon/evening periods) may signal the need for a change in the time of day when reservations are required. Park staff may change the number of hours per day when a reservation system would be implemented, should monitoring of relevant indicators show this to be necessary. This adjustment may result in reservation systems starting earlier or later in the day (e.g., changing from a 9:00 a.m. start time to 7:00 a.m.). The change may also result in reservation systems ending earlier or going later into the afternoon/evening (e.g., changing from a 3:00 p.m. end time to 4:00 p.m.). For timed entry reservations specifically, the window of duration in which the permit would grant access to the park or corridor may be adapted (e.g., from two hours to four hours. These would be adjusted to maximize visitor access and convenience while maintaining desired conditions.
- **Distribution.** Reservations would be made available to the public for purchase using a variety of time frames, from several months in advance to night before or day of sales. The exact duration and allocation of these reservations would be evaluated each year and communicated with the public before implementation.
- **Exceptions.** Vehicles entering the park for nonrecreational purposes (e.g., administrative use) or with special use permits (e.g., weddings, First Amendment activities) are not included in the reservation systems. Visitors with an overnight reservation at a campground or wilderness camping permit would not be required to also purchase a reservation to enter the park. However, park staff may change this requirement if use levels need to be adjusted to manage within identified capacities and achieve desired conditions.
- **Bicycle Use.** Bicycle access (including e-bikes) may be subject to the reservation system in the future should use levels increase and necessitate proactive management to ensure that

use levels are consistent with desired conditions.⁹ Roadway safety or high numbers of bicycles parked at trailheads could be monitored as indicators in the future. Change in these indicators could warrant a need to consider bicycles in the reservation system.

Fees

Operation and management of the reservation system would be funded through an expanded amenity fee associated with each reservation. The expanded amenity fee would cover both the cost of operating and managing the reservation system, as well as any fees associated with the Recreation.gov platform.¹⁰

Commercial Visitor Services

Concession contract holders would not be required to acquire reservations, as market entry is already managed via the competitive contract bid process. Commercial use authorization (CUA) holders would not be required to acquire reservations (as described in the action alternatives) as long as total CUA clients remain below 2% of average annual visitation.¹¹ To monitor CUA client numbers, the park would continue to require CUA operators to report their annual visitor use statistics. If the 2% threshold is exceeded for two consecutive years, then park staff would develop a reservation system specific to CUA operators and would communicate these changes before implementation.

Identify Visitor Capacities

Visitor capacity is the maximum amounts and types of visitor use that an area can accommodate while achieving and maintaining the desired resource conditions and visitor experiences that are consistent with the purposes for which an area was created. By identifying and managing the maximum amount and types of visitor use (visitor capacities), the National Park Service can help ensure that resources are protected and visitors have the opportunity for a range of high-quality experiences, not only today but for future generations, as directed by the NPS Organic Act (1916) (54 USC 100101).

The implementation of visitor capacities is considered a part of the alternatives and is common to all action alternatives. Visitor use levels best meet desired conditions when use is dispersed throughout the day, rather than when use occurs at concentrated times, causing pulsing visitation patterns. When visitation is concentrated, desired conditions for resource protection and visitor experience are not maintained. Table 3 includes the identified visitor capacities for the analysis areas where the visitor capacity is directly related to plan actions, and these actions are needed to manage within this capacity. See appendix D for other identified capacities (where no immediate

9. For regulations on bicycle use, see the Rocky Mountain National Park Compendium: https://www.nps.gov/romo/learn/management/rmnp_compendium.htm.

10. The expanded amenity fee per reservation would be approximately \$3–\$4.

11. Average client numbers are based on the 2017–2022 (excluding 2020 due to COVID-19) annual CUA use reports, guided activities for historic attractions, and annual total visitor statistics. The difference between the current use of 1.2% to a threshold use of 2% allows for moderate, acceptable growth in current CUA visitation and additional activities that may require a CUA in the future. Park managers consider 2% or less as an acceptable level of CUA use, as it represents a very small amount of overall visitation and is in line with CUA use at comparable park units.

action is needed to manage to these capacities in this plan) and additional details on these analysis areas.

Table 3. Identified Visitor Capacities

Analysis Area	Proposed Visitor Capacity
Wild Basin	The proposed capacity is 300 people at one time.
Fall River Pass (Alpine Visitor Center Area)	The proposed capacity is 420 people at one time
Longs Peak	The proposed capacity is 580 people per day.
Bear Lake Road Corridor: Summer	The proposed capacity for the corridor is 6,000 people at one time.
Bear Lake Road Corridor: Winter	The proposed capacity is 2,200 people at one time.

ALTERNATIVE B: TIMED ENTRY RESERVATIONS FOR REST OF PARK AND BEAR LAKE ROAD CORRIDOR (PROPOSED ACTION AND NPS PREFERRED ALTERNATIVE)

Under this alternative, all visitors in private vehicles entering Rocky Mountain National Park would be required to obtain one of two reservations during peak seasons and days when the reservation system is in effect: either a timed entry reservation for the Bear Lake Road Corridor, which is common to all alternatives and would provide access to the Bear Lake Road Corridor and all other areas of the park, or a rest-of-park timed entry reservation, which would only provide access to areas outside of the Bear Lake Road Corridor (such as Trail Ridge Road, Kawuneeche Valley, Wild Basin, Longs Peak, Lumpy Ridge, and East Portal). Reservations would be both for entry during a specific time frame (e.g., 8:00 a.m.–10:00 a.m.) and on a specific day. Upon initial implementation of this plan, this system would be in place from May through October from 9:00 a.m. to 3:00 p.m. each day.¹²

The timed entry reservation system under this alternative is intended to distribute visitation more evenly across the park throughout the day, while protecting fundamental resources and values and managing for desired conditions. Furthermore, the separate reservation for the rest of the park maximizes park entry to the extent practicable and allows visitors who want to experience other areas to obtain a reservation without competing with visitors who want to go to the Bear Lake Road Corridor and its associated trails.

Number of Reservations Available

The number of reservations available for private vehicles and Hiker Shuttle users would correspond with actions needed to manage within the desired conditions of the park. The estimated number of reservations applies to the reservation system during initial implementation, as described above. After initial implementation of the reservation system using the estimated numbers below, the number of reservations may be adjusted to optimize visitor access while managing within related thresholds and identified visitor capacities.

12. While not exactly the same, this alternative is most similar to the pilot program in place during summer 2022 and 2023.

Table 4. Estimated Number of Daily Reservations for Private Vehicles in Alternative B

Location	Estimated Private Vehicle and Hiker Shuttle Reservations ^{a, b}
Bear Lake Road Corridor ^c	2,940 reservations
Rest of the park ^d	1,875 reservations

a. Estimates are based on observed use levels during the summers of 2021 and 2022.

b. Estimated numbers of reservations were determined based capacity analyses for areas of the park, hourly vehicle entry counts, average number of people per private vehicle, and average parking lot turnover rates. The park uses a visitation scenario management tool to estimate volume of vehicles at one time under different scenarios.

c. Numbers here assume time of day and seasonality for initial implementation as described in “Strategies Common to Action Alternatives B, C, D.”

d. Numbers here assume time of day and seasonality for initial implementation as described above for this alternative.

ALTERNATIVE C: DAILY RESERVATIONS FOR REST OF PARK AND TIMED ENTRY FOR BEAR LAKE ROAD CORRIDOR

Under this alternative, during the peak season and on peak days when the reservation system is in place, visitors entering the park in private vehicles would be required to obtain one of two reservations: either a timed entry reservation for the Bear Lake Road Corridor, which is common to all alternatives and would provide access to the Bear Lake Road Corridor and all other areas of the park, or a rest-of-park daily reservation, which would only provide access to areas outside of the Bear Lake Road Corridor (such as Trail Ridge Road, Kawuneeche Valley, Wild Basin, Longs Peak, Lumpy Ridge, and East Portal). Unlike timed entry with reservations blocks (e.g., 12:00 p.m. –2:00 p.m.), daily reservations to areas outside the Bear Lake Road Corridor would allow more opportunities for flexibility and spontaneity, as visitors with reservations could arrive at any time during the daily reservations window (e.g., 9:00 a.m.–3:00 p.m.). Upon initial implementation of this plan, daily reservations for the rest of the park would be in place from May through October from 9:00 a.m. to 3:00 p.m. each day.

The purpose of the daily reservation system under this alternative is to distribute use temporally throughout the week or season and achieve desired conditions, while allowing visitors with reservations to enter at any time of the day. Due to the concentrated visitation that the Bear Lake Road Corridor receives, a separate timed entry reservation allows park management to maximize the number of visitors who can access the Bear Lake Road Corridor area while still maintaining desired conditions. Furthermore, the separate reservation for the rest of the park allows visitors who want to experience other areas to obtain a reservation without competing with visitors who want to go to the Bear Lake Road Corridor.

Number of Reservations Available

The number of reservations available would correspond with actions needed to manage within desired conditions. Under this type of system, it is expected that there would be a “peak arrival” period in the mid-morning hours (as historically observed under the no-action alternative). Therefore, the number of reservations in this alternative is designed to be consistent with desired conditions and identified capacities during this peak period of the day. The estimated number of reservations applies to the reservation system during initial implementation, as described above. After initial implementation of the reservation system, the number of reservations may be adjusted to maximize visitor access of the existing sites within related thresholds and identified visitor capacities.

Table 5. Projected Number of Daily Reservations for Private Vehicles in Alternative C

Location	Estimated Private Vehicle and Hiker Shuttle Reservations ^{a, b}
Bear Lake Road Corridor ^b	2,940 reservations
Rest of the park ^c	940 reservations

a. Estimated numbers of reservations were determined based capacity analyses for areas of the park, hourly vehicle entry counts, average number of people per private vehicle, and average parking lot turnover rates. The park uses a visitation scenario management tool to estimate volume of vehicles at one time under different scenarios.

b. Estimates are based on observed use levels during the summers of 2021 and 2022.

c. Numbers here assume time of day and seasonality for initial implementation, as described in “Strategies Common to Action Alternatives B, C, D.”

d. Numbers here assume time of day and seasonality for initial implementation, as described above for this alternative.

Other Actions by Area

Longs Peak Trailhead. Under this alternative, park staff would implement a required educational permit.¹³ Areas accessed from this trailhead include extensive alpine landscapes with several safety hazards and resources especially sensitive to visitor use impacts. An educational requirement would increase the likelihood that visitors minimize their impact on resources and are adequately prepared to access hazardous terrain.

A limited use permit could be implemented if the educational requirement does not have the intended effect to achieve desired conditions. If this strategy is needed in the future, additional environmental analysis will be done as appropriate.

ALTERNATIVE D: TEMPORARY ENTRANCE STATION CLOSURES FOR REST OF PARK AND TIMED ENTRY FOR BEAR LAKE ROAD CORRIDOR

Under this alternative, the park would require timed entry reservations for visitors in private vehicles seeking to access the park and visit Bear Lake Road Corridor (which is common to all action alternatives and would also provide access to the rest of the park) and would use temporary closures (e.g., two to four hours) at entrance stations to manage access for visitors in private vehicles who only want to visit areas outside the Bear Lake Road Corridor. These temporary closures would be triggered based on the number of vehicles that had entered the park for that day. Once a set number of vehicles enters the park, entrance stations would close and remain closed until the identified areas are able to accommodate more use while maintaining desired conditions.¹⁴ Gates connected to the same roadway systems would all be managed together as one closure. Visitors would face uncertainty related to closures, but past use patterns suggest daily closures would be implemented at the Beaver Meadows, Fall River, Grand Lake, and Wild Basin entrances from May through early October lasting two to four hours. Due to traffic and safety concerns, visitors would not be permitted to queue at entrance stations and would be advised to leave and return when entrance stations reopen. Reopening may not be predictable,

13. Data from national park units suggest that preventative search and rescue strategies, such as education or permit systems, have led to a decrease in the number of annual search and rescue operations (Malcolm and Heinrich 2017).

14. The specific number will vary by season and other factors (e.g., how many lots are open and the number of available spaces). This will help to ensure that all vehicles entering the park have a legal place to park. Based on observed use patterns, gates would likely need to close when around 1,900–2,100 total vehicles enter the park through the entrances at Beaver Meadows, Fall River, and Grand Lake entrances. These entrances would all open and close together. The Wild Basin entrance would close at about 110 total vehicles to manage within the identified capacity of that area.

and visitors would need to monitor park information (e.g., check social media or call the park information line) for gate status. Areas would reopen when staff have identified there is sufficient parking in key lots (e.g., Alpine Visitor Center) to accommodate more vehicles. Visitors with a reservation for the Bear Lake Road Corridor could still enter Bear Lake during their reservation time at Beaver Meadows, Fall River, or Grand Lake Entrance.

ALTERNATIVES AND ACTIONS CONSIDERED BUT DISMISSED

The planning team considered other alternatives and potential actions, including those identified through civic engagement that were determined infeasible and/or not responsive to the purpose and need for action. These actions and the rationale for not carrying them forward for further analysis are summarized in appendix E.

ALTERNATIVES SUMMARY TABLE

Table 6. Alternatives Summary

Alternative	Alternative A: No Action	Alternative B: Timed Entry Reservations for Rest of Park and BLRC* (NPS Preferred)	Alternative C: Daily Reservations for Rest of Park and Timed Entry for BLRC	Alternative D: Temporary Entrance Station Closures for Rest of Park and Timed Entry for BLRC
Alternative statement	Access for private vehicles would be on first-come, first-served basis.	All private vehicles entering the park would be required to obtain a timed entry reservation for either the BLRC or a timed entry reservation for the rest of the park.	All private vehicles entering the park would be required to obtain either a timed entry reservation to the BLRC or a daily reservation for the rest of the park.	All private vehicles entering the BLRC would be required to obtain a timed entry reservation. Access for vehicles entering the rest of the park would be on a first-come, first-served basis, with entrance stations closing after a set number of vehicles have entered until identified areas could accommodate more visitors.
Reservations for rest of the park	N/A	Timed entry reservations would be required.	Daily reservations would be required.	No reservations would be required; gates would close when park reaches capacity.
Number of daily reservations available	N/A	BLRC: 2,940 Rest of park: 1,875	BLRC: 2,940 Rest of park: 940	BLRC: 2,940 Rest of park: N/A
Expected daily vehicle volume	8,800 vehicles	7,300 vehicles	7,000 vehicles	Unknown and highly variable. Likely less than 6,600 vehicles.
Projected change in daily visitation compared to alternative A	N/A	Decrease of approximately 8% during the season in which the reservation system is in effect.	Decrease of approximately 21% during the season in which the reservation is in effect.	Decrease of approximately 25% during the season in which the reservation system is in effect.
Reservations for BLRC	N/A	All private vehicles and Hiker Shuttle users would be required to obtain a timed entry reservation to access the BLRC during reservation hours.	Same as alternative B.	Same as alternative B.

Alternative	Alternative A: No Action	Alternative B: Timed Entry Reservations for Rest of Park and BLRC* (NPS Preferred)	Alternative C: Daily Reservations for Rest of Park and Timed Entry for BLRC	Alternative D: Temporary Entrance Station Closures for Rest of Park and Timed Entry for BLRC
Adaptive management	N/A	The reservation system would be managed adaptively to maximize visitor access while maintaining desired conditions.	Same as alternative B.	Same as alternative B.
Private vehicle restrictions	Corridors and other areas would close for varied amounts of time (e.g., 2–4 hours). Closures would be unplanned but could be anticipated daily during peak season.	No closures anticipated. Temporary closures could be implemented during a sudden change in visitation to protect park resources and visitor experiences.	Same as alternative B.	Entrance stations would close unpredictably for varied amounts of time (e.g., 2–4 hours). Closures could be anticipated daily during peak season. Visitors with timed entry for the BLRC could still enter.
Other area-specific actions	N/A	N/A	Visitors would be required to obtain an educational permit to use the Longs Peak Trailhead.	N/A
Other actions	<ul style="list-style-type: none"> • Continued visitor information, orientation, and enforcement focus. • Technology improvements. • Continued use of shuttles as funding allows. • Continued Tribal Nation access. • Continued private landowner access. • Continued transit partnerships. • Continued special use permits. • Temporary closures, as needed for high-demand areas. 	<p>Same as alternative A plus:</p> <p>Park staff would manage within visitor capacities.</p> <p>Day use in the park would be zoned and desired conditions established.</p> <p>Indicators and thresholds would be established to monitor for desired conditions.</p>	Same as alternative B.	Same as alternative B.

* BLRC – Bear Lake Road Corridor

Chapter Three Affected Environment and Environmental Consequences

3



This page intentionally blank.

CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter describes the current and expected future condition of visitor use and experience; socioeconomics; alpine tundra; lakeshore and streamside vegetation; opportunities for solitude in wilderness; and the natural quality of wilderness character that may be affected by the alternatives under consideration, including the reasonably foreseeable environmental trends and planned action(s) in the area (40 CFR 1502.15). The effects of the proposed actions under each alternative are compared to the conditions of the resources. The resources relate to the key issues, and this impact analysis will inform the NPS decision on how to provide day use visitor access in a way that protects and enhances the park's fundamental resources and allows visitors to have high-quality experiences. Impact topics considered but dismissed from detailed analysis are described in appendix F.

METHODOLOGY

This chapter is organized by impact topic. The affected environment, or the current and expected future conditions of the resource, is presented first and includes a discussion of trends and past, present, and reasonably foreseeable future actions. For the purposes of this analysis, the affected environment describes the conditions of the resources primarily from 2020 to 2023, when the piloted timed entry reservation systems were in place at the park. The impacts of the no-action alternative describe the condition of the environment before the initiation of the first timed entry reservation system pilot program in 2020 (i.e., conditions of the resource primarily from 2010 to 2019). The "Environmental Consequences" section evaluates the direct, indirect, and cumulative impacts of implementing each alternative (Council on Environmental Quality regulations 1508.1[g]).

A comparative conclusion of the impacts across alternatives is included for each impact topic.

VISITOR ACCESS, USE, AND EXPERIENCE

Affected Environment

This section describes current conditions related to visitor access, use, and experience at Rocky Mountain National Park in the summer and winter months. Visitor access, use, and experience are unique but intertwined elements of a visit to Rocky Mountain National Park. For example, access can influence how a visitor uses and experiences the park, and desired experiences can influence how a visitor recreates and when they access the park. Visitor access, use, and experience are individually reviewed in the affected environment sections to provide a detailed understanding of the concepts. Due to the close relationship between the concepts, the environmental consequences section brings these concepts together to evaluate alternatives. The description of current conditions is reflective of the piloted timed entry reservation systems that park staff implemented from 2020 to 2023. The description of these elements is based on the best professional judgement of NPS staff, recent research, and public scoping efforts.

Rocky Mountain National Park provides visitors with unique experiences to connect with nature and develop a personal connection to the park that inspires stewardship. The park’s landscape offers visitors abundant recreational opportunities, with over 250,000 acres that transition from montane ecosystems to alpine tundra. Interpretative exhibits and historic and cultural landscapes connect visitors to 10,000 years of human use and occupation. Trail Ridge Road, the highest continuous paved road in the continental United States, offers expansive views as it rises into the alpine tundra, and its roadside overlooks serve as convenient stops on scenic drives. More than 350 miles of trails invite visitors to enjoy hikes close to facilities or to adventure into wilderness.

A 2022 visitor survey found viewing wildlife or natural scenery as the most important reasons to visit the park, followed by spending time with family or friends (Cullinane, Flyr, and Koontz 2022). In addition to these activities, the park offers recreational opportunities for hiking, fishing, climbing, and road biking, among others. Recreational uses of and experiences in the park differ between seasons, as access to areas of the park becomes more limited during winter months due to weather conditions. For instance, due to the amount of snowfall at high elevation, the 24 miles of Trail Ridge Road above tree line closes approximately from mid-October until end of May. During the winter months, locations such as the Bear Lake Road Corridor and Hidden Valley receive concentrated visitation. During the winter, visitors come to the park to cross-country and backcountry ski, snowshoe, and sled, and guided snowshoe tours and avalanche awareness classes have become more common in recent years.

Facilities, infrastructure, and staff presence all contribute to a meaningful visitor experience at Rocky Mountain National Park. Access to basic and clean facilities help visitors feel comfortable and can impact the overall perception of “pleasantness” of a place. Under current conditions and the piloted timed entry reservation systems, visitor use patterns were less concentrated at one time, which has downstream positive impacts on visitor experience. For instance, park staff are able to interact with visitors more frequently rather than focus their attention on managing parking lots. Furthermore, the facilities and infrastructure that support visitor use and experience—such as buildings, trails, and roads—require less routine maintenance when visitation is dispersed throughout the day and season, as it is under the piloted timed entry reservation systems, compared to when use is highly concentrated. Lastly, park staff are generally able to access facilities and infrastructure for routine maintenance when the roadways are less congested, thus ensuring support of visitor experiences throughout the park.

Visitor Access

Visitor access refers to how and when visitors enter the park or reach infrastructure and facilities and how and when park management may influence visitor admission patterns. The ways visitors access the park and destinations in the park influence visitor experience and type of use. The park’s foundation document highlights “access to wild places” as a fundamental resource and value to provide a “high-quality visitor experience” (NPS 2013a). Visitors’ first impression of the park is often the arrival at an entrance station. There are three main entrance stations to the park and an entrance station to the Wild Basin area, as well as several access areas outside of staffed entrance booths, such as Lumpy Ridge, Longs Peak, East Portal, and Lily Lake. The Beaver Meadows and Fall River entrance stations are located west of Estes Park, and the Wild Basin entrance station is located in Allenspark, just south of Estes Park. The Grand Lake entrance station is on the west side of the park. While most visitors arrive in private vehicles (92%), other modes of transportation include the Hiker Shuttle from Estes Park, commercial or partnership transit (e.g., on guided scenic driving tours, Bustang), bicycles, or on foot (Otak, Inc. 2023). Data

indicate that approximately 54% of visitors enter through the Beaver Meadows entrance station, followed by Grand Lake (23%), Fall River (17%), and Wild Basin (6%) (Otak, Inc. 2023).

During the summer months, Trail Ridge Road and Old Fall River Road provide roadside access to higher elevation pulloffs and the Alpine Visitor Center at 11,796 feet. Trail Ridge Road provides generous pulloffs where people can park, leave the car, and walk to roadside scenic vistas (NPS 2005). Bear Lake Road is open year-round and brings visitors to several popular destinations, such as Bear Lake, Glacier Gorge, and Sprague Lake, while still providing an enjoyable scenic drive. Wild Basin Road, on the other hand, remains undeveloped and narrow, constrained by a forest edge, topography, and the North St. Vrain River. The characteristics of Wild Basin Road limit roadside access points to facilities and trailheads, and, therefore, influence how visitors use the area.

Under current conditions, visitors are required to obtain a timed entry reservation to access the park from 9:00 a.m. to 2:00 p.m. and a reservation to access the Bear Lake Road Corridor from 5:00 a.m. to 6:00 p.m. However, visitors may still access the park spontaneously when the reservation system is not in effect. For instance, in 2023, visitors may enter the majority of the park via any entrance station before 9:00 a.m. or after 2:00 p.m. without a reservation from May 26 to October 22. This access maintains a level of spontaneity and flexibility for visitor access, particularly for visitors who live or are staying nearby. During public engagement, some visitors emphasized the importance of maintaining spontaneity to access the park, particularly given some external factors such as weather conditions (NPS 2023). Others supported the current management strategy because they were able to access destinations due to reduced road and parking lot congestion and reduced crowding on park trails (NPS 2023). While park staff have managed access at certain times of the day, this strategy greatly reduces the frequency in which staff temporarily close areas of the park (e.g., Bear Lake Road Corridor, Alpine Visitor Center, Wild Basin) due to visitor crowding and congestion. The variability of temporary closures degraded visitor access, use, and experience, as they prevented visitors from participating in their desired recreational activity and served as a barrier to visitation.

The piloted timed entry systems from 2020 to 2023 resulted in changes to visitor access when the reservation system is in effect. The systems encouraged dispersed visitation throughout the day, meaning visitor access was more consistent on an hourly basis as opposed to majority of access occurring during peak times (i.e., 10:00 a.m.–2:00 p.m.), as was experienced before 2020. For example, at the Beaver Meadows entrance station, data collection suggests that in 2013, more than 200 vehicles were accessing the park each hour from 10:00 a.m. to 3:00 p.m. during the summer season. In 2017, more than 200 vehicles were accessing the park via the Beaver Meadows entrance station each hour from 9:00 a.m. to 1:00 p.m. However, in 2021, this trend shifted to more than 200 vehicles in the hour from 8:00 a.m. to 9:00 a.m., and again around 3:00 p.m., indicating that visitors were accessing the park immediately before and after the timed entry reservation was required during that year. Figure 6 illustrates this shift in visitor access via the Beaver Meadows entrance station, which has resulted in more consistent access throughout the day rather than concentrated use as experienced before 2020. Consistent and dispersed visitation can lead to less congestion, reduced wait times at the entrance station, and improved quality of visitor experience. Data collection at other entrance stations suggests that the piloted timed entry systems resulted in similar shifts in visitor access patterns.

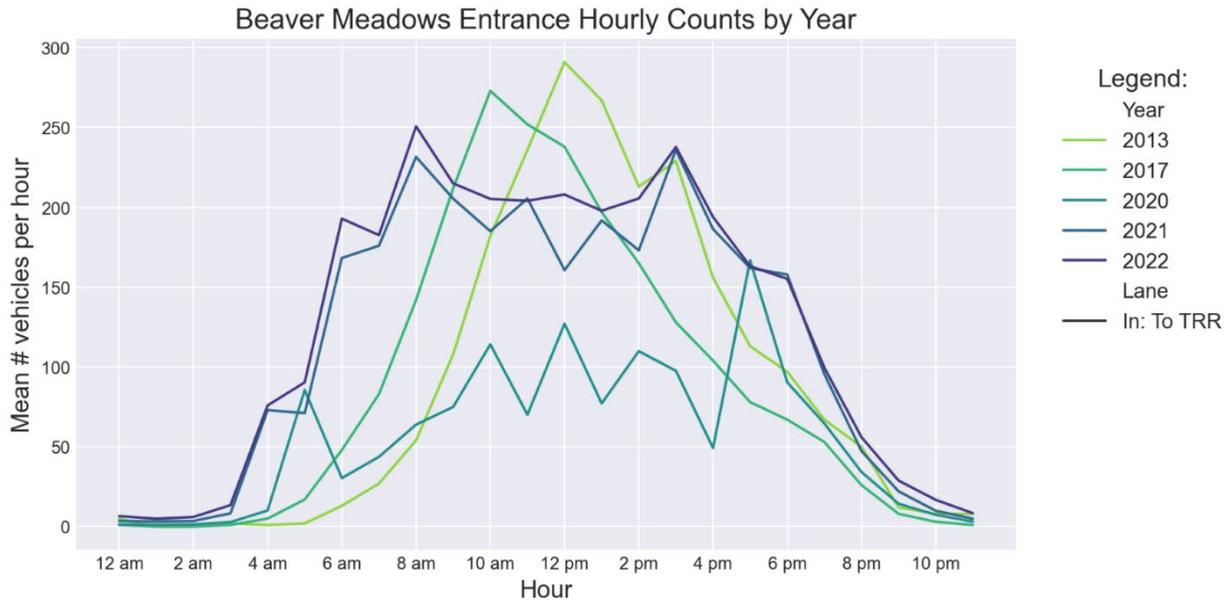


FIGURE 6. BEAVER MEADOWS ENTRANCE HOURLY COUNTS BY YEAR (NPS PERS. COMM. 2023)

Visitor Use

Visitor use refers to human presence in an area for recreational purposes, including education, interpretation, inspiration, and physical and mental health. In the frontcountry areas of the park, primary visitor uses include scenic driving, hiking, and interacting with park facilities and rangers. Scenic driving is a popular visitor activity at Rocky Mountain National Park, with breathtaking views of mountains, rivers, valleys, and alpine tundra. In a recent survey, approximately 63% of respondents stated they participated in scenic driving (Otak, Inc. 2023). Visitor use of Trail Ridge Road and Old Fall River Road include scenic drives to alpine tundra and an opportunity to visit the Alpine Visitor Center. Data indicate that approximately 64% of visitors planned to visit the Alpine Visitor Center (Otak, Inc. 2023). The two roads that provide access were designed for markedly different uses: Trail Ridge Road was designed for driving in comfort, and practically every corner offers a stunning view, while Old Fall River Road remains a much more rustic experience with tight curves and few pulloffs. Bear Lake Road similarly offers an unfolding of mountain peaks, which hover above green forest and meadows of the montane landscape. These expansive viewsheds are a critical component of the historic character of the road. Wild Basin Road is less frequently used for scenic drives due to its short distance, but the autumn foliage may attract visitors to the canopy that defines the road corridor.

Hiking is the most popular recreational activity at the park, with 79% of visitors indicating they hiked during their visit and 41% reporting hiking as their primary activity (Cullinane, Flyr, and Koontz 2022). The park has more than 350 miles of hiking trails, ranging from flat lakeside strolls to steep mountain peaks. Hiking opportunities range in elevation from 7,500 feet to over 14,000 feet at the summit of Longs Peak and can occasionally involve some technical climbing. Many of the park's frontcountry trails are suitable for families and people of all abilities, including Coyote Valley, Lily Lake, Sprague Lake, and Bear Lake trails. As visitation has increased, parking lot congestion in these more accessible trails impacted desired trail uses and spontaneity due to inability to find a parking space and crowded trails.

During public engagement sessions, visitors expressed that under current conditions, the pilot permit system helps disperse visitation throughout the day, allowing visitors to engage in desired recreational activities due to reduced crowding on trails and at trailheads (NPS 2023). However, some visitors stated that the requirement to obtain a reservation during timed entry impacted their desired use, such as a spontaneous drive through the park to entertain guests (NPS 2023). Conversely, others appreciated the ability to plan their visits before arriving to the park (NPS 2023). Some visitors complimented park management for incorporating the flexibility to arrive before and after the timed entry period, adding that pilots had no impact on their recreational goals, such as to reach a summit, which entails starting a hike early in the morning to evade afternoon storms (NPS 2023). Others expressed concern that timed entry may alter use by motivating people to stick to hiking plans, even if the weather forecast warranted a change (NPS 2023). The public engagement sessions showed that the pilot permit system had potential positive and negative impacts on visitor use.

Visitor Experience

Visitor experience is the perceptions, feelings, and reactions that a visitor has before, during, and after a visit to an area. Visitors to Rocky Mountain National Park have opportunities to connect with the landscape through a variety of uses to foster unique desired experiences. With a variety of hiking opportunities, visitors can find a trail or destination that best suits their desired experience, whether relaxation near an alpine lake or a physical challenge presented by mountain peaks. Access to the park contributes to visitor experience, such as a visitor's perception of crowding and congestion, and can vary amongst individuals. While some visitors may appreciate a more isolated experience in the backcountry, others visit the park for a social experience with friends and family. Visitor experience in a national park includes perceptions of resources, and resource conditions can impact visitor experiences. For instance, a pristine alpine lake can invoke awe, or trampled vegetation may negatively impact perceptions of wilderness.

Public feedback from the 2022–2023 public engagement sessions often compared experiences from before 2020 to current conditions. Visitors stated that dispersing vehicles throughout the day, via timed entry, managed traffic flow better compared to conditions before 2020 when vehicles would be turned around or forced to idle in traffic (NPS 2023). Some of these commenters added that the pilot timed entry reservation systems lessen congestion and support a positive driving experience, and reduced crowding throughout the day facilitated high-quality visitor experiences (NPS 2023). Similarly, visitors reported that while views from scenic overlooks occasionally included vehicles, there was freedom to move freely along the roadway, and vehicular congestion was reduced compared to previous experiences (Creany and Monz 2023). However, some comments stated that accessing a permit was burdensome or difficult which impacted their experience before visiting the park (NPS 2023).

Visitor Access, Use, and Experience: Bear Lake Road Corridor

The Bear Lake Road Corridor is one of the most in-demand destinations at Rocky Mountain National Park, with nearly 62% of visitors indicating they plan to visit this area (Otak, Inc. 2023). The corridor offers visitors opportunities to experience several popular hiking trails, scenic viewpoints, high elevation lakes and streams, world class climbing routes, and meadow picnic areas. The access and appeal of the Bear Lake Road Corridor makes it a popular destination year-round, including during the winter months. Snowshoeing, backcountry skiing, and guided tours and trainings, such as avalanche safety classes, contribute to increased visitation during the

winter. During the summer months, visitors have the option to park at the Estes Park Visitor Center and use the Hiker Shuttle to access the corridor. Visitors are required to obtain a permit for the Hiker Shuttle, which provides transit to and from the park's Park & Ride transit hub during the peak season.

During public engagement sessions, members of the public frequently identified the Bear Lake Road Corridor as the most heavily visited area of the park and in need of a managed access plan (NPS 2023). Commenters indicated that the pilot timed entry reservation system meets the needs for visitor use management in the corridor (NPS 2023). Under current conditions and when pilot timed entry reservations are required, visitors can access primary destinations in the corridor with minimal impact on their experiences. Some visitors who obtained reservations were invited to complete a survey and generally reported that parking and traffic congestion did not impact their experience in the corridor (Creany and Monz 2023). Comparatively, before 2020, parking lots would fill as early as 9:00 a.m. in certain locations, and as visitation increased throughout the day, park staff would temporarily close the corridor to visitors. These restrictions occurred almost daily during the summer months and were disappointing for visitors seeking to access this area of the park, thus degrading the visitor experience and time consuming for park staff and management-intensive (Dietz et al. 2019). Under the current system, these closure restrictions rarely occur due to the proactive management of visitation, thus reducing impacts on visitor use and experience. For example, data collected at the park illustrates that in July 2019, park staff temporarily closed Bear Lake Road Corridor 30 days of the month; in contrast, during July 2022, park staff temporarily closed the corridor less than three times.

Visitor Access, Use, and Experience: Longs Peak

Longs Peak is a popular trailhead at the park that provides recreational access for hiking and climbing (technical and nontechnical) within designated Wilderness. Most hikers go to either Chasm Lake or the Boulder Field from the trailhead for an out-and-back hike; however, other hiking areas are accessible from the Longs Peak Trailhead such as Estes Cone and Storm Pass. Several technical rock-climbing routes go to the summit of Longs Peak, but most visitors attempting to summit Longs Peak use the Keyhole Route. Although ropes are not usually needed to climb the Keyhole Route, the route crosses sheer vertical rock faces and narrow ledges and has areas of loose rock. Attempting to reach the summit of Longs Peak (at 14,259 feet above sea level) is an iconic park experience and typically takes from 10 to 15 hours round trip. The National Park Service advises visitors to be prepared for afternoon thunderstorms, but some visitors are uninformed on the intensity and risks of hiking and climbing in the Rocky Mountains. Search-and-rescue operations in this area can be complicated and dangerous.

Due to the roundtrip time and danger of afternoon storms, many visitors, whether hiking or climbing, start at the trailhead early, which can lead to concentrated use on certain sections of the trail. Under current conditions, approximately 10 visitors access the trailhead hourly from 2:00 a.m. until 10:00 a.m. during the summer season, meaning visitors should expect to encounter other groups frequently. The relatively constant visitor use pattern often leads to chokepoints and visitor queueing along the Keyhole Route, which degrades the visitor experience. From 2020 to 2022, the average number of visitors accessing the trailhead hourly peaked at 1:00 p.m. and ranged from 15 to 20 people per hour across those years (NPS pers. comm. 2023c). This visitor pattern is more representative of hikers, given the time of day, and indicates that at any time of the day, visitors should expect to encounter other groups.

Visitor Access, Use, and Experience: Winter Use

Seasonal winter road closures reduce opportunities for visitors to experience certain areas of the park, particularly along Trail Ridge Road; however, visitors may still enjoy stunning, snow-covered mountains and frosted forests. Trail Ridge Road generally closes in mid- to late October and opens for the summer at the end of May. Visitors to the east side of the park have access to Trail Ridge Road up to the Many Parks Curve parking area, while visitors on the west side enjoy scenic views along the Kawuneeche Valley up to the turnoff into the Colorado River Trailhead parking area. Old Fall River Road typically closes to vehicles in early October and opens to vehicles the first week of July. Wild Basin Road closes at the winter parking area, approximately 1 mile from the summer trailhead from October through May, depending on conditions. Bear Lake Road is open to vehicles year-round, though it may temporarily close during winter storms.

From November to May, visitors are currently not required to obtain a timed entry reservation to access the Bear Lake Road Corridor or other areas of the park. Although winter daily visitation numbers are lower than in the summer months, the park is experiencing increased winter visitation (Bioeconomics and RRC Associates 2023). Popular summer activities, such as scenic driving and climbing, become less feasible, and other activities, particularly snowshoeing and backcountry/cross-country skiing, become more prominent. Data collected in the Bear Lake Road Corridor identified that the most popular winter activities are snowshoeing (57%), hiking (53%), and backcountry skiing (11%) (Schultz and Svajda 2016). In addition, Hidden Valley serves as a popular winter destination for snowplay (e.g., sledding), snowshoeing, and backcountry/cross-country skiing that provides visitors with winter access to wilderness. With more constrained options for transportation to and in the park, relatively low daily numbers can result in greater impacts on visitor experience. Concentrated visitation in the winter, particularly on weekend days or holidays, may result in vehicular congestion and pedestrian crowding that disrupts desired conditions for visitor experience. During the winter (November 1, 2022, to February 28, 2023), data collected by the park indicates that an average of 1,100 vehicles accessed the Bear Lake Road Corridor on weekend days. During this same time frame, an average of 500 vehicles accessed the corridor on weekday days, thus indicating the concentrated visitation during weekend days (NPS pers. comm. 2023).

In the Longs Peak area, winter use is much less comparable to summer use due to the snowy conditions that hinder hikers and climbers from being able to summit Longs Peak. Although summits are feasible, the routes that serve as hiking trails during the summer transition to winter mountaineering due to conditions. The facilities along this trail, namely the backcountry toilets, are closed to visitors. However, visitors can access the trail for other activities (e.g., snowshoeing) and can expect to encounter fewer visitors along the trail compared to summer.

Trends and Planned Actions

Ongoing and planned actions that affect visitor use and experience include actions such as routine maintenance and facility upgrades for safety and accessibility (e.g., trails, roads, buildings, utility lines) and post-fire facility repairs. Currently, park staff are planning several larger projects, subject to funding availability, to improve visitor experience and accessibility throughout the park. These projects include improvements to the Alpine Visitor Center and Fall River Pass area; rehabilitation of the Kawuneeche Visitor Center; changes to Deer Ridge Junction parking and circulation, including trailheads; and entrance station updates at Fall River, Beaver Meadows, and Grand Lake to better meet operational need, improve visitor safety, and support

the visitor experience. While these actions can temporarily degrade visitor experiences during construction phases (e.g., closures of parking areas or traffic lanes, increased traffic congestion due to fewer lanes), once complete, they would result in beneficial impacts by ensuring visitor access, safety, and quality experiences.

Overall, visitation to Rocky Mountain National Park has been consistently increasing, with peak visitation occurring in 2019, when the park received just over 4.6 million visits. Visitation levels under current conditions (i.e., 2020–2023) have been influenced by several external factors, including the COVID-19 pandemic and wildfires in Colorado that resulted in temporary area closures in the park. When compared to average annual visitation from 2016 to 2019, visitation in 2022 had just a 5.6% decrease; however, all park units across the country saw a 4.6% decrease, indicating that visitation to Rocky Mountain National Park was not disproportionately impacted by the pilot timed entry systems implemented in 2020–2022 (Bioeconomics and RRC Associates 2023). Furthermore, changes in visitation primarily occurred during summer months (i.e., June to September), while visitation in shoulder and winter months stayed relatively constant or increased slightly (figure 7).

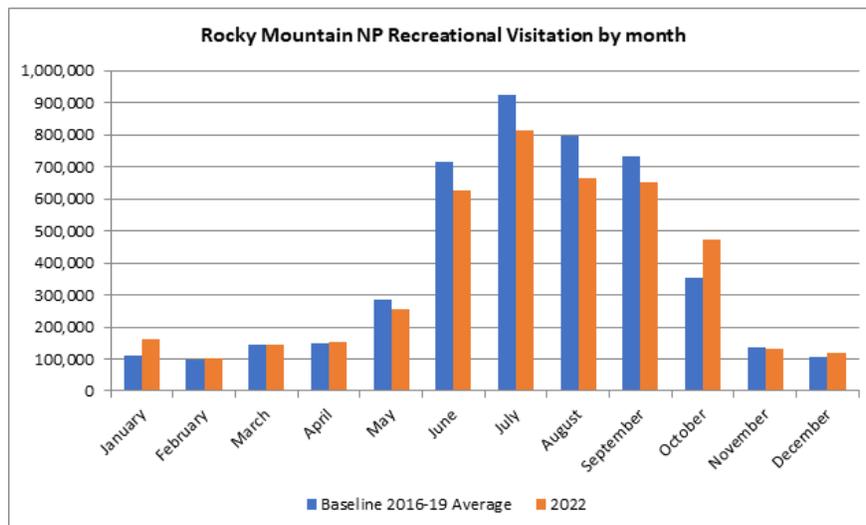


FIGURE 7. ROCKY MOUNTAIN NATIONAL PARK RECREATIONAL VISITATION BY MONTH

Although there were minor changes to annual visitation during the timed entry pilots, park staff observed that the system successfully dispersed use throughout the day and by area, which provided beneficial impacts on the visitor experience by allowing areas to accommodate visitors at a pace that facilities and park staff were equipped to handle. In 2021, visitors who obtained a timed entry reservation and who had also previously visited the park before the timed entry system were surveyed. Approximately (76%) of survey respondents indicated that their park experience under timed entry was about the same, somewhat better, or much better than previously experienced, with nearly half reporting that their experience was somewhat better or much better (Creany and Monz 2023). This finding is supported by comments received during the public engagement period, which found that visitor experiences improved under pilot timed entry reservation systems (NPS 2021b, 2023). However, recent research indicates that visitor experience was impacted by the inability to obtain a timed entry reservation for their desired entrance time (Creany and Monz 2023). Under the piloted timed entry systems, park staff noticed a decrease in congestion on roadways, lower encounter rates on some trails, and more meaningful

visitor contacts. Specific to Rocky Mountain National Park visitors, survey respondents reported favorable attitudes towards visitor use strategies such as reservation systems. Similarly, at other national park units, visitors expressed support for continuing reservation systems during the peak season to reduce crowding (Miller et al. 2023).

Visitor use patterns are anticipated to be impacted by climate change throughout the national park system, including when, where, and how visitors recreate (Fisichelli et al. 2015). Projections for future potential visitation include a 15%–42% increase in annual visitation; a 12%–34% increase in peak season visitation (three busiest contiguous months); a 30%–72% increase in shoulder season visitation (two months prior and two months after peak season); and a 7%–16% decrease in low season visitation (three contiguous months with least visitation) (Fisichelli et al. 2015). Such changes in visitation patterns, particularly an increase in the shoulder season, can impact opportunities for high-quality visitor experiences and even change patterns of visitor use. In addition, climate change increases the risk of ecological disturbances, such as wildfires, and may impact opportunities for visitors to access the park. For instance, the East Troublesome Fire (2020) severely impacted areas of the park, and managers implemented closures due to safety concerns, for resource protection, and to rehabilitate infrastructure. Recovery from ecological disturbances varies but may reduce access and alter ecosystems and aesthetics.

Environmental Consequences

Common to All Alternatives

Actions common to all alternatives would not result in any new impacts on visitor use and experience beyond what is described above in the affected environment section. Ongoing actions, such as continuing transit partnerships, enhancing technological capabilities, and providing visitor information, orientation, and enforcement, would continue to provide beneficial impacts on visitor use and experience. Temporary area closures of high-demand areas (e.g., Bear Lake Road Corridor, Alpine Visitor Center, Wild Basin Road) would result in adverse impacts, as visitors would not be able to access their desired location and would be displaced to other areas of the park. Overall, the impacts on visitor use and experience would be similar to what is described above in the affected environment section, and many of these actions are consistent with ongoing park operations.

Alternative A: No Action

Under the no-action alternative the visitor experience would return to conditions observed before initiating the pre-2020 pilot management systems. Visitor access would be similar to what was experienced before 2020, when concentrated visitor use during peak times led to long wait times at entrance stations, roadways and parking lot congestion, high demand of facilities, displacement from desired destinations (Wesstrom et al. 2021), and observable ecological impacts (D'Antonio et al. 2013). Under these conditions, data collection indicates that more than 300 vehicles per hour were accessing Moraine Park from 8:00 a.m. to 4:00 p.m. and that similar patterns were occurring at other key destinations and entrance stations. The high concentration of visitor access to the park impacted staff's ability to maintain facilities or access project work sites. Consequently, park staff would temporarily restrict visitor access to areas of the park (e.g., Bear Lake Road Corridor, Alpine Visitor Center, Wild Basin Road), and no visitor access would be permitted, resulting in adverse impacts on visitor access, use, and experience. These restrictions were often in place as early as 8:00 a.m. during the summer months at key

destinations. While spontaneity and flexibility for visitor access would be improved under this alternative due to no reservation system, the temporary closures that can occur for hours and long wait times at entrance stations can reduce spontaneity and flexibility, thus resulting in adverse impacts on visitor access.

As annual visitation grew before the implementation of the pre-2020 pilot management systems, congestion at entrance stations increased and resulted in vehicle queueing and long wait times, which can degrade the visitor experience. Park staff frequently received complaints from visitors regarding wait times to access the park. Wait times varied depending on the number of vehicles that were in line and other factors such as technology (connectivity and migrating to new credit card processing systems), the number of visitors seeking a basic orientation from the ranger at the gate, and staffing levels.

Once inside the park, visitors encountered congestion and crowding and were more frequently displaced from primary destinations. Research in the Bear Lake Road Corridor found that, during 2017 temporary closures, approximately 21% of vehicles that were redirected from the corridor returned at another time, while 9% left the park (Wesstrom et al. 2021). The vehicles that returned to the corridor spent an average of 3.5 hours elsewhere in the park before returning, indicating that more time was spent driving around, making short stops, and adding to vehicular congestion (Wesstrom et al. 2021). The redirection of vehicles due to temporary area closures led to increased traffic and resource impacts in other areas of the park, such as Deer Ridge, Fern Lake, Alluvial Fan, and Trail Ridge Road, and increased travel distances and time for visitors, which can degrade the experience. Visitor displacement to other areas of the park led to similar issues (e.g., vehicular congestion, visitor crowding, safety concerns, lack of emergency egress), which caused park staff to close other areas of the park, thus degrading visitor use and experience nearly parkwide.

Bear Lake Road restrictions, as implemented before 2020, would result in adverse impacts on visitor access, use, and experience. Under this alternative, the corridor may close as early as 7:00 a.m. to prevent gridlock and unsafe conditions in the corridor and could adversely impact visitors. Potential visitors would be advised to go elsewhere in the park, return at a later time, or access the area via the Hiker Shuttle from Estes Park. Altogether, the no-action alternative would result in adverse impacts on visitor use and experience in the Bear Lake Road Corridor.

Once visitors arrived at their destination, the opportunity for meaningful interactions with rangers to understand the resource and participate in safety briefings declined due to staffing needs for parking management. When an area received concentrated volume of vehicles, park rangers would be pulled from interpretive duties to help manage parking, resulting in less interpretive programs being available for visitors, which can degrade the experience. Crowding reduced opportunities for visitors to interact with rangers in a meaningful way to learn about park resources and plan their trip. Under these conditions, park facilities were overused, and park staff were unable to keep up with demands for routine cleaning and maintenance. Visitors experienced long wait lines for facilities (e.g., restrooms) or were unable to access picnic areas to share lunch with their family.

The park received an increasing number of visitor comment cards about crowding along trails and parking areas. Increased visitation displaced visitors from many trailheads, as parking lots could fill up as early as 7:00 a.m., which resulted in visitors parking in unendorsed areas to reach their destination. Unendorsed parking occurred more frequently due to no timed entry

reservation system, which led to safety concerns such as visitors walking in the roadway and vehicle congestion that impeded traffic flow, thus impacting emergency response access throughout the park. Furthermore, high encounter rates on trails diminished the quality of wilderness hiking experiences, particularly at key frontcountry access areas such as Longs Peak, Wild Basin, Colorado River Trailhead, and Lumpy Ridge. Concentrated visitation, or more people at one time in a specific area, resulted in increased trail widening and braiding because shoulder-to-shoulder hikers trample vegetation and compact soils. Not only does the concentration of visitors impact visitor experience, but it also negatively impacts visitor enjoyment of the natural environment.

Along the roadways, including Trail Ridge Road, Bear Lake Road, and Wild Basin Road, visitors often experienced high levels of congestion. Visitors expressed frustration with the volume of vehicles at one time on the roadway, which often resulted in stalled traffic for long periods that degrades visitor experiences to enjoy a scenic drive in the park. Traffic impacted viewscapes as a line of vehicles filled the roadways and vehicles parked in unendorsed areas. Illegal passing, honking horns, and exhaust smells diminishes visitor experiences, distracting from iconic views and connection to nature.

In this alternative, there are no specific actions for Longs Peak or winter use in the park, and it is unlikely any additional impacts would occur as a result of the no-action alternative. Visitor use and experience would be similar to the description of current conditions in the affected environment section.

Cumulative Impacts. The impacts of past, present and reasonably foreseeable future actions are described above in the visitor use and experience trends and planned actions section. When paired with actions common to all alternatives and impacts from past, ongoing, and reasonably foreseeable future actions, the no-action alternative would result in overall adverse cumulative impacts on visitor use and experience compared to current conditions. While the no-action alternative would allow visitors to access the park on a first-come, first-served basis without a reservation, concentrated visitor use from May through October would contribute substantial adverse effects due to long entrance gate lines, vehicular congestion and circulation along roadways, frequency of unendorsed parking, impacts on park facilities and infrastructure, and crowding along trails that would result in degraded visitor access, use, and experience parkwide. As a result, overall cumulative impacts on visitor use and experience would be adverse under alternative A.

Common to Alternatives B, C, and D

Across alternatives B, C, and D, reservations would be required for visitors to access the Bear Lake Road Corridor, which negatively impact visitors seeking spontaneous access. The reservation window (i.e., 5:00 a.m.–6:00 p.m.) does not provide many opportunities for visitors to arrive before or after the reservation system is enforced, which degrades spontaneity. However, for visitors who do obtain a reservation, their access would be improved due to a reduction in long vehicle queues at the entrance station and less competition for parking in the corridor. In addition, park staff would be less likely to implement the corridor restrictions under this alternative, which would provide a level of certainty to visitors who are able to obtain a reservation.

Based on visitor feedback and staff observations during the piloted timed entry systems, the Bear Lake Road Corridor reservation system is anticipated to beneficially impact visitor use and

experience. The majority of visitors to the park want to visit Bear Lake during their trip; therefore, implementing a reservation system for the corridor would have some impacts on visitor use and experience. The piloted reservation system benefits visitor experience by distributing use throughout the day, which leads to a reduced concentration of vehicle volume at peak times. As previously noted, data collection indicates that in July 2017, more than 300 vehicles were accessing the corridor each hour from 8:00 a.m. to 4:00 p.m., on average. In 2021, the average number of vehicles accessing the corridor per hour never exceeded 250, indicating a reduction in approximately 400 cars per day during this summer month. Research indicates that reducing vehicle volume on roadways enhances scenic driving experiences for visitors by enhancing the level of service on roadways (Pettengill et al. 2012). Visitors are able to use park facilities (e.g., restrooms) with shorter wait times and opportunities for educational ranger interactions increases. Furthermore, a reduction in concentrated use, as described above, leads to less concentration at trailheads and is likely to reduce hourly encounter rates on trails.

Across all alternatives, park staff may adaptively manage components of the reservation system, such as the seasonality and timing. If the reservation system for Bear Lake Road Corridor is expanded to the shoulder season due to increases in visitation (e.g., April and November) or to winter weekends, no new impacts would occur on visitor use and experience. Rather, the impacts would be similar to what is described above but would occur for the time period and location of the expanded reservation system and apply in particular to winter recreationists. Activities such as scenic driving along Trail Ridge Road would not be impacted by an expanded reservation system due to the seasonal closure.

As part of all action alternatives, park staff would implement a zoning scheme and associated desired conditions for visitor use management parkwide. The visitor use management zones provide updated management direction for visitor use, visitor experience, and resource protection across the various park landscapes, providing consideration and inclusion of equitable, accessible, and inclusive experiences and for facilities that support a diverse range of visitor interests and preferences. The development of zones and desired conditions would benefit visitor use and experience, as they provide clear direction for long-term management of the park. In addition, park staff would identify and manage to visitor capacities by implementing the actions described in chapter 2. The identified capacities help ensure that desired conditions for visitor use and experience are maintained, thus beneficially impacting the experience.

Alternative B

In addition to the impacts of a Bear Lake Road Corridor reservation system, alternative B would negatively impact people looking for spontaneity and those who may not be able to get a reservation for the preferred day or time of day. Upon implementation, the timed entry reservation for the rest of the park would be required from 9:00 a.m. to 3:00 p.m., which still grants opportunities for spontaneous access to areas of the park outside of the Bear Lake Road Corridor and outside the reservation window. Visitors seeking to access key destinations, such as Longs Peak, Lumpy Ridge, Milner Pass, and Alpine Visitor Center, during the timed entry requirement would be adversely impacted. However, under this alternative, the number of temporary closures in high-demand areas would be reduced, mitigating the adverse impacts on visitor access due to the proactive management via the reservation system. This alternative would require additional planning for visitors compared to the no-action alternative.

Once inside the park, it is more likely that a visitor's preferred destination would have available parking and there would be reduced visitor displacement from primary destinations, resulting in visitor use and experience conditions that most resemble current conditions. With visitation dispersed throughout the day (both in the Bear Lake Road Corridor and the rest of the park), alternative B would have similar impacts on scenic driving as the pilot timed entry systems due to decreased congestion on roadways. Visitor surveys (Creany and Monz 2023) and staff observations during piloted timed entry indicate that although congestion may still occur under a timed entry system, there would be a substantial improvement in viewsheds as a result of fewer lines of traffic, and cars could mostly move freely on roadways. In addition, data collection from timed entry reservation pilots indicates that visitors would likely experience shorter wait times for facilities and have a greater opportunity for educational interactions with rangers, thus positively impacting visitor experience. Furthermore, distributed visitation spatially and temporally would likely lower hourly encounter rates on trails, thus improving the visitor experience while hiking. For instance, data collected at the Colorado River Trailhead suggests that in 2019, the average number of hourly visitors hiking the trail was above 30 people per hour from 11:00 a.m. to 4:00 p.m. In 2022, the average number of hourly visitors hiking the trail was above 30 people per hour from 11:00 a.m. to 2:00 p.m. only, resulting in a slight shift in visitation trends (NPS pers. comm. 2023). Additionally, the trail to Fern Lake—located in the Bear Lake Road Corridor—saw a similar change in visitor patterns. In July 2019, the average number of hourly visitors hiking the trail exceeded 40 people per hour from 10:00 am to 2:00 p.m. each day. However, in July 2022, the average number of hourly visitors hiking the trail exceeded 40 people from 11:00 p.m. to 1:00 p.m. Data collection indicates that overall, more visitors accessed this trail in July 2022 compared to 2019 but avoided peak times (NPS pers. comm. 2023). This visitation shift suggests that fewer people are on the trail at one time, indicating fewer hourly encounter rates on trails which improve visitor use and experience.

Winter use would not be impacted by this alternative unless the park expanded reservations to winter weekends in the Bear Lake Road Corridor, as described in the common to all alternatives. There are no new anticipated impacts on the visitor experience. Rather, the impacts would be similar to what is described above but would occur for the time period and location of the expanded reservation system and apply, in particular, to winter recreationists.

Under this alternative, there are no specific actions for Longs Peak, and it is unlikely any additional impacts would occur as a result of the preferred alternative. Visitor use and experience would be similar to what was experienced before 2020, which aligns with the description of current conditions in the affected environment section.

Cumulative Impacts. The impacts of past, present, and reasonably foreseeable future actions are described above in the visitor use and experience trends and planned actions section. When paired with these impacts, and impacts from actions common to all alternatives, alternative B would result in positive cumulative impacts on visitor use and experience. Conditions under this alternative would be most similar to what is described in the affected environment section. While the dual timed entry reservation systems impacts visitors seeking spontaneous access to the park, these actions beneficially impact experiences for visitors who are able to obtain a reservation by dispersing visitor use temporally and spatially in a manner that reduces congestion. This alternative maximizes the number of visitors who can access the park while still protecting resources and providing desired conditions for visitor use and experience. In conclusion, overall cumulative impacts on visitor use and experience would be beneficial under alternative B.

Alternative C

Alternative C would result in both beneficial and adverse impacts on visitor access and experience. Alternative C would negatively impact visitors looking for spontaneity, and those who may not be able to get a reservation for their preferred day. As described in chapter 2, park staff anticipate that the number of reservations available for the rest of the park would be fewer under alternative C compared to alternative B. However, upon implementation, the daily reservation would be required from 9:00 a.m. to 3:00 p.m., which still grants opportunities for spontaneous access to areas of the park outside of the Bear Lake Road Corridor. Furthermore, the number of temporary closures in high-demand areas like Alpine Visitor Center parking lot and the Bear Lake Road Corridor would be reduced due to the proactive management via the reservation system, thus mitigating the adverse impacts on visitor access associated with temporary closures. This alternative would require additional planning for visitors compared to the no-action alternative.

Unlike timed entry in alternative B, a daily reservation system for the rest of the park grants more spontaneity and flexibility for visitors to access the rest of the park, because visitors could enter the park at any time on the day of their permit. Once inside the park, there would be beneficial impacts on visitor experience as a result of fewer reservations available, likely leading to fewer vehicles on the roadway and opportunities for visitors to disperse across the park, excluding the Bear Lake Road Corridor. This would not only beneficially impact the experience along the roadways but also on trails, as there is less likely to be pulsing visitation to key destinations in the park compared to the no-action alternative. Furthermore, this alternative would benefit visitor experience, as visitors are less likely to be displaced from their desired destination compared to the no-action alternative. Park visitors would experience reduced crowding at park facilities compared to the no-action alternative and, as a result, would have more opportunities for educational interactions with a park ranger, thus improving the visitor experience. Encounter rates on most trails would likely decrease, improving the visitor experience.

Under this alternative, educational permits would be required for visitors to access Longs Peak Trailhead, whether they are hiking or climbing. If monitoring indicates that the educational permit is not effective in achieving and maintaining desired conditions for this area, park staff may implement a limited use permit for the Longs Peak Trailhead. The requirement to obtain an educational or use permit could both positively and adversely impact visitor use and experience. Educational permits could improve visitor experience by ensuring visitors are aware of basic safety information and risks associated with hiking or climbing Longs Peak and could encourage visitors to follow Leave No Trace principles, which can result in an overall improved visitor experience due to preserved natural resources. Limited use daily permits on Longs Peak would adversely impact visitor use by reducing spontaneity for visitors to recreate along this trail. In addition, a required permit may shift visitation patterns to seasonal windows that are higher risk (e.g., late spring, early fall) when the permit system is not in effect, which may degrade visitor experience along this trail compared to current conditions. In contrast, a daily use permit for Longs Peak would beneficially impact visitor experience, as it would proactively manage the number of visitors accessing the trailhead and, therefore, could reduce encounter rates and result in less visitor queueing at narrow points along the trail. If a limited use permit was implemented, additional environmental analysis would be needed.

Winter use would not be impacted by this alternative unless park managers expanded reservations to holidays and winter weekends in the Bear Lake Road Corridor, as described in the

common to all alternatives section. No new anticipated impacts on the visitor experience are anticipated. Rather, the impacts would be similar to timed entry but would occur for the time period and location of the expanded reservation system and apply, in particular, to winter and shoulder season recreationists.

Cumulative Impacts. The impacts of past, present, and reasonably foreseeable future actions are described above in the visitor use and experience trends and planned actions section. When paired with these impacts and impacts from actions common to alternatives B, C, and D, alternative C would result in positive cumulative impacts on visitor use and experience compared to the no-action alternative. While the number of available reservations to access the rest of the park would be lower compared to alternative B, thus negatively impacting visitor access, visitors who obtained a reservation would benefit from reduced vehicles along the roadway and fewer people along trails, particularly when the reservation is in effect. The educational permit system for Longs Peak would beneficially impact visitor use and experience due to increased education and visitor awareness. Although this alternative would result in fewer reservations sold, the visitor use and experience would be improved compared to the no-action alternative and would preserve resources in the park. In conclusion, overall cumulative impacts on visitor use and experience would be beneficial under alternative C.

Alternative D

In addition to the impacts described under the common to alternatives B, C, and D, actions in alternative D would both positively and negatively impact the visitor experience. This alternative would improve spontaneity and flexibility for visitors seeking to access areas of the park outside of the Bear Lake Road Corridor. However, park staff would temporarily close entrance station gates (Beaver Meadows, Fall River, Grand Lake, Wild Basin) as needed when desired conditions for visitor experience and resources are not being met in the park, indicated by vehicle volume at the entrance stations. This alternative would result in conditions that are most similar to the no-action alternative, due to the frequency and duration of temporary closures that would be uncertain to visitors. Therefore, while this alternative maintains spontaneous visitor access, the temporary closures would adversely impact visitor access, use and experience and result in visitors being turned away from the entrance gate for a period of time.

Visitors who are able to obtain a Bear Lake Road Corridor reservation would continue to be allowed to access the park, however they may experience long queue lines due to a concentration of visitors seeking to access the rest of the park in anticipation of a temporary closure. Long queue lines to enter the park would degrade the visitor experience due to the added length of time waiting in line rather than recreating in the park. When temporary entrance gate closures are in effect, visitors would not be permitted to queue in the entrance line and may try to stay in the immediate area to be ready when the park reopens. This visitor pattern would negatively impact visitor use and experience due to lack of access, vehicular congestion, and crowded conditions. Alternatively, visitors may be displaced to other areas. Research suggests that during the 2017 Bear Lake Road Corridor closures, approximately 21% of turned away vehicles returned at another time while 9% left the park (Wesstrom et al. 2021). Given that this alternative would temporarily close entrance gates to visitor access, it is likely that visitor displacement to other recreational areas would occur and underutilized areas may see concentrated visitation.

Once inside the park, visitors to areas outside of the Bear Lake Road Corridor would likely experience crowding at key destinations due to concentrated visitation patterns, similar to the

no-action alternative and what the park experienced before 2020. The visitor experience would be degraded compared to current conditions due to obstructed views along the roadways and on trails, vehicular congestion, and pedestrian crowding. Other areas of the park, such as Colorado River Trailhead, Lumpy Ridge, Longs Peak, Wild Basin, and Alpine Visitor Center may see concentrated use in a manner that increases hourly encounter rates and obstructs natural viewsheds, thus adversely impacting the visitor experience. However, the temporary gate closures would mitigate the extent of these adverse impacts on visitor use and experience.

Winter use would not be impacted by this alternative unless the park expanded reservations to winter weekends in the Bear Lake Road Corridor as described in the common to all alternatives. There are no new anticipated impacts on the visitor experience. Rather, the impacts would be similar to what is described under timed entry, but would occur for the time period and location of the expanded reservation system and apply in particular to winter and shoulder season recreationists.

Cumulative Impacts. The impacts of past, present, and reasonably foreseeable future actions are described above in the visitor use and experience trends and planned actions section. When paired with these impacts and impacts from actions common to alternatives B, C, and D, alternative D would result in overall adverse cumulative impacts on visitor use and experience compared to current conditions. While alternative D would allow for spontaneous access to areas outside of the Bear Lake Road Corridor, the frequency of temporary entrance gate closures would increase compared to alternatives B and C, which would reduce opportunities for visitor access and likely displace visitors. Furthermore, concentrated visitor use would likely occur early in the day in anticipation of entrance gate closures, resulting in long queue lines, vehicular congestion along roadways, and crowding along trails that would degrade visitor use and experience inside the park. Therefore, overall cumulative impacts on visitor use and experience would be adverse under alternative D.

Comparative Conclusion Across Alternatives

The no-action alternative would result in substantial adverse impacts on visitor access, use, and experience, as concentrated visitor use would lead to entrance gate queue lengths with long wait times, vehicular congestion along roadways, unendorsed parking, impacts on park facilities and staff operations, and visitor crowding along trails and at key destinations. This alternative would result in conditions that most resemble park conditions when the park implemented the pre-2020 pilot management system. The implementation of a reservation system across alternatives B, C, and D would benefit visitor access, use, and experience in varying degrees compared to the no-action alternative. Figure 5 illustrates anticipated visitation patterns to the Beaver Meadow entrance station across the alternatives. Based on data collection and staff observations, park staff anticipate that other entrance stations would experience similar visitation patterns. Alternative B would likely result in an 8% decrease in daily visitation from May to October compared to the no-action alternative; alternative C would result in a 21% decrease in daily visitation compared to the no-action alternative; and alternative D would result in a 25% decrease in daily visitation compared to the no-action alternative. However, research suggests that visitation during other seasons would increase and that the timed entry reservation system did not strongly impact annual visitation (Bioeconomics and RRC Associates 2023).

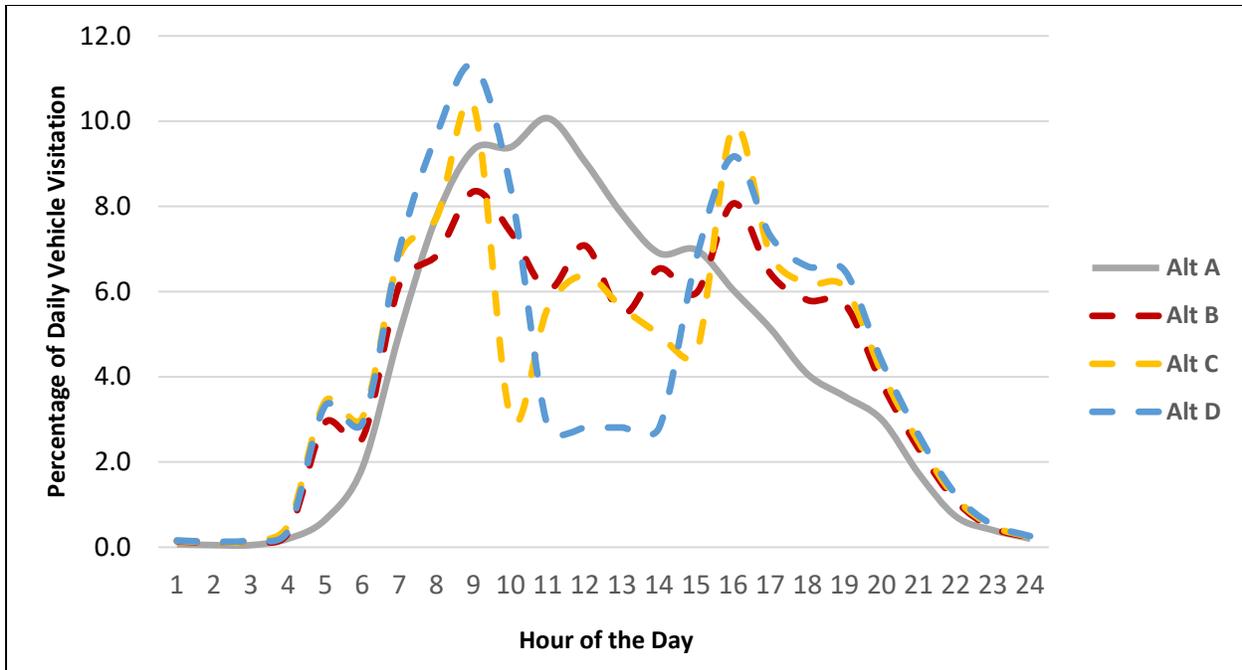


FIGURE 8. PROJECTED VEHICLE ENTRIES TO BEAVER MEADOWS ENTRANCE STATION BY ALTERNATIVE, WITH THE Y-AXIS DISPLAYING PERCENTAGE OF DAILY VEHICLES AND THE X-AXIS DISPLAYING TIME OF DAY. THE DASHED LINES REPRESENT PROJECTED PATTERNS AND VOLUMES.

Alternative B (timed entry reservations for rest of park and Bear Lake Road Corridor) would degrade opportunities for spontaneous access but would guarantee entry for visitors with a reservation and would improve their experience once inside the park. This alternative would result in conditions most similar to current conditions, or what is described in the affected environment section. Alternative C (daily reservations for rest of the park paired with timed entry for Bear Lake Road Corridor) would have similar impacts, but the number of available reservations would be reduced to achieve desired conditions in the park and to account for the likelihood that daily permit holders would arrive in a similar window (e.g., 9:00 a.m.–11:00 a.m.). While this alternative provides beneficial impacts on visitor use and experience compared to the no-action alternative, the impacts would not be as great as those from alternative D (temporary entrance station closures for rest of park and timed entry for Bear Lake Road Corridor), which maximizes visitor access and use in the park while maintaining desired conditions. Alternative D would improve spontaneity due to only requiring a reservation to access the Bear Lake Road Corridor but would degrade visitor access, use, and experience due to temporary entrance gate closures. These closures would occur when desired conditions in the park are not being met, indicating that visitors would experience vehicular congestion along roadways, concentrated use on trails that obstruct natural viewsheds, wait times for facilities, and overall degraded visitor experiences. Because of the timed entry reservation to Bear Lake Road Corridor, conditions under alternative D would likely be improved compared to the no-action alternative but degraded compared to alternatives B and C. As described in chapter 2, if the reservation system was expanded to the shoulder or winter season, the impacts on visitor use and experience would be the same as described above, but the impacts would occur whenever the reservation system is in effect. Across all action alternatives, the establishment of visitor use management zones, desired conditions, and visitor capacity provides management direction parkwide to provide high-quality visitor experiences while preserving park resources.

SOCIOECONOMICS

Affected Environment

This section describes the current conditions, including the conditions experienced during the pilot timed entry reservations, related to the socioeconomic environment of Rocky Mountain National Park and its surrounding communities. Partners, stakeholders, visitors, and other interested parties play an important role in helping to shape the management of national park units, and frequent collaboration is essential to planning. This socioeconomic analysis is presented across the following elements:

- socioeconomics of gateway communities (including economics and quality of life)
- equitable access
- commercial use authorizations

The description of these elements is based on the best professional judgement of NPS staff, past and recent research, and scoping efforts.

Socioeconomics of Gateway Communities

The socioeconomic analysis for gateway communities focuses on Estes Park and Grand Lake, as visitation to the park has a direct and measurable impact on the economies for these communities (Bioeconomics and RRC Associates 2023). Gateway communities are defined as the areas surrounding NPS sites, including the cities and towns where visitors typically stay and spend money while visiting sites. In 2021, approximately 4.4 million visits to Rocky Mountain National Park resulted in an estimated \$323 million spent in gateway communities, supporting more than 4,000 jobs in these regions (NPS 2021). Most visitor spending directly affected the hospitality industry, namely hotels and restaurants. A recent analysis indicates there are strong relationships between park visitation and spending in Estes Park and Grand Lake, suggesting that changes in visitation correlate with changes in economic health (Bioeconomics and RRC Associates 2023).

In addition to the importance of economic contributions from park visitors, another key consideration is the quality of life for residents in Estes Park and Grand Lake. Research indicates that tourism development can have varying impacts and, as it continues, can shift resident attitude and overall quality of life from positive to negative (Uysal et al. 2016). A recent socioeconomic monitoring report suggests that approximately 92% of visitors to the park traveled via a private vehicle (i.e., car, truck, or sport utility vehicle) from their home, which can lead to vehicular crowding and congestion in the gateway communities (Otak, Inc. 2023). During peak visitation, vehicular congestion may impede residents' ability to perform routine activities such as driving to the grocery store, running errands, or commuting to their place of work. When this occurs, residents must plan around peak visitation times of day and season. Additionally, vehicle queue lengths at the entrance stations, namely Fall River Entrance and Wild Basin Entrance, would occasionally back-up outside of the park boundary and may block residents from being able to access their property or hinder residents from accessing their businesses.

Estes Park

Estes Park is located southeast of the park's most frequently used entrance station, Beaver Meadows, in Larimer County. The visitor survey (Otak, Inc. 2023) shows that approximately 54%

of respondents used this entrance station. The town sits at the intersection of Highways 36 and 34, which serve as a key transportation route for visitors from Fort Collins, Loveland, Longmont, Boulder, and Denver in Colorado.

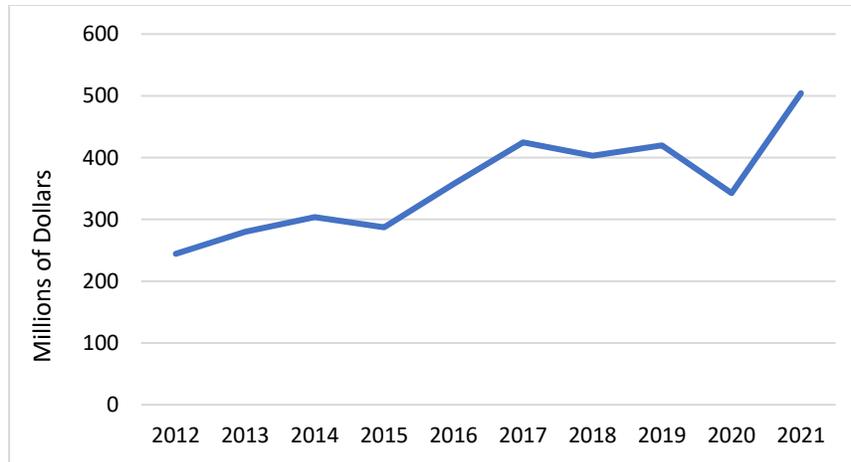
A regional transportation study analyzed location-based services data to better understand visitor travel patterns to and through the park (Fehr & Peers 2020). The analysis concluded that visitation is fairly concentrated during weekend days and during the peak season (i.e., May through October), with the Bear Lake Road Corridor being the most frequently visited area of the park. While the study was conducted before the implementation of the piloted timed entry reservation systems, recent data collection indicates these travel patterns continued during the pilots (Otak, Inc. 2023).

The Town of Estes Park uses the National Community Survey to better understand overall quality of life and trends in livability in the area. This survey is standardized, with a goal to capture opinions within the three pillars of a community (community characteristics, governance, and participation). The survey was first distributed in 2011 and has been repeated in 2014, 2016, 2018, and 2021. The survey asks respondents to rank Estes Park as a place to live and the overall quality of life from poor, fair, good, or excellent. In 2011, 84% of respondents indicated that overall quality of life was good or excellent, but in 2018, the percentage dropped to 76%. Similarly, from 2011 to 2018, the percentage of respondents to state that Estes Park was an excellent or good place to live decreased from 91% to 82% (Town of Estes Park, Colorado 2023a). However, both of these metrics increased from 2018 to 2021, indicating improvements.

Tourism is the largest economic driver for Estes Park residents and business owners. Local businesses provide visitors with services, including lodging, retail, food and beverage, and outdoor adventures in the park or on surrounding public lands. Specifically, in Estes Park, businesses have recorded increased sales tax revenue, which is a proxy for visitor spending since 2017. As expected, visitor spending in 2020 was relatively low due to the COVID-19 pandemic, wildfires, and temporary park and business closures related to these events.

From 2017 to 2022, annual sales tax revenue in Estes Park increased by approximately 64%. While some of these changes are likely attributable to inflation and increased population, these data suggest that the piloted timed entry systems from 2020 to 2022 did not adversely impact business operators in the gateway community (Bioeconomics and RRC Associates 2023). During the months the pilot timed entry system was in effect, tax revenue increased 35%. While sales tax revenue saw a greater increase during months in which the reservation system was not in effect (44%), these data suggest that the timed entry system did not hinder economic growth in Estes Park and that economics during the shoulder and winter season (November through April) are growing (Town of Estes Park, Colorado 2023b). Many tourism and destination marketing organizations strive for economic growth and encourage year-round visitation to gateway communities, which may explain the growth seen in sales tax revenue (Visit Estes Park 2023; Estes Park EDC 2023).

Another study found that visitor spending in the Estes Park Local Marketing District increased by 106% from 2012 to 2021 (Dean Runyan Associates 2022). While there was a dip in 2020, likely due to the COVID-19 pandemic and park closures in response to historic wildfires, visitor spending increased from nearly \$420 million in 2019 to \$504 million in 2021, a 20% increase.



**FIGURE 9. ANNUAL VISITOR SPENDING IN THE ESTES PARK LOCAL MARKETING DISTRICT FROM 2012 TO 2021
(DEAN RUNYAN ASSOCIATES 2022)**

Results from the socioeconomic monitoring report (Otak, Inc. 2023) indicate that lodging outside of the park (e.g., hotels, cabins, vacation rentals) was the primary accommodation in the local area (74% of overnight visitors to the park), followed by camping in the park (10% of overnight visitors). Of the overnight respondents who lodged outside of the park, the median length of stay was four nights, which is indicative of the economic contribution that visitation has had on the local community. Prior to implementing the piloted timed entry system, overnight users often competed with day users to access the park, and anecdotal evidence indicates that overnight users were less likely to stay as long in Estes Park due to crowding and congestion.

Grand Lake

The gateway community of Grand Lake is known as the “Western Gateway” to Rocky Mountain National Park. While there is a strong economic relationship between park visitation and the Grand Lake community, socioeconomic data are less available and, therefore, this analysis is more qualitative in description. Specifically, there is no community survey data available to analyze quality of life for Grand Lake residents. As previously noted, the Grand Lake entrance station and the Kawuneeche Visitor Center welcomes visitors to this area of the park. Trail Ridge Road (Highway 34) is the primary road corridor from Grand Lake to the park and, at high elevations, is closed in the winter. Grand Lake is located 100 miles from Denver through the Rocky Mountains, and the drive can take two to three hours, depending on road conditions. However, visitors to and residents of Grand Lake can recreate year-round in the park. Similar to Estes Park, Grand Lake is a small community that depends heavily on visitation to the park. Because more than 80% of park visitors enter through the east entrances, Grand Lake receives much of their summer visitation via Trail Ridge Road. While many businesses are closed in the winter, the town remains a growing winter destination for those who want to participate in winter recreational activities, such as snowmobiling on US Forest Service lands outside the park, cross-country skiing, or snowshoeing. Increased marketing and year-round growth in tourism may shift the socioeconomics of Grand Lake.

Although socioeconomic research highlights the strong relationship between park visitation and sales tax revenue in Grand Lake (Bioeconomics and RRC Associates 2023), economic data for Grand Lake only goes back to 2018 and, at times, is not as detailed as data for Estes Park. Data collection suggests that, similar to Estes Park, total taxable sales have grown consistently in Grand

Lake from 2018 to 2022 (Town of Grand Lake, Colorado 2023). Figure 8 illustrates the annual increase, which equates to a 92% increase in sales tax revenue from 2018 to 2022. These data also support that most Grand Lake visitation occurs in the summer months. Sales tax revenue by month indicates that July saw the greatest revenue (18% of annual amount), followed by August and June (each 14% of annual amount) for 2022 specifically.

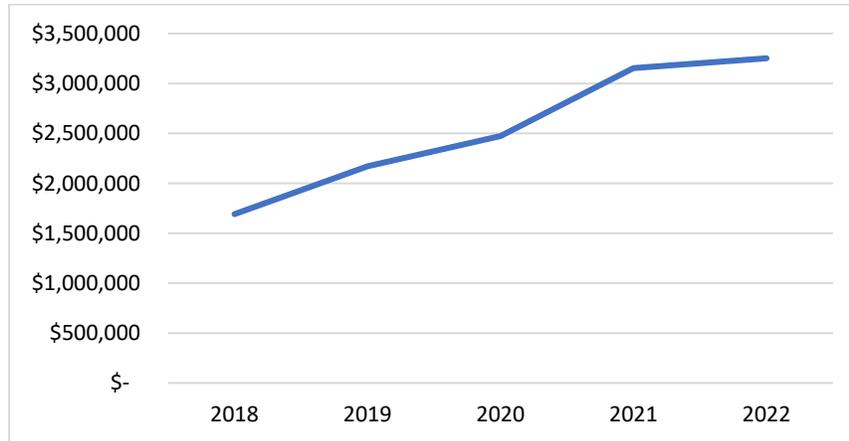


FIGURE 10. ANNUAL SALES TAX REVENUE IN GRAND LAKE, COLORADO (TOWN OF GRAND LAKE, COLORADO 2023)

Equitable Access

Another important socioeconomic consideration includes constraints or barriers to visitation that both visitors and non-visitors experience. Understanding these barriers can help inform NPS managers of how best to serve populations. In this case, equitable access means access to a “healthy, sustainable, and resilient environment in which to live, play, work, learn, grow, worship, and engage in cultural and subsistence practices” (Executive Order 14096, 2023).

A recent study suggests that the top barriers for non-visitors to national parks are the travel distance from home to a national park, associated costs of travel, lack of transportation options, and the cost of entrance fees at national parks (Institute for Tourism & Recreation Research et al. 2022). Entrance fees at Rocky Mountain National Park are \$30 per vehicle for the day. In addition to entrance fees, visitation to the park typically requires a personal vehicle to get to Estes Park, where visitors may access the park via the town shuttle in the summer season, or continue to the park. Visitors without a vehicle may access the park from Denver and other select locations via a transit partnership, the Bustang, for a fee of approximately \$15 round trip. However, this transit service is only offered on weekend days and holidays, from Memorial Day to Labor Day. Visitors who travel from out of state typically need to pay for a flight or fuel for their private vehicle, lodging accommodations and rental car (if applicable), food, and beverage, all of which contribute to financial constraints. In many cases, national park regions and gateway communities may have higher than typical costs for services, thus increasing the cost of a trip. Furthermore, research suggests that as income rises, so does the intention to visit a national park, which illustrates the socioeconomic disparities among non-visitors and visitors to national parks (Institute for Tourism & Recreation Research et al. 2022). Other potential barriers discussed in the research include lack of knowledge of what to do in national parks, the perception that national parks are too crowded, personal health issues, lack of accessibility options for people with disabilities, lack of connectivity in parks that prevents communication with friends and family, and concerns about crime or vandalism. However, the research also indicates that overall,

most respondents felt neutral about these potential barriers or disagreed that they were barriers to visitation (Institute for Tourism & Recreation Research et al. 2022).

During the pilot systems, an additional fee was required for visitors to book a reservation. While this system adds an additional cost to visitation, the amount (e.g., \$2–\$5) is nominal compared to the other associated costs of visiting national parks. In addition, the piloted timed entry systems may pose other barriers for potential visitors who do not have internet access, do not have the flexibility to take time off work to book a reservation, or have language barriers. A lack of information and interpretive signage in other languages can be a barrier to non-English-speaking visitors (Vermeer 2021). The current system, Recreation.gov, only presents information in English and can deter potential visitors from trying to obtain a permit. However, a recent study suggests that implementing a timed entry system at Arches National Park did not meaningfully impact visitor demographics such as race/ethnicity, education level, or income (Miller et al. 2023).

Commercial Use Authorizations

Commercial services allow companies or individuals to conduct business in Rocky Mountain National Park. An organization is considered a business if it provides goods, services, activities, or other things to the public using NPS lands. Two general types of commercial services exist: commercial use authorizations (CUAs) and concession contracts. Commercial use authorizations are one-year permits, while concession contracts are multiyear contracts that range from 10 to 15 years. This document focuses on commercial use authorizations that operate in the park because the short-term contracts (i.e., 2 years) are more likely to be impacted by management decisions compared to long-term (i.e., 10 to 15 years) contracts.

From 2017 to 2023 (excluding 2020), nearly 200 commercial use authorizations have provided visitors services in the park each year. During this time frame, the type of activities offered has not changed substantially, but there has been a shift in number of commercial use authorizations and visitors served annually (figure 11). The most popular activities with the greatest number of permits each year include interactive interpretative vehicle tours, guided hiking, guided backpacking, guided winter activities (i.e., snowshoeing, cross-country skiing, avalanche and education courses), and guided fly fishing.

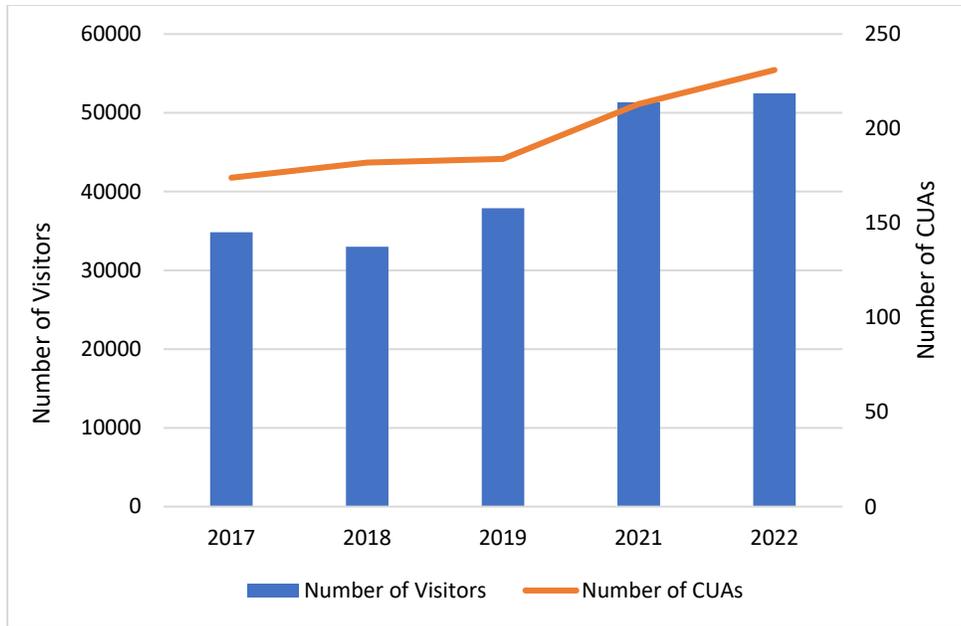


FIGURE 11. NUMBER OF ANNUAL VISITORS PARTICIPATING IN COMMERCIAL SERVICES AND NUMBER OF COMMERCIAL USE AUTHORIZATIONS, BY YEAR (CUA ANNUAL REPORTS)

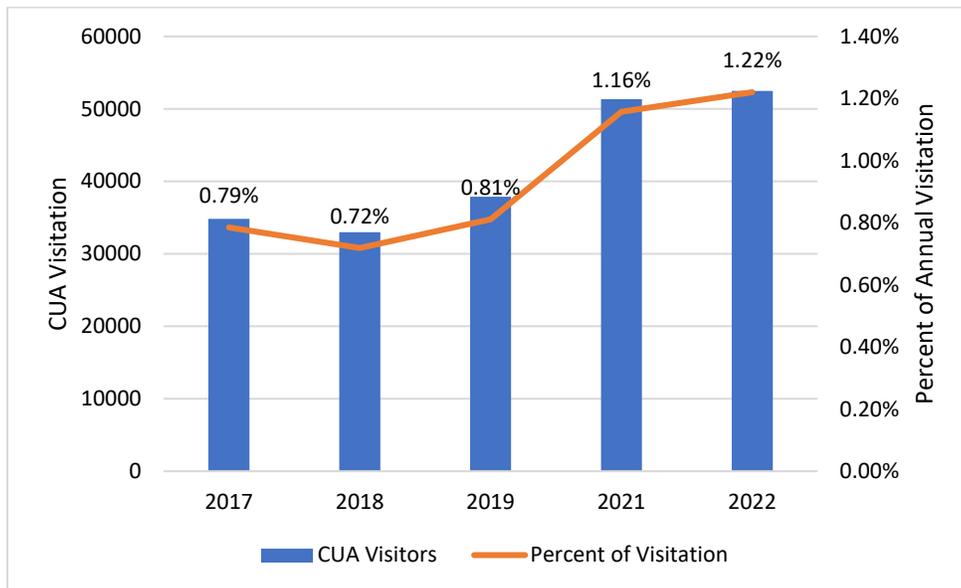


FIGURE 12. ANNUAL PERCENTAGE OF VISITORS PARTICIPATING IN GUIDED ACTIVITIES COMPARED TO ANNUAL VISITATION (CUA ANNUAL REPORTS)

Socioeconomic Trends and Planned Actions

In 2022, the population of Estes Park was roughly 5,800 people, which is an approximately 2% increase in population growth from 2010 (Headwaters Economics 2023). Alternatively, Grand Lake experienced a population decrease from nearly 470 people in 2010 to approximately 400 people in 2022 (World Population Review 2023). This decrease may have been tied to the East Troublesome Fire in 2020, which destroyed approximately 300 private homes in the greater

Grand Lake area (Jackson 2021). Generally, trends in the socioeconomics of gateway communities, equitable access, and CUA providers change annually.

Increased visitation, concentrated visitor use, and pulsing visitation patterns lead to positive trends in business revenue to an extent but can decrease the quality of life for nearby residents, particularly for Estes Park. A community survey of Estes Park residents found that overall quality of life improved between 2018 and 2021; in 2018, 76% of residents stated quality of life was good or excellent and in 2021, that percentage increased to 81% of residents (Town of Estes Park, Colorado 2023a). Data from other national park gateway communities suggests that the number of people visiting can negatively impact the quality of life for residents.¹⁵ Therefore, managing concentrated visitation use, such as through piloted timed entry systems, can result in conditions that reduce negative impacts on quality of life. In addition, the overall economic health has improved during this time according to residents; 54% of people surveyed in 2018 indicated that economic health was good or excellent in 2018 and in 2021, this increased to 66% (Town of Estes Park, Colorado 2023a). Overall, excluding Estes Park in 2020, taxable sales have grown consistently in the two gateway communities between 2016 and 2022. Estes Park and Grand Lake have both seen more rapid increases in taxable sales than was experienced for the state as a whole (Bioeconomics and RRC Associates 2023). These data suggest that the timed entry pilot reservation systems did not have a negative or positive impact on the economic health of the gateway communities, and that they continue to flourish.

During the piloted timed entry reservation system, the reduced vehicular congestion and distribution of visitation throughout the day presumably improved residents' quality of life and allowed businesses to better staff and plan for visitation hours. Discussions with representatives from the Town of Estes Park and the Town of Lyons indicate that the reservation system aided with the traffic congestion they experienced before 2020. The park and the Grand Lake area have seen increased through traffic, particularly on Sunday afternoons, as people often avoid the I-70 corridor to head east from the mountains.

Park managers continue to strive to provide equitable access for visitors by reducing some of the barriers described above in the affected environment section. For instance, the transit partnership with Bustang provides an affordable means of transportation from Denver and other areas along the Front Range to the park. To reduce technological barriers, the park partnered with Rocky Mountain Conservancy to provide high-speed internet access visitor centers located outside the park entrance stations (i.e., Beaver Meadows, Fall River, and Kawuneeche Visitor Centers) and provides technology (e.g., iPads) in an effort to allow visitors to spontaneously acquire a reservation permit, if any are available for that day. The park partners with the Estes Valley Library to provide internet access that allows visitors and residents to purchase reservations online and collaborates on training for library staff and volunteers. Lastly, the park works with nonprofit youth groups, schools, and affinity groups to bring underrepresented groups into the park. These activities strive to bridge the equity gap and encourage visitation from

15. A recent survey in Jackson Hole, Wyoming, found that 93% of Teton County residents strongly agreed or agreed that the number of people visiting the area has a negative impact on the quality of life in the summer. In addition, 87% strongly agreed that tourism contributes to traffic problems (International Institute of Tourism Studies 2022). A similar survey of residents in Sitka, Alaska, found that 81% of respondents noticed a change in their ability to access local businesses, including restaurants, given increased tourism (Matthews and Gandhi 2023).

new audiences. This work will continue to be a priority for the park, and staff will explore new ways to overcome barriers to access to public lands.

The National Park Service has engaged in a nationwide effort to conduct socioeconomic monitoring across national park units. Despite these improvements, equitable access fluctuates. As the state population continues to flourish and the economy grows, increases in cost of living can further exacerbate socioeconomic disparity among visitors. Increasing cost of travel may hinder low-income populations from being able to afford to visit or take time off work, while high-income populations would continue to visit. Consequently, visitors to national parks may continue to be primarily white, older, and higher income populations, as currently seen across the agency (Otak, Inc. 2023)

Regarding CUA holders, park staff recorded a notable shift in the number of visitors participating in guided activities from 2017 to 2022 (excluding 2020). In 2017, nearly 35,000 visitors participated in a guided activity; in 2022, this number increased by approximately 34% to more than 53,000. The substantial increase was noted from 2019 to 2021, when interactive, interpretive vehicle tours became more popular among visitors. The percentage of visitors participating in guided activities compared to the annual number of visitors was 0.79% in 2017. This percentage increased to 1.22% in 2022 (figure 9).

Climate change could increase the frequency and severity of natural disasters, such as wildfires, avalanches, or thunderstorms. Damages from such storms, such as the 2013 Colorado floods, can negatively impact gateway socioeconomics if residents and business owners are forced to evacuate or lose their homes and/or businesses. These natural disasters typically take time to rebound from and can have impacts on economic health in a community for months to years. Furthermore, damage from severe storms occasionally leads to park closures (i.e., wildfires of 2020), which drastically reduce visitation and lead to negative short-term and long-term trends in economic contribution to gateway communities businesses. On the contrary, changes in weather patterns, such as extended warm weather seasons, may lead to increased visitation in shoulder seasons or nonpeak seasons, which can lead to economic growth. Recent climate change research suggests that Rocky Mountain National Park may see up to a 34% increase in visitation during the peak season (i.e., three busiest contiguous months) and up to a 72% increase in shoulder season visitation (two months before and two months after peak season), based on air temperature and potential visitation growth (Fisichelli et al. 2015). These shifts in visitation would likely have positive impacts on the economic growth of gateway communities.

In summary, some aspects of socioeconomics have improved, while others have degraded and the conditions can change annually depending on various factors (e.g., natural disasters, visitation patterns). Economic health in the gateway communities of Grand Lake and Estes Park are consistently improving, as is the quality of life. However, unsustainable growth in tourism can have negative impacts on residents (Uysal et al. 2016). Specific to the topic of equitable access, the National Park Service and Rocky Mountain National Park have taken actions nationwide and parkwide to evaluate barriers to visitation so that park managers can identify solutions to reduce these barriers. While some improvements have been made over the years, an increased cost of living and economic disparities can exacerbate some of the primary barriers identified in the research. Although the reservation system under the pilots costs an additional fee, the amount is nominal compared to the costs associated with traveling to national parks. Lastly, CUA operators have experienced positive trends in recent years due to an increase in number of visitors participating in guided activities. Planned actions in the park, such as ongoing accessibility and

circulation improvements, routine trail and facility maintenance, technological improvements, and fire restoration activities, are unlikely to have substantial impacts on the socioeconomic trends described above.

Environmental Consequences

Common to All Alternatives

Actions common to all alternatives, such as continuing transit partnerships, technological improvements, providing visitor information, visitor orientation, and enforcement, would not have additional impacts on socioeconomics. The trends would be similar to what is described above in the affected environment section, and many of these actions help reduce some of the barriers to equitable access and visitation.

Alternative A: No Action

Under the no-action alternative, impacts on socioeconomics would be similar to what is described in the affected environment section before the implementation of the piloted timed entry reservation systems. The population growth of Colorado is expected to lead to increased visitation and continued congestion in the park. While an increase in visitation may provide economic benefits to businesses in gateway communities, park staff observed that with pre-2020 pilot management systems, some visitors were unable to find parking spots in town and, consequently, did not stop in the gateway communities, thus reducing the potential contributions to the local economy and adversely impacting the economic benefits to businesses. Furthermore, concentrated use during the weekends leads to traffic congestion that occasionally impedes the ability for residents to complete basic errands or access private property and businesses. As noted in the affected environment section above, Estes Park community surveys indicate that quality of life decreased from 2011 to 2018, during which the park experienced a substantial increase in visitation. From 2018 to 2021, survey results indicate that overall quality of life increased (Town of Estes Park, Colorado 2023a). Under the no-action alternative, temporary closures in high-demand areas would be more frequent, as observed before 2020. These closures have the potential to cause visitor displacement, leading to increased congestion in other areas of the park or outside the park, which can degrade the quality of life.

Under the no-action alternative, continuing pre-2020 pilot management strategies would result in little-to-no additional impacts on equitable access. As noted above, recent studies indicate that travel distance to a national park, financial costs, and lack of transportation options serve as the primary barriers to visitation. These barriers would likely continue under the no-action alternative. However, the temporary closures in high-demand areas would prevent access to all visitors when the closures are in effect.

The no-action alternative would likely result in adverse impacts on CUA holders, as numbers of visitors participating in guided activities would likely shift back to 2017 to 2019 numbers or less than 1% of annual visitation to the park compared to an average of 1.2% of annual visitation in 2021 and 2022. A reduction in this visitor participation would decrease their revenue.

Cumulative Impacts. The impacts of past, present, and reasonably foreseeable future actions are described above in the socioeconomic trends and planned actions section. Socioeconomic conditions can vary annually, but general trends have been improving. When paired with impacts from past, present, and reasonably foreseeable future actions, there would be overall beneficial

cumulative impacts under the no-action alternative; however, the adverse impacts of the no-action alternative would reduce some benefits. Under the no-action alternative, socioeconomic conditions and trends would be similar to what was experienced during the pre-2020 pilot management system. Many of the socioeconomic improvements that have been made from 2020 to 2023 to reach current conditions would be negated, particularly for socioeconomics of gateway communities and CUA operators. Although overall economic health of gateway communities would likely remain strong, there may be adverse impacts on businesses due to concentrated visitation that prevents visitors from stopping in town due to lack of parking or eagerness to get into the park. Additionally, quality of life for residents would be adversely impacted. While the agency and the park strive to better understand key barriers to visitation, such as travel distance to a national park, financial costs, and lack of transportation, an increased cost of living may lead to economic disparities that could hinder low-income populations from being able to afford a trip or take time off work to visit parks. Overall, cumulative impacts on socioeconomics would be beneficial, with some adverse impacts under alternative A.

Common to Action Alternatives B, C, and D

Based on lessons learned from the piloted timed entry reservation systems at Rocky Mountain National Park, the Bear Lake Road Corridor timed entry system is anticipated to beneficially impact the socioeconomics (e.g., economic contributions and quality of life) of Estes Park, primarily. Data from the socioeconomic monitoring survey indicate that approximately 62% of respondents either visited or planned to visit Bear Lake during their trip (Otak, Inc. 2023). Therefore, the implementation of a reservation system for the Bear Lake Road Corridor would have some impacts on socioeconomics but would be greater when paired with other alternatives, as described below.

The timed entry reservation system to the Bear Lake Road Corridor benefits the quality of life for Estes Park residents due to reduced congestion at peak times, but the system also creates more consistent visitation patterns by dispersing visitor use throughout days, weeks, and months. This provides business owners with more predictability, increases the chances of consistent business throughout the day, and allows them to staff accordingly. Conversations with local stakeholders suggest that under the piloted timed entry reservation system, visitors had more confidence that they would be able to get into the park and find a parking spot, which led visitors to spend more time in the gateway community before and after their timed entry reservation slot. Upon implementation, there would be no additional impacts on quality of life or socioeconomics during times of year when the system is not in place. If the reservation system is expanded to the shoulder or winter weekend season, impacts would be similar to what is described above. However, many businesses operate different hours in the winter and may even be closed; therefore, there would likely be no additional impacts on economic health. For an analysis of impacts on visitor access to the park, please see the visitor use and experience section.

Similarly, for commercial services, the timed entry reservation system for the Bear Lake Road Corridor is likely to provide beneficial impacts for operators at the onset. Because the majority of CUA holders provide visitor services in the Bear Lake Road Corridor, more visitors may have purchased a commercially guided tour to access the park because, under these piloted systems, commercial operators were excluded from the requirement to obtain a timed entry reservation. This would be expected to continue with a long-term timed entry system for the corridor and would likely result in beneficial impacts due to increased revenues for CUA holders who operate from May through October. There would be no additional impacts on winter operators at the

time of implementation. If the reservation system is expanded to the shoulder or winter season, impacts would be the same, as described above for winter CUA operators. If the park implemented a reservation requirement for CUA holders (described in chapter 2), and this system is implemented as a separate from a reservation system for the public, this action would adversely impact operators, as it puts a maximum on the number of trips that can be provided in a given year.

Bear Lake Road Corridor reservations may impact equitable access for visitors due to the additional fee; however, it is a nominal fee when compared to the overall costs of traveling to and visiting national parks, including the park entrance fee. Due to the timing in which reservations are released and how quickly they can sell out, potential visitors may need to acquire their reservations during work hours. Depending on the occupation, this may pose added difficulties for some visitors and may favor visitors who are retired or have flexibility with their occupations. Additionally, the reservation is sold online, meaning potential visitors need to have access to internet to obtain a reservation. Consequently, a reservation system would be unlikely to further impact socioeconomic disparities in visitation, resulting in the national park continuing to see visitor demographics that are primarily white, over the age of 45, and with an income greater than \$100,000 (Otak, Inc. 2023; Miller et al. 2023). If the reservation system is expanded to the shoulder or winter weekend season, impacts on equitable access would be similar to what is described above on a more frequent basis.

Across all alternatives, park staff may adjust components of the reservation system, such as the seasonality and timing. If Bear Lake Road Corridor reservations are expanded to the shoulder season (e.g., April and November) or to winter weekends, there would not be new impacts on visitor use and experience. Rather, the impacts would be similar to what is described above but would occur for the time period and location of the expanded reservation system and apply in particular to winter recreationists. Activities such as scenic driving along Trail Ridge Road would not be impacted by an expanded reservation system due to the seasonal closure.

In addition, park staff would implement a zoning scheme and associated desired conditions for visitor use management parkwide. The visitor use management zones provide updated management direction for visitor use and experience across the various park landscapes, providing consideration and inclusion of equitable, accessible, and inclusive experiences and supported facilities that support a diverse range of visitor interests and preferences. The development of zones and desired conditions would benefit socioeconomics, as they provide clear direction for long-term management of the park and allow neighboring communities to better plan for related issues such as traffic flows and public services. In addition, park managers would identify and manage to visitor capacities by implementing the actions described in chapter 2, and the impacts of those actions are evaluated in this section. The identified capacities help ensure that desired conditions for experiences and resources are maintained, thus beneficially impacting socioeconomics.

Alternative B

In addition to the impacts described under the common to all action alternatives, a timed entry reservation system for the rest of the park would further impact socioeconomics. When paired with reservations for the Bear Lake Road Corridor, a timed entry system to the rest of the park would reduce vehicular and pedestrian congestion in gateway communities, improving the quality of life for gateway community residents who could access private property and businesses

without having to wait in the entrance station queue. Furthermore, reduced traffic would allow residents to complete day-to-day errands in a timelier manner. This paired reservation system would also maximize the number of visitors the park can accommodate (see chapter 2) while maintaining desired experiential and resource conditions. As described in the affected environment section and under the piloted timed entry system, the economic health and quality of life in Estes Park and Grand Lake greatly improved (Town of Estes Park, Colorado 2023a, 2023b; Town of Grand Lake, Colorado 2023), and similar benefits would be expected under this alternative.

A timed entry reservation system for the rest of the park would have similar nominal impacts on equitable access and visitation as described above for the Bear Lake Road Corridor reservations in the common to alternatives B, C, and D section. The impacts of temporary closures in high-demand areas would be reduced, as the reservation system would be designed to minimize the number of times a closure is needed as a management strategy. There would be no additional impacts on CUA operators, and impacts would be similar to what is described above in the affected environment section for commercial use authorizations during the years the park piloted timed entry system and in the common to alternatives B, C, and D section.

Cumulative Impacts. The impacts of past, present, and reasonably foreseeable future actions are described above in the socioeconomic trends and planned actions section. Conditions in socioeconomics can vary annually, but general trends have been improving. Actions under alternative B would result in beneficial cumulative impacts on the socioeconomics of both Estes Park and Grand Lake. This alternative, when paired with ongoing actions and actions common to alternatives B, C, and D, would result in conditions that are similar to what is currently experienced. As a result, overall cumulative impacts on socioeconomics would be beneficial under alternative B.

Alternative C

Alternative C would result in beneficial impacts on socioeconomics but would not maximize the number of visitors who can access the rest of the park. Under a daily reservation system, park staff would reduce the number of reservations available to account for pulsing visitation or visitors accessing the park at the same time, as occurred before 2020. This daily permit system could potentially result in fewer visitors from May through October, which could adversely impact businesses during this time due to decreases in revenue. While quality of life for community residents may improve due to less vehicle congestion, the daily permit system to the rest of the park is more likely to result in concentrated visitor use during peak times, compared to current conditions, because if a certain number of reservations are valid from 9:00 a.m. to 3:00 p.m., it is likely that majority of daily permit holders would arrive within the same window (i.e., 9:00 a.m. to 11:00 a.m.). This pattern of concentrated visitor arrival would likely result in traffic congestion in gateway communities.

An additional daily reservation system for the rest of the park would have similar nominal impacts on equitable access and visitation, as described above for the Bear Lake Road Corridor reservation system. The impacts of temporary closures in high-demand areas would be reduced, as the reservation system would be designed to minimize the number of times a closure is needed as a management strategy. There would be no additional impacts on CUA operators, and impacts would be similar to what is described above in the actions common to alternatives B, C, and D section.

Cumulative Impacts. The impacts of past, present, and reasonably foreseeable future actions are described above in the socioeconomic trends and planned actions section. Conditions in socioeconomics can vary annually, but general trends have been improving. Actions under alternative C would result in a mixture of beneficial and adverse impacts on the socioeconomics of both Estes Park and Grand Lake. This alternative, when paired with ongoing actions and actions common to alternatives B, C, and D, would result in beneficial cumulative impacts on socioeconomic conditions; however, some adverse impacts from alternative C would reduce these benefits. As a result, overall cumulative impacts on socioeconomics would be beneficial under alternative C.

Alternative D

While the reservation system for the Bear Lake Road Corridor would have beneficial impacts, as described above in the common alternatives B, C, and D section, visitation to other areas of the park would be managed by entrance gate closures. The reservation system for the Bear Lake Road Corridor may cause visitor displacement to the rest of the park. Therefore, entrance gate closures would likely occur during times of concentrated visitation (i.e., weekend days and holidays from May through October). The impacts of entrance gate closures to gateway communities are less certain. Entrance gate closures may cause visitors to spend more time in gateway communities or less if they choose to travel elsewhere for recreation. Entrance gate closures would degrade the experience and may reduce the number of visitors who visit the park again in the future. Data suggest that nearly 60% of visitors to the park are repeat visitors; therefore, this change in visitation could adversely impact socioeconomics of gateway communities if repeat visitation decreases and leads to an overall decrease in annual visitation (Otak, Inc. 2023).

Entrance gate closures would prevent visitors from accessing the park and would adversely impact equitable access and visitation by creating an additional barrier. Similarly, CUA operators would be adversely impacted by entrance gate closures and would likely experience reduced revenue due to the inability to provide guided services during closures.

Cumulative Impacts. The impacts of past, present, and reasonably foreseeable future actions are described above in the socioeconomic trends and planned actions section. Conditions in socioeconomics can vary change annually, but general trends have been improving. Actions under alternative D—namely entrance gate closures for the rest of the park when concentrated visitor use occurs—would result in adverse cumulative impacts on the socioeconomics of both Estes Park and Grand Lake. This alternative, when paired with ongoing actions and actions common to alternatives B, C, and D, would result in adverse socioeconomic conditions compared to what is described above in the affected environment section. As a result, overall cumulative impacts on socioeconomics would be adverse under alternative D.

Comparative Conclusion Across Alternatives

The no-action alternative would result in cumulative beneficial impacts on socioeconomics that would be reduced by adverse impacts, such as concentrated visitor use, and lead to traffic congestion and queue lengths at the entrance station that contribute to a degradation of quality of life for residents who cannot access their property or place of employment or complete day-to-day errands in a timely manner. Socioeconomics would most resemble conditions in the pre-2020 pilot management system. Across alternatives B, C, and D, the implementation of a reservation system from May through October provides beneficial impacts of varying degrees to

socioeconomics when compared to the no-action alternative. For alternatives B and C, if any of the reservation systems (i.e., the Bear Lake Road Corridor or rest of park) are expanded to the shoulder season or winter weekends, impacts on socioeconomics would be the same as described above but extended to the time for which the reservation system is in effect. Alternative B would likely result in an 8% decrease in visitation from May to October compared to the no-action alternative; alternative C would result in a 21% decrease compared to the no-action alternative; and alternative D would result in a 25% decrease compared to the no-action alternative. However, research suggests that visitation during other seasons would increase and that the timed entry system did not hinder economic growth in Estes Park; in fact, economics during the shoulder and winter seasons are growing (Town of Estes Park, Colorado 2023b; Bioeconomics and RRC Associates 2023). However, alternatives C and D would result in a more substantial change to visitation, and adverse socioeconomic impacts may be greater under these alternatives.

Alternative B would result in the most beneficial impacts on socioeconomics compared to the no-action, as the timed entry reservation for the Bear Lake Road Corridor and the rest of the park maximizes the number of visitors who can be accommodated and encourages an even distribution of visitors throughout the day and season. Some barriers to equitable access and visitation would continue, but park managers would continue to mitigate these barriers through partnerships, technological improvements, and other means. In addition, CUA operators would continue to benefit from visitation and increased interest in commercial services. Alternative C would result in beneficial socioeconomic impacts compared to the no-action alternative, but the daily permit system for the rest of the park would result in fewer reservations sold per day to account for visitors arriving at the same time within the daily window (i.e., if a permit is valid from 9:00 a.m. to 3:00 p.m., the majority of visitors would still arrive between 10:00 a.m. and 12:00 p.m.). Impacts on equitable access and visitation and CUA operators would be similar to alternative B. Overall, beneficial impacts of alternative C would not be as substantial as the impacts of alternative B. Alternative D would have some beneficial impacts due to the reservation system for the Bear Lake Road Corridor, but frequent entrance gate closures would adversely impact the socioeconomics of gateway communities, serve as a barrier to equitable access and visitation, and likely reduce some revenue for CUA operators who provide guided services in the rest of the park.

ALPINE TUNDRA

Affected Environment

This section describes the existing conditions related to the alpine tundra environment of Rocky Mountain National Park (2020–2023). The description of these elements is based on the best professional judgement of NPS staff, past and recent research, and scoping efforts.

Alpine tundra comprises approximately one-third of the total park area. This ecosystem is characterized by a harsh climate and starts between elevations of 11,000 to 11,500 feet. It is characterized as treeless, cold, and relatively dry. Alpine tundra in the park occurs at such high elevations where temperatures are colder, winters are longer, and growing seasons are shorter (NPS 2020b). Strong, frequent winds and cold temperatures limit plant species that can grow there. Most alpine plants are perennials. Many are dwarfed by the stressful elevational and exposed conditions, but their few blossoms may be brilliant and full sized. Many flowering plants of alpine tundra have dense hairs on stems and leaves to provide wind protection or red-colored pigments capable of converting the sun's light rays into heat. Some plants take two or more years to form flower buds, which survive the winter below the surface and then open and produce fruit

with seeds in the few weeks of summer. Grasses and sedges are common where alpine tundra soil is well-developed. Adaptations for survival amidst drying winds and cold temperatures may make alpine tundra vegetation seem hardy, but in some respects, it remains very fragile. Summer on the alpine tundra is short; snow is prominent on the landscape into June, with a few isolated snow patches remaining through the summer. July is generally the warmest month, with an average high temperature of 52°F (11°C). Wind across the alpine tundra is common and can make even a warm, sunny day feel cold. During the long winter, plants are dormant, wind blows snow into deep patches, and animals are either in hibernation or adapting to extreme cold.

Because alpine tundra is a fundamental resource, park managers give it increased attention to protection and access in this ecosystem. Almost all alpine tundra in the park is located in federally designated Wilderness, which requires the preservation of wilderness character, including the natural quality of wilderness character (see the wilderness impact topic for more information). Trails in alpine tundra remain minimal and were designed to preserve the function and integrity of this ecosystem. Rare alpine tundra vegetation at the park includes “snow lover” (*Chionophila jamesii*) and *Castilleja puberula*, a paintbrush plant. Alpine tundra plants require special adaptations to live here. These species are generally low to the ground and can live for years (possibly decades to more than 100 years old). Each summer, they have a very short window in which to green up, flower, and produce seeds. It may take hundreds of years for the alpine tundra to recover from seemingly minor impacts, which include trampling by visitors and vehicles (NPS 2020a).

With some exceptions, the park’s high-elevation ecosystems retain natural integrity, and alpine tundra vegetation thrives in its natural environment. This vegetation supports wildlife that both migrate to alpine tundra and wildlife species that remain in alpine tundra all year. A species of importance to the park is ptarmigan (*Lagopus leucura*), which depends heavily on alpine willow populations. The ptarmigan population near Trail Ridge Road is documented to be in decline, while other populations in Colorado are not (Braun et al. 1991). Causes of decline in the Trail Ridge Road population include loss of willow due to willow overbrowsing by elk and climate change (Braun et al. 1991). However, the species’ location along the roadway calls into question whether disturbance from visitors plays a role.

The 11 miles of Trail Ridge Road above tree line, for example, show signs of widespread expansion of unendorsed parking and visitor-created trails. In some areas along Trail Ridge Road, in the late spring and summer, visitors are enticed by existing snow fields on both sides of the road and will park informally on both sides of the road in the shoulder—denuding vegetation between the road and snowbanks—seeking snow play opportunities. Excessive footsteps on these areas also compact soils and creates trails, which may take decades to recover. Snowbanks that block easy access to trails or muddy conditions among recently melted areas often cause visitors to go off-trail to reach their desired destinations (e.g., Forest Canyon Overlook).

Trends and Planned Actions

As a fundamental resource, park managers have studied alpine tundra for decades. Some long-term studies have documented the impacts of visitor use on alpine tundra. Formal monitoring of the impacts of visitors in the alpine tundra started in 1959 when Dr. Beatrice Willard established two research plots along Trail Ridge Road. Willard and her coauthors concluded that repeated trampling leads to soil loss in alpine tundra. Willard noted when one or a few visitors leave their cars in parking areas and walk over dry alpine tundra, they may leave no

trace of their passage (Willard et al. 1970). However, if other visitors follow the same route day after day, pathways develop because soils are compacted and plants are first bent, then broken, and finally killed. If trampling continues, the plant cover, and eventually the more friable upper-soil layers, are churned up and eroded over time by wind and water. Willard continued her monitoring for 40 years and published numerous papers on the subject.

Since the 1970s, visitor impacts have been regularly monitored and documented by several researchers. Researchers concurred with Willard that alpine tundra vegetation in the park was more heavily impacted by high-density visitor use, like that found along Trail Ridge Road, designated trails, or at recreation sites, than by dispersed or low-density visitor use (Willard et al. 1970).

Based on recommendations from Dr. Willard, park staff hardened alpine tundra trails and increased education about the alpine tundra ecosystem. Park staff paved trails to help define walking paths, but when concentrated visitor use exceeds the designed trail width, visitors step off the paving and expand the trail. These environments do not recover on their own without the physical exclusion of visitors, and this recovery can take decades or more (Willard et al. 2010). Park staff perform revegetation of selected visitor trampled areas, and such work is time consuming and expensive.

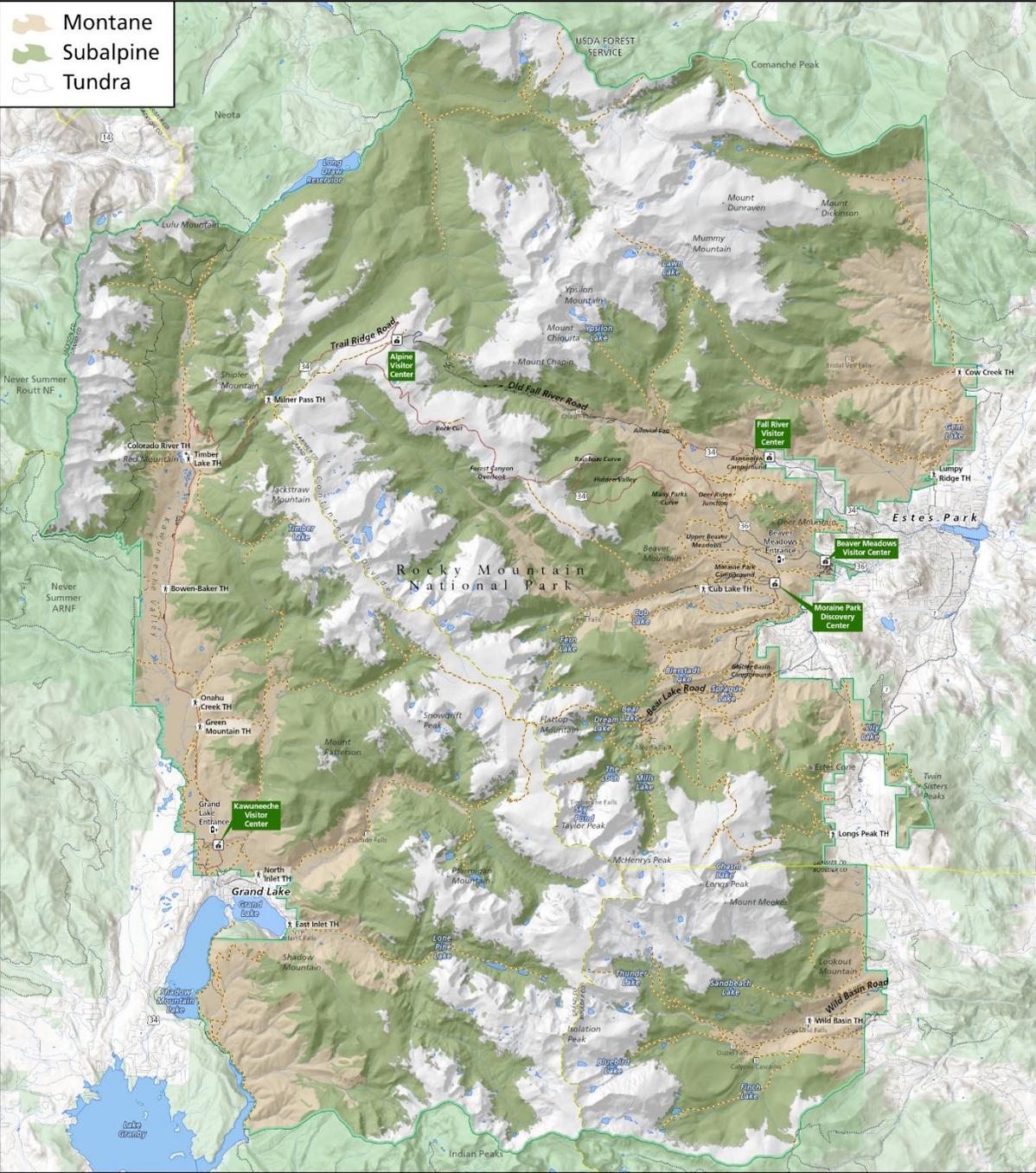
Several other studies regarding visitor impacts have been documented through the years. For example, researchers concurred that alpine tundra vegetation in the park was more heavily impacted by high-density visitor use, like that found along trails or at recreation sites, than by dispersed or low-density visitor use (Baron and Richer 2011). Park staff's current use of fully hardened trail sections, area closures, and intense education efforts aims to keep people on trails and helps protect alpine tundra in highly used areas.

In addition to visitor impact studies, other studies have shown that elevated levels of atmospheric nitrogen deposition, in concert with climate change, could affect plant species composition and increase grass species cover in the alpine at the expense of forbs. In addition, park staff have observed invasive exotic plants, including smooth brome (*Bromus inermis*) and yellow toadflax (*Linaria vulgaris*) in the alpine tundra beginning in 2022, potentially due to warming temperatures combined with unintentional human transport of seeds and plant propagules. Similarly, minor soil warming and the loss of permafrost has been documented along Trail Ridge Road. Willard and Cooper (2007) found that trampling in protected plots established midcentury showed impacts on vegetation recovery, along with other factors, and also favored specific types of plant species over others.



Ecoregion Map

- Montane
- Subalpine
- Tundra



Produced By: ROMO Geospatial Program, 7/6/2023
Projection: NAD 1983 (2011) UTM Zone 13N

FIGURE 13. ROCKY MOUNTAIN NATIONAL PARK ECOREGIONS

Facility projects in alpine tundra since the 1990s have focused on visitor experience and road safety. These include replacement of comfort stations, formalizing visitor-created pullouts in appropriate areas, and restriping the Alpine Visitor Center parking lot multiple times. In addition, park staff use signs and a variety of roadside barriers to try to contain visitors to hardened surfaces, especially in high-concentration areas. Park staff have also added curbing to some roadside parking to try to keep vehicles on pavement. Park staff have been working on three projects along Trail Ridge Road since 2019 to restore areas that lost alpine tundra vegetation due to decades of human-caused trampling. These projects are challenging to undertake because of the short working and growing season during summer months, the time it takes to collect and sow native seed, and the challenges of reestablishing vegetation in alpine tundra. For these three projects, park staff removed broken asphalt, hauled in topsoil to reestablish the vulnerable organic layer, grew out seeds collected from the park's alpine tundra, planted more than 65,000 plants, and watered them for multiple summers. Restoration plant types include tundra grasses and forbs (e.g., alpine avens, old man on the mountain sunflower, clover, and tufted hair grass). These projects helped stabilize steep slopes and included placing rocks and boulders to assist with slope grade improvements. These example projects also provide opportunities to educate and engage visitors in alpine tundra protection.

In addition, the superintendent implements tundra closure areas around key sites, including Fall River Pass, Forest Canyon Overlook, the Gore Range parking area, and the Lava Cliffs parking area. Park staff also implement numerous efforts to preserve alpine tundra, such as those along the Longs Peak Trail (e.g., trail projects, privies, education and outreach). Tundra closures are designated to restrict use and protect fragile alpine tundra from damage caused by heavy, concentrated foot travel. The park also prohibits off-trail hiking within 100 yards of the trails and parking lots in closure areas unless otherwise designated. In addition, park staff manage visitation to alpine tundra through wilderness camping permits (where applicable) and CUA stipulations (e.g., guided fishing at approved areas).

The park prioritizes sharing information about visiting alpine tundra, recreating responsibly, and safety. These messages are available through ranger programs, roving volunteers, and via the website, apps, and social media. Because this education effort started in the early 1960s, visitors also educate each other about alpine tundra protection. In 2020, the Year of the Tundra was initiated, which further enhanced interpretive efforts to increase stewardship (NPS 2020a).

However, the development of visitor-created trails and the widening of existing trails in the alpine tundra is especially pronounced (Svadja et al. 2016). Damage to this sensitive environment from repeated foot traffic can destroy tundra plants and compact soils and without protection and restoration, may take hundreds of years to recover. In recent years, park staff have observed and mapped an increase in the impacts of visitor-created trails, according to data from the Continental Divide Research Learning Center. For example, Marmot Point has seen an expansion of an unendorsed parking area and increases in the number and width of visitor-created trails and subsequent erosion. In a pullout west of Forest Canyon Overlook, a visitor-created trail continues to develop and expand. As visitation increased, park staff took actions to protect the alpine environment, adding signage directing visitors "how to behave on fragile tundra," and updating the Superintendent's Compendium to authorize site-specific closures to mitigate resource impacts. Regarding winter use, alpine tundra plants are dormant, mostly covered by snow, and recreational use and overall visitor impacts are low.

Climate change would likely change visitor use patterns, which would likely impact alpine tundra as well. An increased interest in winter recreation combined with climate change effects (e.g., later snowfalls in fall and early winter) may lead to increased visitation during historically lower-use seasons. These dynamics would add to repeated foot traffic that can destroy tundra plants, compact soils, and would require a very lengthy timespan to recover. Richardson and Loomis (2004) cited a study from the summer of 2001 to estimate the effects of climate change on park visitation, for example. Results suggested that changes in climate would lead to increased visitation for baseline and moderate climate scenarios. However, in an extreme heat climate scenario (greater than 50 days exceeding 80 degrees Fahrenheit), visitation would decline. Regarding wildlife patterns, as climate warms and seasonality shifts, wildlife usage would likely adapt to increasing pressure on alpine willow, which would further impact ptarmigan populations. Tree line elevations would likely recede and move upslope, reducing the overall alpine tundra area (Fisichelli et al. 2015).

Environmental Consequences

Common to All Alternatives

Actions common to all alternatives would not have additional impacts on alpine tundra. Actions such as temporary area closures have a benefit to this resource. The trends would be similar to what is described above in the affected environment section. Similarly, all action alternatives would incorporate potential restoration efforts, as well as the sharing of stewardship messaging from park staff and volunteers.

Alternative A: No Action

Under the no-action alternative, returning to the pre-2020 pilot management strategies, visitation would concentrate between 10:00 a.m. and 2:00 p.m. This concentration would lead to a full parking lot at the Alpine Visitor Center and to overflow roadside parking along Trail Ridge Road. Parking at overlooks and designated trailheads would fill on a daily basis (figure 14).

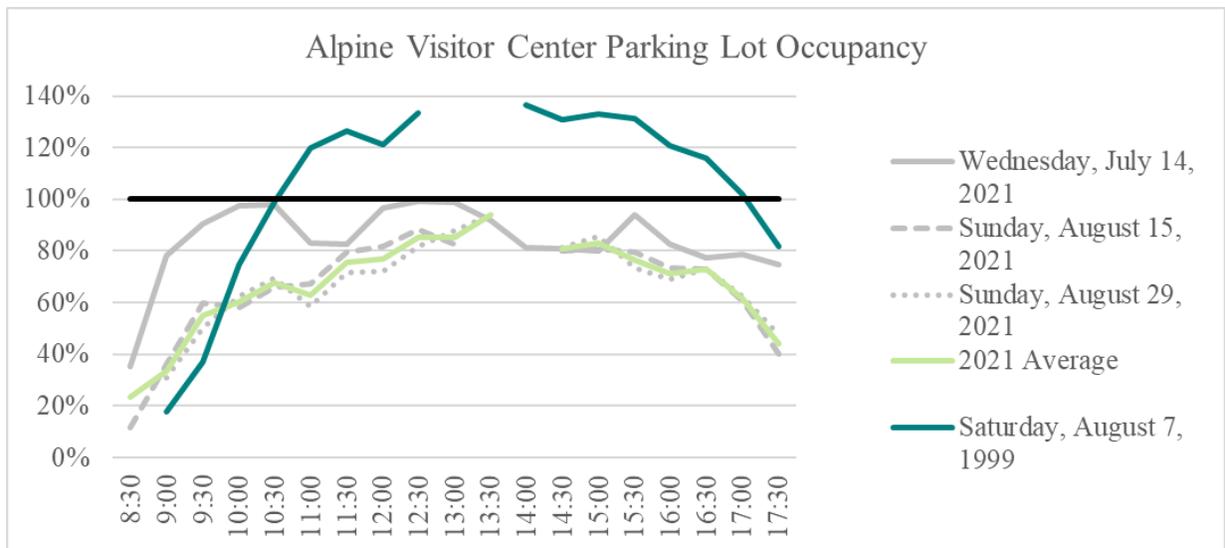


FIGURE 14. ALPINE VISITOR CENTER PARKING LOT OCCUPANCY

Relatively small numbers of people would continue to cause most impacts on alpine tundra. More specifically, too many people in one area at one time often leads to dispersing patterns from the concentrated areas, spreading into undisturbed alpine tundra and gradually expanding compaction and bare impacts on new areas (Cole 2021). Areas of bare ground on alpine tundra would persist and potentially expand, as visitors denude vegetation and thereby widen areas that experience heavy use such as viewing pulloffs, parking areas, and trails. Current visitation patterns for when most day use visitors enter the park in congested time frames seeking alpine experiences lead to pulses of illegal parking on alpine tundra. As such, any increases in unendorsed parking along road shoulders in alpine tundra under the no-action alternative would cause additional trampling, compaction, and bare ground in alpine tundra. Additional visitor-created trails leading to and from non-designated parking areas would likely increase—all of which would expand areas of bare ground and denude the alpine tundra environment.

Cumulative Impacts. Past actions include visitor-created trail restoration efforts to replant native alpine vegetation and improvements to the Trail Ridge Road Corridor, which will likely have long-term beneficial impacts on alpine tundra vegetation communities.

A series of future actions to improve the visitor experience and traffic flows at Fall River Pass may include pedestrian and parking-related changes. While parking reconfiguration is anticipated, the number of parking spots is not anticipated to increase. When the incremental impacts of the no-action alternative are combined with the past, present, and reasonably foreseeable actions described in this section and in affected environment, overall cumulative impacts on alpine tundra would continue to be long term and adverse. While the past, present, and future actions would help reduce the impacts of visitor uses of trails and outside designated facilities in the alpine tundra environment, this would have limited cumulative beneficial effects when considered in the context of the overall impact from millions of annual visitors recreating in fragile alpine tundra areas that would continue to cause trampling and compaction and would likely expand areas of bare ground.

Common to Alternatives B, C, and D

Because relatively small numbers of people cause the majority of impacts on alpine tundra, encouraging visitors to use areas where impacts already exist and preventing dispersion and displacement in this sensitive environment is critical to protecting it. Implementing timed entry reservations, combined with area closures to protect the alpine environment, when needed, would encourage visitors to stay off places that are lightly impacted or just beginning to show damage from recreation uses. Similarly, managing visitation in alpine tundra areas within the park's management capabilities to preserve this resource supports the purpose of this planning effort. Current data included in chapter 3, visitor use and experience section, anticipates that alternative B would result in an 8% decrease in visitation from May to October compared to the no-action alternative; alternative C would result in a 21% decrease compared to the no-action alternative; and alternative D would result in a 25% decrease compared to the no-action alternative. However, research suggests that visitation during other seasons would increase and that the timed entry system did not strongly impact annual visitation (Bioeconomics and RRC Associates 2023).

While trampling and compacting alpine tundra and contributing new bare ground impacts in the alpine environment would likely continue, these decreases in visits per day under the action

alternatives would benefit alpine tundra by better limiting visitation to the threshold of the park's facilities and management capabilities to preserve this fundamental resource.

Implementing reservations for the Bear Lake Road Corridor across the action alternatives is expected to have a long-term beneficial impact on alpine tundra in two primary ways. In the park's most popular alpine tundra locations accessible from the Bear Lake Road Corridor, timed entry reservations would help distribute use and impacts rather than concentrate use to only a few hours each day. In areas that currently have little or no recreational impacts, timed entry reservations would assist in maintaining the current conditions of these areas (i.e., 2020–2023). Another benefit of reservations for the Bear Lake Road Corridor is the opportunity for park managers to educate visitors during trip planning on behaviors that protect alpine tundra. Management actions across all action alternatives would seek to keep use impacts off alpine tundra (and other sensitive environments like steep streambanks) that are lightly impacted or just beginning to show effects from visitor use.

If reservations for the Bear Lake Road Corridor is expanded to the shoulder season (e.g., April and November) or to winter weekends, there would be no new impacts compared to what is described above for fall and winter seasons. However, in the late spring and early summer, when trails and parking areas melt, visitors looking for snow recreation opportunities along roadsides, designated parking areas, and trailheads traverse through or around muddy areas to reach snowfields, which can result in impacts on the spring growth in those areas. Extending the reservation season into the spring for the corridor could have beneficial impacts for alpine tundra in the areas where spring reservations are implemented.

Visitation from millions of annual visitors recreating the alpine tundra environment in these fragile areas would continue to cause trampling and compaction and would likely expand areas of bare ground. While timed entry reservations for the Bear Lake Road Corridor are expected to decrease visitor impacts on the alpine environment, they would not eliminate adverse impacts.

In addition to timed entry, park staff would manage three day-use zones across all action alternatives in this plan. Comprising mostly of designated Wilderness, minimal numbers of designated trails and routes and restricted access to Research Natural Areas, Visitor Use Zone 1 would emphasize the protection of alpine tundra landscapes. This zone would ensure the greatest preservation of alpine tundra and wilderness character qualities among the three zones. Due to easier visitor access to alpine tundra and closer proximity to formal trails, facilities, and paved areas, Visitor Use Zone 2 would accommodate more users, and impacts on alpine tundra would be more noticeable (e.g., bare dirt in areas of higher visitation). Alpine tundra would be most impacted in Visitor Use Zone 3, which encompasses paved roads, parking lots, visitor centers, campgrounds, and the park's most accessible and maintained trails. Impacts on alpine tundra in zone 3 would include concentrated impacts in heavy use areas. These concentrated impacts establish bare ground that could potentially expand as visitors denude vegetation, which results in wider pulloffs, parking areas, and trails.

Alternative B

Under alternative B, impacts on alpine tundra would be reduced due to decreases in the intensity of visitation expected at popular areas at one time. Impacts on alpine tundra from visitor-caused trampling near vehicle pulloffs and on visitor-created trails that lead to alpine tundra (like those accessible from Trail Ridge Road) could be eased, as designated parking lots and trailheads would be available more frequently throughout the day. This alternative would likely result in an 8%

decrease in visitation during the season (see visitor use and experience section) in which the timed entry reservation system is in effect compared to the no-action alternative. However, research suggests that visitation during other seasons would increase and that the timed entry system did not strongly impact annual visitation (Bioeconomics and RRC Associates 2023).

While trampling and compacting alpine tundra and contributing new bare ground impacts in the alpine environment would likely continue (as discussed in the affected environment section), these decreases in visits per day under the preferred alternative would benefit alpine tundra by better limiting visitation to the threshold of the park's facilities and management capabilities to preserve this resource.

Cumulative Impacts. A series of future actions to improve the visitor experience and traffic flows (e.g., at Fall River Pass) may include pedestrian and parking-related changes. While parking reconfiguration is anticipated, the number of parking spots is not anticipated to increase.

Past and present actions, which include restoring visitor-created trails and replanting native alpine vegetation, however, have had beneficial impacts on alpine tundra. Similarly, improvements to the Trail Ridge Road Corridor to prevent visitor-created trails have had beneficial impacts on alpine tundra. The impacts of past, present, and reasonably foreseeable future actions are described above in the alpine tundra trends and planned actions section. This alternative, when paired with ongoing actions and actions common to alternatives B, C, and D, would result in conditions that are similar to what is currently experienced, as described above in the affected environment section. Overall cumulative impacts on alpine tundra would be beneficial under alternative B.

Alternative C

Alternative C affords the most protection to alpine tundra among the action alternatives as compared to the no-action alternative because it reduces the overall number of people who can access alpine tundra. The daily reservation system would likely result in most people arriving at historically peak times within the reservation period, which could concentrate use at popular alpine tundra destinations, such as those along Trail Ridge Road. To combat the expectation of concentrated uses, alternative C would reduce the number of reservations issued to remain within desired use levels. These actions would benefit the alpine tundra environment because the number of arrivals and overall intensity of visitation at these sites would be the most limited under the plan's alternatives.

Alternative C would likely result in a 21% decrease in visitation during the season in which the daily reservation system is in effect compared to the no-action alternative (see visitor use and experience section). However, similar to the preferred alternative, research suggests that visitation during other seasons would increase and that the timed entry system did not strongly impact annual visitation (Bioeconomics and RRC Associates 2023). Like the other action alternatives, while trampling and compacting alpine tundra and contributing new bare ground impacts in the alpine environment would likely continue (as discussed in the affected environment), these decreases in visits per day under alternative C would benefit alpine tundra by better limiting visitation to the threshold of the park's facilities and management capabilities to preserve this resource.

Cumulative Impacts. Future actions to improve the visitor experience and traffic flows (e.g., at Fall River Pass) may include pedestrian and parking-related changes. As noted, the number of parking spots is not anticipated to increase.

As noted, however, past and present actions, which include restoring visitor-created trails and replanting native alpine vegetation, have had beneficial impacts on alpine tundra. Similarly, improvements to the Trail Ridge Road Corridor to prevent visitor-created trails have had beneficial impacts on alpine tundra. When paired with the adverse impacts noted above, the cumulative adverse impacts of alternative C would result in long-term adverse impacts for potential parking lot expansions, while vegetation replanting efforts would result in long-term beneficial impacts on alpine tundra for areas that have been restored.

Alternative D

Outside of the Bear Lake Road Corridor reservations, alternative D would have similar impacts on alpine tundra as the no-action alternative because visitation would be concentrated spatially and temporally until a particular entrance station is closed. Like current visitation cycles, most day use visitors (not including Bear Lake Road) would continue to enter the park during congested time frames seeking alpine experiences and leading to pulses of people recreating in alpine tundra environments. Impacts would occur most frequently along Trail Ridge Road. Too many people in one area at one time would continue to lead to illegal parking and dispersal patterns from the concentrated areas and spread into undisturbed alpine tundra that would gradually expand trampling, compaction, and bare ground on new areas.

Alternative D would likely result in a 25% decrease in visitation during the season in which the temporary entrance closures and reservation system is in effect compared to the no-action alternative (see visitor use and experience section). Like the other action alternatives, research suggests that visitation during other seasons would increase and that the timed entry system did not strongly impact annual visitation (Bioeconomics and RRC Associates 2023). Also similar to the action alternatives, trampling and compacting alpine tundra, contributing new bare ground impacts in the alpine environment, would likely continue. Estimated decreases in visits per day under alternative D would benefit alpine tundra by better limiting visitation to the threshold of the park's facilities and management capabilities to preserve this resource.

Cumulative Impacts. Future actions to improve the visitor experience and traffic flows (e.g., at Fall River Pass) may include pedestrian and parking-related changes. As noted, the number of parking spots is not anticipated to increase.

As noted, past and present actions, which include restoring visitor-created trails and replanting native alpine vegetation, have had beneficial impacts on alpine tundra as well. Improvements to the Trail Ridge Road Corridor to prevent visitor-created trails have also benefitted alpine tundra. When paired with the adverse impacts noted above, the cumulative adverse impacts of alternative D would result in long-term adverse impacts for potential parking lot expansions, while vegetation replanting efforts would result in long-term beneficial impacts on alpine tundra for areas that have been restored.

Comparative Conclusion Across Alternatives

When alternatives B, C, and D are compared to the no-action alternative, the expected decreases in visits per day under the preferred alternative would benefit alpine tundra by better limiting

visitation to the threshold of the park's facilities and management capabilities to preserve this fundamental resource. In addition, the requirement for visitors to obtain a reservation would provide opportunities for park managers to educate visitors during trip planning on behaviors that protect alpine tundra. Encouraging visitors to use areas where impacts already exist and preventing dispersion and displacement in this sensitive environment is critical to protecting it. Implementing reservations and/or gate closures (as described in the action alternatives), would encourage visitors to stay off areas that are lightly impacted or just beginning to show damage from recreation uses. In the park's most popular locations, reservations would help limit use and impacts. In areas that currently have little or no recreational impacts, reservations would assist dispersing use and impacts across both time and location. Combining reservations for heavily used areas with other methods of distributing day use visitors can be beneficial for alpine tundra preservation; however, enforcement support is needed to prevent or discourage visitors from accessing alpine tundra closure areas.

While the impacts on alpine tundra are similar in alternatives B, C, and D, implementing timed entry reservations in alternative B would disperse vehicles and people throughout the day, and fewer permits would be sold under the daily reservations (alternative C) to accommodate the maximum number of visitors within peak hours. Therefore, this alternative would best decrease the concentration of visitors who would recreate in high alpine environments during the hours of system operation and keep visitor numbers within capacity.

LAKESHORE AND STREAMSIDE VEGETATION

Affected Environment

This section describes the current conditions (i.e., 2020–2023) related to human uses in and near the park's lakeshores and streamside. The description of these elements is based on the best professional judgement of NPS staff, both past and recent research, and scoping efforts.

Lakeshore and streamside vegetation provide important ecosystem functions and serve as an environmental buffer between the terrestrial and aquatic landscape. Among these aquatic environments, the park's montane wetlands, such as Moraine Park and Kawuneeche Valley, are not considered healthy and fully functional systems. The Kawuneeche Valley has lost over 96% of its tall willows since 1999. The park has spent 15 years, through its elk and vegetation management plan efforts, to accelerate the recovery of montane wetlands (NPS 2012). Vegetation in areas protected by elk enclosures have shown improvements, although they are still not restored. By contrast, the park's alpine and subalpine watersheds include healthier, more functional wetlands.

Visitor-created trails, trampled vegetation along lakeshores and streambanks, nitrogen loading, and bacteria contaminants from human waste are evident throughout the park's trail system near lakes and streams. While the sources of stream and lake water contaminants are extensive, they tend to proliferate along trails and near recreation sites (Wallace et al. 2006). Denuded vegetation around popular lakeshores reduces the soil and vegetation that buffer inputs of contaminants and reduce water quality. These inputs include excess nitrogen from atmospheric deposition, human waste and increases in waterborne pathogens, such as giardia and E. coli, and sediment inputs from erosion that can be amplified by drainage from trails, visitor trampled areas, or effects of wildfires higher in the watershed.

Contaminant loading, combined with climate change, have caused algal blooms and changes in species composition in high-elevation lakes. In areas such as Loch Vale, park staff have noted an increase in blooms in areas with a greater incidence of human waste and a decrease water quality in wetland and riparian areas as well (Scott et al. 2022; Baron et al. 2023).

Actions to improve the condition of lakes, streams, and riparian wetland areas in the park include ongoing restoration efforts in the Kawuneeche Valley. Lakes and streams there have been degraded by a variety of stressors such as overbrowsing by ungulates and past land uses. Park managers are working with more than 10 partners and funding organizations to support the restoration of heavily impacted areas in the valley. Park managers have taken limited postfire vegetation restoration activities in response to the Cameron Peak Fire and East Troublesome Fire to improve vegetation health in these heavily impacted areas, which would help improve long-term water quality and the hydrological function of lakes and streams in these areas.

The abundance of lakeshore impacts may be due to the effect of the destination itself (Kidd et al. 2015). The number of accessible high alpine lakes, waterfalls, and scenic destinations in the Bear Lake Road Corridor make this area one of the most sought-out destinations in the park (Otak, Inc. 2023). Once visitors reach a destination, they may “explore” off-trail more than they do on the trail leading to the destination. Impacts around lakes are influenced by water being attractive (Marion et al. 2013), as well as steep topography that pushes trail margins to lake edges. Steep and often erosive topography on similar mountainous lands with lakes and streams is the most common driver of human-caused resource impacts (Cole 2019). A 2019 study conducted at the park found that at least half of all resource impacts (i.e., informal trails, spur trails, and visitor created sites) mapped on Emerald Lake, the Loch, and Mills Lake trails occur within the 200-foot lakeshore buffer and 42% of all sites (Graham and Monz 2019). The Graham and Monz assessment highlighted that steep topography adjacent to several park lakes may also constrain visitor movements, perhaps funneling hikers toward lakeshores rather than uphill and away from lakeshores.

Similarly, soil compaction and erosion over time in and near wetland vegetation prevents native plants from thriving and increases incidence of exotic plants. Erosion has led to sedimentation in surface water bodies and altered hydrology in the project area (including increased sedimentation from roadside parking and the resulting asphalt damage). In addition to altering hydrology in certain areas, increased sediment creates problems downstream when loads fill reservoirs or clog water treatment facilities, leading to more frequent and costly culvert cleaning and maintenance.

Increases in mobile sediment from erosion causes further harm to the biological environment because it carries an overabundance of nutrients (e.g., nitrogen) that enter water columns and cause algal blooms along lakeshores. Multiyear studies under different visitor use management strategies may inform trends in anthropogenic watershed impacts, such as Battaglin et al. 2018, Heath and Baron 2014, Richer and Baron 2011, and Wetherbee 2016.

However, trail maintenance activities, including past construction of retaining walls, bridges, boardwalks, and recent trail projects that encourage visitors to stay on designated trails, focus on preserving lakeshore and streamside vegetation. In addition, visitation to lakes, streams, and riparian habitat adjacent to these aquatic resources would continue to be managed through wilderness camping permits (where applicable) and CUA stipulations (e.g., guided fishing at approved areas).

Trends and Planned Actions

There are strong experiential connections between people and water (Llanos-Paez and Acuña 2022). Visitors are drawn to lakes and streams at the park from a variety of factors, such as beautiful scenery, social constructs, park interpretive materials, and park trails that lead visitors to lake and stream destinations (Llanos-Paez and Acuña 2022). Similarly, increases in social media posts (i.e., “Insta-Hype”) that show picturesque environments, including alpine lakes, can further drive interest in visiting these hotspots (Wartmann et al. 2021; Fisher et al. 2018). Trampling and soil compaction impacts on lakeshore and streambank areas attest to these uses over time. When more people visit a particular lake at the same time, they tend to disperse across a larger area of shoreline and create new paths and denuded congregation areas. However, while popular lakeshore destinations, such as Bear Lake, Sprague Lake, and the Loch, have incurred impacts from visitor trampling, there are many lakeshores throughout the park that are not trampled because they have low visitor use.

Visitor use management actions around lakes appear to have improved vegetation conditions. Through the years, park staff have noted that the initiation of the wilderness camping permits has reduced the concentration of campsites and camping pressure on lakeshores as well, which has promoted recovery of vegetation in some areas. Prior to implementing the permits, some wilderness lakeshores were becoming highly degraded from camping activities. When park managers implemented the permit system, lakeshore vegetation conditions improved. Similarly, past actions to replant visitor-created trails with native vegetation have improved conditions for these resources.

Environmental Consequences

Common to All Alternatives

Actions common to all alternatives, such as temporary area closures for high-demand areas, would not have additional impacts on lakeshores and streamsides. However climate change-related impacts on lakeshores and streamsides, including later snowfalls projected in fall or early winter, may lead to increased visitation during historically lower-use seasons. While all reservation systems would initially be implemented during the summer season and summer shoulder months, climate change under all alternatives could contribute to changing visitor use patterns. In popular or highly visited lake destinations in the Bear Lake Road Corridor, for example, these patterns would likely prolong—and exacerbate—impacts on lakeshores and streamsides. Numbers of visitors at one time in a particular location would likely be higher and more intensive during the 10:00 a.m. to 2:00 p.m. window, as mentioned below in the no-action alternative analysis. However, climate change would likely extend high visitation demand deeper into the fall and winter under all alternatives, resulting in longer use seasons and likely more stress on popular stream and lakeside destinations.

In addition, park managers expect to see shifts in visitor destinations, as some visitors who cannot obtain reservations to the Bear Lake Road Corridor may choose to visit areas like Upper Beaver Meadows, Horseshoe Park, or the Alluvial Fan/Endo Valley. These sites have experienced increased visitation since timed entry reservation pilots began (e.g., visitors who cannot get reservations for Moraine Park visit other areas instead). Unendorsed parking, visitor-created trails, and expanded visitor trampling at pullouts along park roads have increasingly impacted vegetation at these sites, including areas along streamsides.

Park staff will continue to maintain and improve trails that access lakes, streams, and wetlands to minimize direct impacts on these resources. Examples of ongoing trail maintenance work include reconstructing retaining walls, bridges, boardwalks, and erosion control structures. In key locations, park staff may actively revegetate and protect denuded areas, though park staff's ability to do this at many locations is severely limited due to staffing and the level of effort needed to make these efforts successful.

Other ongoing measures park staff implement to reduce human impacts near lakes and streamsides include communicating with visitors about impacts and educating visitors to practice Leave No Trace principals on day trips and backcountry excursions. In recent years, park staff have used online messaging and provided educational materials at visitor centers and in ranger programs to encourage more responsible trip planning behaviors from visitors (e.g., “know before you go” and using restroom facilities before embarking on outings).

Regarding winter recreation, changing visitor use patterns (e.g., an increased interest in winter recreation) or climate change effects (e.g., later snowfalls in fall/early winter) may lead to increased visitation during historically lower-use seasons. These conditions could extend visitor impacts on lakeshores and streamsides later in the season, which would give these environments less time to recover from high season trampling and compaction. However, during winter months, visitor-created trails, trampling, compaction, and loss of vegetation at lakeshores, for example, would be negligible or insignificant due to frozen winter soil conditions, likely protective, and foreseeable snow cover along lakeshores. Similarly, there would likely be only isolated instances of nitrogen loading and bacterial contamination near lakes and streams from human waste.

Alternative A: No Action

Under the no-action alternative, visitor impacts (e.g., visitor-created trails, trampling, compaction, loss of vegetation) would continue to occur at lakes and along sections of creeks and drainages near popular trails. More people would continue to visit popular lake and stream destinations at the same time and would tend to disperse across a larger area of shoreline, create new trails, and denude new areas of vegetation in new congregation areas. There would continue to be surges in total hourly visitor arrivals, resulting in a strong bell-shaped curve, with the highest number of visitor arrivals between approximately 10:00 a.m. and 2:00 p.m. Capacity analysis conducted for this plan for the Colorado River and Wild Basin Trailheads provides a good example of how high numbers of visitors tend to visit a particular lake at the same time, resulting in bare ground along the most popular lake and streamside destinations. The park would continue to restrict access to certain road corridors, such as Bear Lake Road and Wild Basin, and visitors seeking lakes and streams would disperse to other areas of the park, creating new impacts at more lakes and streams.

Park trails to lakes and streams would continue to widen under the no-action alternative. Strong correlations have been identified between visitor volume and trail widening, which has led to compaction and denuded vegetation—especially around lakes (Svadja et al. 2016). When congestion occurs, some visitors veer off designated trails to lower-use areas to avoid crowds. These behaviors would continue to impact streamsides, lakeshores, and the trails that lead to these popular park destinations. Other visitors may widen trails where they do not have enough physical room along trails or attraction points and trample wider sections of trails or bare ground (Cole 2019). Similarly, Svadja et al. (2016) found that trail widening and soil loss are the most

visible effects of trail degradation. For example, when there are several groups along a given lakeshore at the same time, they may seek available areas to take in the views and the solitude of the experience. More visitors at one time causes parties to spread out, which expands trampling, compaction, and denudation of vegetation beyond existing areas of use. Park staff have noted, for example, that multiple groups of anglers at a single body of water would disperse along the lakeshore or stream bank from one or two key destinations to several outlying spots—often trampling vegetation in the process of getting to an open area—to maintain space from fellow anglers and other users.

Cumulative Impacts. Past actions, including replanting visitor-created trails with native vegetation, would have long-term beneficial impacts on lakeshores and streamsides (where these projects treated riparian areas). Ongoing and routine trail and facility maintenance, which primarily occurs in subalpine environments, would have beneficial effects to lakeshores and streamsides.

Present actions include improving the condition of streams and riparian wetland areas in the Kawuneeche Valley that have been degraded by a variety of stressors such as overbrowsing by ungulates and past land uses. Park staff are also implementing an ongoing program to manage exotic plants and conduct vegetation restoration throughout the park. Projects are prioritized on an annual basis, and some are intended to restore areas damaged by visitor use, which would have beneficial impacts on applicable lakeshores and streamsides.

When the incremental impacts of the no-action alternative are combined with the past, present, and reasonably foreseeable actions described in this section and in affected environment, overall cumulative impacts on lakeshores and streamsides would continue to be long term and adverse. While the past, present, and future actions would help reduce the impacts of visitor uses of trails and outside designated facilities on lakeshores and streamsides, the overall impact from millions of annual visitors recreating in fragile riparian areas would continue to cause trampling and compaction and would likely expand areas of bare ground in these environments that would drive overall cumulative effects.

Common to Alternatives B, C, and D

A primary goal of the action alternatives is to manage visitation so that many people arriving at one time at highly used areas does not cause visitors to begin dispersing. Bear Lake Road Corridor timed entry reservations are intended to disperse visitation and minimize displacement in sensitive lakeshore and streamside environments that are lightly impacted or just beginning to show damage from recreation uses. When coupled with potential area closures to protect the lakeshore and streamside environments, these actions would have beneficial impacts by helping to prevent further degradation of these vital environments.

For alternatives B, C, and D, NPS staff may adjust components of the reservation system such as seasonality and timing. If reservations for Bear Lake Road Corridor are expanded to the shoulder season (e.g., April and November) or to winter weekends, there would be no new impacts compared to what is described above. The impacts would occur for the time period and location that the reservation system is in effect.

As discussed in the alpine tundra impact analysis, in addition to timed entry, park staff would manage three visitor use management zones across all action alternatives in this plan. Comprising designated Wilderness with few designated trails and routes, Visitor Use Management Zone 1

would emphasize the protection of these vast areas, which include alpine lakes and streams. This zone would ensure the greatest preservation of the alpine and wilderness environment among the three zones. Due to easier visitor access to alpine areas and closer proximity to formal trails, facilities, and paved areas, zone 2 would accommodate more users, and impacts on alpine lakes and streams would be more noticeable (e.g., bare dirt along lakeshores in areas of higher visitation). Zone 3 would encompass paved roads, parking lots, visitor centers, campgrounds, and the park's most accessible and maintained trails.

Impacts on alpine tundra in zone 3 would include concentrated impacts near facilities. These concentrated impacts establish bare ground that could potentially expand as visitors denude vegetation, which results in wider pulloffs, parking areas, and trails.

For example, snowshoeing and hiking, which are the primary winter recreational activities at the Bear Lake Trailhead, would have minimal impacts on lakes and streams compared to peak season visitation and would be further minimized with a reservation system. As noted, these conditions could extend visitor impacts on lakeshores and streamsides later in the season, which would give these environments less time to recover from high season trampling and compaction. However, visitor-created trails, trampling, compaction, and loss of vegetation at lakeshores would be negligible or insignificant due to frozen winter soil conditions and protective, foreseeable snow cover along lakeshores. Similarly, there would likely be only isolated instances of nitrogen loading and bacterial contamination near lakes and streams from human waste.

Managing visitation to the park's popular lakes and streams within managers' capabilities to preserve these resources supports the purpose of this planning effort. While trampling and compacting lakeshores and streamsides and contributing new bare ground impacts on the alpine environment would likely continue, these decreases in visits per day under the action alternatives would benefit lakes and streams by better limiting visitation to the threshold of the park's facilities and management capabilities to preserve these resources.

Alternative B

Under alternative B, impacts on streamside and lakeshore environments would be slightly minimized in the Bear Lake Road Corridor and parkwide due to a small decrease in the intensity of visitation expected at popular lake and stream destinations at one time. Under this alternative, the distribution of hourly use (i.e., visitor arrivals to trailheads and subsequent arrival time frames at popular lakeshore destinations) would reflect visitation patterns similar to those indicated in the no-action alternative.

Similarly, capacity analysis conducted for this environmental assessment at the Colorado River and Timber Lake Trailheads indicates a bell-shaped distribution of visitor arrivals throughout the day (with the majority of visitors arriving between 10:00 a.m. and 2:00 p.m., similar to the no-action alternative). While the Colorado River Trailhead data are outside the popular lake destinations in the Bear Lake Road Corridor, the data provide an example of how timed entry reservations can minimize dispersion and displacement in sensitive lakeshore and streamside environments. Under alternative B, these actions would have beneficial impacts on lakeshore and streamside environments by helping to keep visitors to areas where impacts already exist and prevent further degradation of vegetation in these areas.

Based on current data collection at the park (included in chapter 2), this alternative would likely result in an 8% decrease in visitation during the season in which the reservation system is in effect

compared to the no-action alternative. However, research suggests that visitation during other seasons would increase, and that the timed entry reservation system did not strongly impact annual visitation (Bioeconomics and RRC Associates 2023). While trampling and compacting lakeshores and streamsides and contributing new bare ground impacts in the alpine environment would likely continue (as discussed in the affected environment section), these decreases in visits per day under the preferred alternative would benefit lakes and streams by better limiting visitation to the threshold of the park’s facilities and management capabilities to preserve this resource.

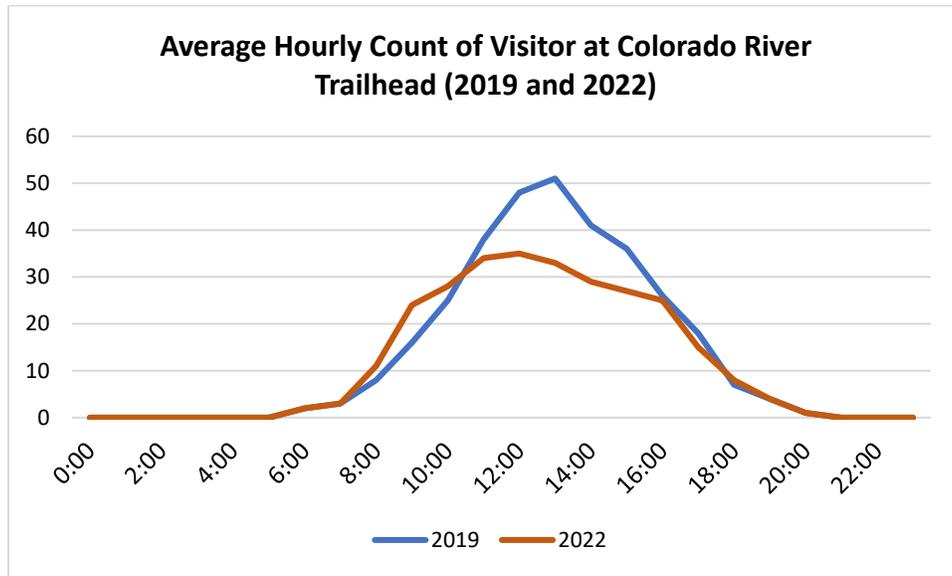


FIGURE 15. AVERAGE HOURLY COUNT OF VISITORS AT COLORADO RIVER TRAILHEAD

While implementing timed entry reservations throughout the park would distribute visitation more evenly across the park, high numbers of visitors would continue to trample lakeshores and streamsides—particularly forest understory groundcover near high-elevation lakes and streams that would remain popular destinations and continue to receive high, albeit more even distribution of visitor impacts along lakeshores. Like the impacts described under alternative B for alpine tundra, the pace and scale of these impacts on lake and stream resources would likely decrease with timed reservations. However, long-term impacts from trampling, compaction, erosion, and loss of vegetation from millions of visitors recreating in these fragile environments would persist.

Cumulative Impacts. Past, present, and reasonably foreseeable future actions, including visitor-created trail restoration efforts to replant native vegetation near lakes and streams, have had beneficial impacts on riparian environments. When paired with these impacts, the positive impacts of alternative B would result in beneficial cumulative impacts on lakeshores and streamsides.

The impacts of past, present, and reasonably foreseeable future actions are described above in trends and planned actions section. This alternative, when paired with ongoing actions and actions common to alternatives B, C, and D, would result in conditions that are similar to what is currently experienced, as described above in the affected environment section. As a result, overall

cumulative impacts on lakeshore and streamside vegetation would be beneficial under alternative B.

Alternative C

Alternative C likely affords the most protection to lakes and streams among the action alternatives because it would have the most limited visitation framework among the plan's alternatives. By requiring private vehicles to obtain a timed entry reservation to the Bear Lake Road Corridor and rest of park or a daily reservation to access all other areas of the park, implementing this alternative would result in the most noticeable reduction in visitation because of the need to manage for peak times of day, and therefore, the most benefits from reduced effects. Daily reservations to areas outside the Bear Lake Road Corridor would likely result in most people arriving at the same time within the reservation period, which would also likely concentrate use at popular lakeshore destinations. To combat the expectation of concentrated uses, alternative C would reduce the number of reservations issued to remain within desired use levels. These actions would benefit lakeshore and streamside vegetation because the number of arrivals and overall intensity of visitation at these sites would be the most limited under the plan's alternatives.

Alternative C would likely result in a 21% decrease in visitation during the season in which the reservation system is in effect compared to the no-action alternative (see visitor use and experience section). However, research suggests that visitation during other seasons would increase and that the piloted timed entry reservation system under current conditions did not strongly impact annual visitation (Bioeconomics and RRC Associates 2023). Like the other action alternatives, while trampling and compacting lakeshores and streamsides contributing new bare ground impacts in the alpine environment would likely continue (as discussed in the affected environment section), these decreases in visits per day under alternative C would benefit lakes and streams by better limiting visitation to the threshold of the park's facilities and management capabilities to preserve this resource.

Cumulative Impacts. Past, present, and reasonably foreseeable future actions, including visitor-created trail restoration efforts to replant native vegetation near lakes and streams, have had beneficial impacts on riparian environments. When paired with these impacts, the positive impacts of alternative C would result in beneficial cumulative impacts on lakeshores and streamsides.

Alternative D

By incorporating a temporary entrance station closure when a maximum capacity of vehicles has entered the park on a given day, alternative D would limit the number of visitors seeking popular lakeshore and streamside destinations and lessen potential impacts from "overflow" visitation that could otherwise occur. However, due to the distances between entrance stations, variable visitor use patterns and differences between east and west side entrance locations, and numerous interconnected roads and trails parkwide, some areas are more popular than others, and lakeshore visitation is not evenly distributed.

This alternative would likely result in a 25% decrease in visitation during the season in which the reservation system is in effect compared to the no-action alternative(see visitor use and experience section). However, research suggests that visitation during other seasons would increase and that the piloted timed entry reservation system under current conditions did not

strongly impact annual visitation (Bioeconomics and RRC Associates 2023). Like the other action alternatives, while trampling and compacting lakeshores and streamsides and contributing new bare ground impacts in the riparian environment would likely continue (as discussed in the affected environment section), these decreases in visits per day under alternative D could benefit lakes and streams by better limiting visitation to the threshold of the park's facilities and management capabilities to preserve this resource.

However, like the impacts discussed for alpine tundra, impacts on lakes and streams in alternative D would be concentrated spatially and temporally until a particular entrance station is closed. As with current visitation cycles, most day use visitors (not including Bear Lake Road) would continue to enter the park during congested time frames seeking experiences at lakes and streams, leading to pulses of heavy visitation at key water-based destinations. Too many people in one area at one time would continue to lead to dispersal patterns from the concentrated areas, spreading into undisturbed shorelines and streambanks and gradually expanding compaction and denudation of riparian vegetation in new areas. Additional visitor-created trails leading to and from expanded sites along lakesides and wetland areas would likely increase, expanding areas of bare ground and denuding shoreline areas and stream banks in increasingly heavily used areas.

Cumulative Impacts

Past park actions, including visitor-created trail restoration and mitigation efforts to replant native vegetation, site plans to designate and improve delineation of park trails, wetland protection activities (e.g., constructing retaining walls, bridges, boardwalks, and trail mitigation projects), and implementing the park's nitrogen deposition reduction plan to reduce nitrogen impacts on high-elevation lakes, have had short- and long-term beneficial impacts on the park's lakeshore and streamside environment. When combined with past, ongoing, and reasonably foreseeable future projects, the cumulative impacts from actions in this plan would have short- and long-term beneficial impacts on the park's lakeshore and streamside environment.

Comparative Conclusion Across Alternatives

When alternatives B, C, and D are compared to the no-action alternative, the expected decreases in visits per day under the preferred alternative would benefit lakeshores and streamsides by better limiting visitation to the threshold of the park's facilities, for example trails, and management capabilities to preserve this resource. In addition, the requirement for visitors to obtain a reservation would provide opportunities for park managers to educate visitors during trip planning on behaviors that protect lakes and streams. Encouraging visitors to use areas where impacts already exist and preventing dispersion and displacement in this sensitive environment is critical to protecting it. Implementing timed entry reservations and or gate closures (as described in the action alternatives) would encourage visitors to stay off lakeshores and streamside areas that are lightly impacted or just beginning to show damage from recreation uses.

In the park's most popular locations, timed entry reservations would help concentrate use and impacts. In areas that currently have little or no recreational impacts, timed entry reservations would assist in dispersing use and impacts. Management actions across all action alternatives would seek to keep use impacts off lakeshores and streamsides that are lightly impacted or just beginning to show effects from visitor use. Combining timed entry reservations for heavily used areas with other methods of distributing day use visitors can be beneficial for lake and streamside

preservation; however, enforcement support is needed to prevent or discourage visitors from accessing vegetation restoration closure areas.

While the impacts on lakes and streams are similar in alternatives B, C, and D, implementing Bear Lake Road Corridor timed entry reservations in alternative C would disperse vehicles and people throughout the day, and fewer permits would be sold under the daily reservations to accommodate the maximum number of visitors within peak hours. Therefore, this alternative would best decrease the concentration of visitors who would recreate in alpine environments during the hours of system operation and keep visitor numbers within capacity.

WILDERNESS CHARACTER

In 2009, Congress designated nearly 250,000 acres of Rocky Mountain National Park (approximately 95% of the unit) as designated and potential wilderness (Public Law 111-11). The wilderness boundary excludes the roads that wind throughout the park and the developed areas near visitor centers (figure 16). The boundary is generally 200 feet from the centerline of paved roads and 100 feet from the centerline of unpaved roads. The day use visitor access plan affects how visitors can access wilderness and, due to the boundary's proximity to key frontcountry areas, sights and sounds of human activity can impact the solitude quality of wilderness character.¹⁶

The wilderness area in the park is also bordered by other designated Wilderness, including Indian Peaks Wilderness, Never Summer Wilderness, Neota Wilderness, and Comanche Peak Wilderness (Wilderness Connect 2023). As noted in the park's foundation document, fundamental resources and values at the park include access to wild places, preservation of wilderness character, and the ability to experience a wide variety of recreational opportunities (NPS 2013). Visitors can access varying degrees of wilderness ranging from short, day use hikes that originate from frontcountry parking lots to multiday recreational opportunities that challenge visitors' self-reliance and sense of adventure. Visitors may recreate in wilderness through many activities, including hiking, backpacking, climbing, fishing, and horseback riding. Included in the park's foundation document is the purpose to "... preserve the high-elevation ecosystems and wilderness character of the southern Rocky Mountains within its borders and to provide the freest recreational use of and access to the park's scenic beauties, wildlife, natural features and processes, and cultural objects" (NPS 2013).

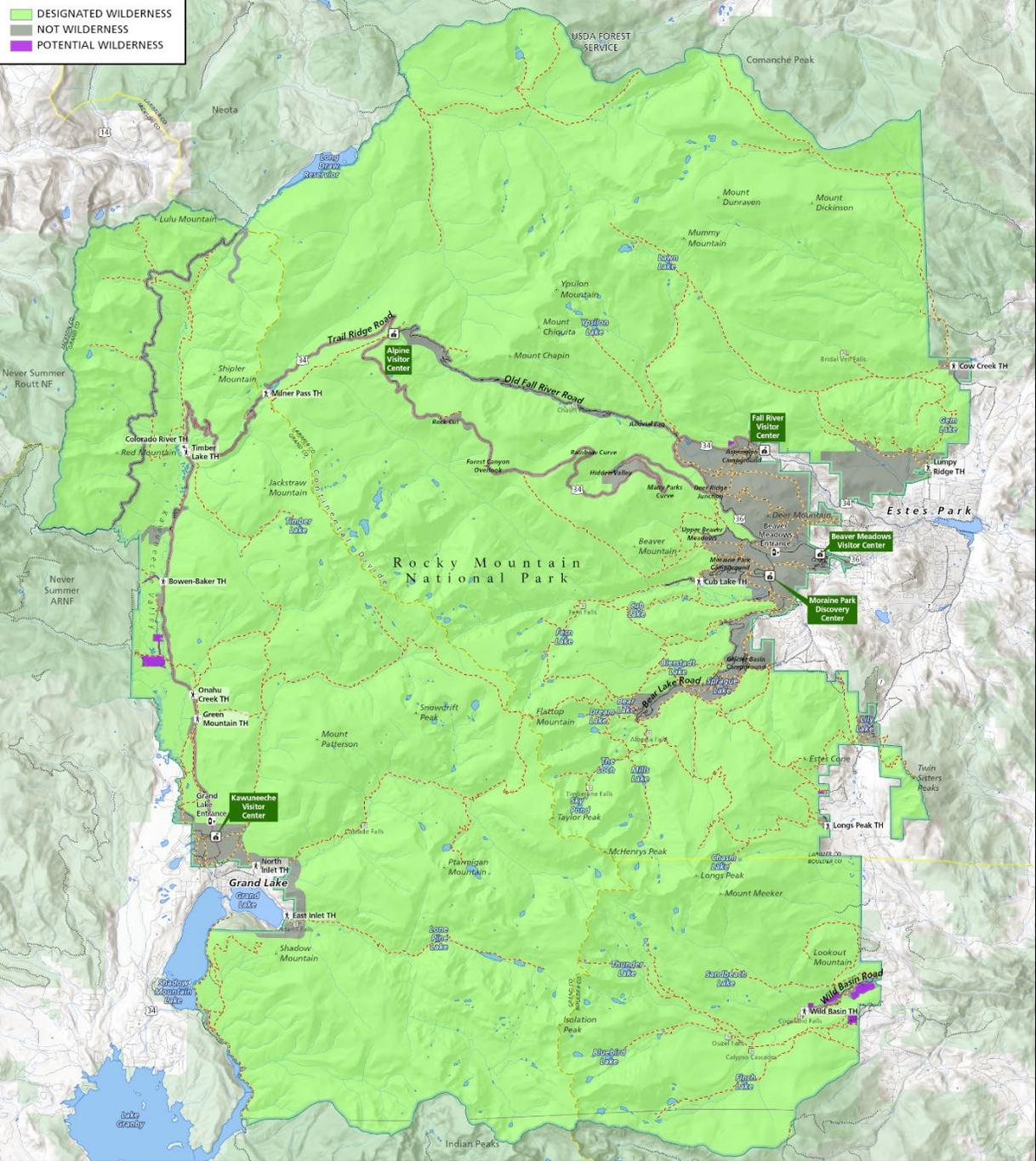
The following section describes the current conditions (i.e., 2020–2023) of two qualities of wilderness character: opportunities for solitude or primitive and unconfined recreation and natural.

16. For more information on park wilderness management, see appendix A.



Wilderness Map

- DESIGNATED WILDERNESS
- NOT WILDERNESS
- POTENTIAL WILDERNESS



Produced By: ROMO Geospatial Program, 8/1/2023
Projection: NAD 1983 (2011) UTM Zone 13N

FIGURE 16. DESIGNATED WILDERNESS IN ROCKY MOUNTAIN NATIONAL PARK

OPPORTUNITIES FOR SOLITUDE OR PRIMITIVE AND UNCONFINED RECREATION

Affected Environment

Rocky Mountain National Park Wilderness Area offers visitors many outstanding opportunities for solitude or primitive and unconfined recreation across its rugged and vast wilderness area. Sublime views and expansive terrain provide opportunities for visitors to experience this natural landscape, as well as uncrowded and dispersed recreation. This quality is preserved or improved by management actions that reduce encounters with other people, minimize signs of modern civilization inside the wilderness, and provide outstanding opportunities for recreation in an environment that is relatively free from evidence of modern society. In contrast, management actions such as requiring permits, food storage regulations, or developing infrastructure to support wilderness experiences can degrade primitive and unconfined recreation. The distinct components of this quality can sometimes be at odds with each other. For example, requiring the use of reservations may enhance solitude but can simultaneously reduce opportunities for unconfined recreation (NPS 2023d).

While visitors are likely to encounter other visitors along wilderness trails who are near frontcountry areas, those who immerse themselves in more remote areas of the park can find solitude. The presence of infrastructure outside of wilderness, such as shuttle stops and parking lots, contribute to impacts on this quality. Sounds from outside of wilderness, such as other visitors, shuttles, and cars, can degrade opportunities for solitude (Landres et al. 2015; Newman et al. 2010). As noted in chapter 1, visitation to Rocky Mountain National Park has been steadily increasing since 2000. As visitation increased, opportunities for solitude along wilderness trails—particularly those accessed in Bear Lake Road Corridor and Wild Basin—were negatively impacted. In 2013, an average of 400 vehicles would access Bear Lake Road Corridor hourly from 10:00 a.m. to 12:00 p.m. in July and August (Esser and Lambert 2021). This surge in hourly visitation is typically associated with concentrated use on trails and more frequent encounters with other visitors. However, under current conditions of the piloted timed entry reservation system, the average number of vehicles accessing key destinations is reduced as visitation is spread more evenly throughout the day. This shift in visitation pattern likely leads to fewer visitors on trails at the same time, thus increasing opportunities for solitude along wilderness trails.

Furthermore, data collection during the pilots from 2020 to 2022 indicated there were spikes in visitation arrivals shortly before and after the requirement for a timed entry reservation was in effect (NPS pers. comm. 2023). During these times of the day, visitors may experience reduced opportunities for solitude along the trail due to the shifting visitation patterns associated with higher arrival rates. Additionally, in the Bear Lake Road Corridor specifically, the shuttle bus drops off larger volumes of people simultaneously, likely resulting in larger volumes of hikers leaving the trailheads. This could result in a loss of solitude until visitors disperse more widely along the trail.

Park staff currently manage wilderness use such that visitors must obtain wilderness permits for overnight use at designated sites group sizes are limited to a 7-person maximum for individual sites and 12 people at group sites, and food storage is required when camping in wilderness. While the permit system, in conjunction with designating campsites and restrictions on group size, helps disperse visitors and improve opportunities for solitude in wilderness, they also degrade opportunities for unconfined recreation.

Trends and Planned Actions

Additional actions that affect opportunities for solitude and primitive or unconfined type of recreation include current policies and guidance, such as restrictions on campfire use and food storage regulations, which degrade opportunities for unconfined recreation. Ongoing and routine park actions, such as trail maintenance, have a positive impact on this quality of wilderness character, as they provide opportunities for visitors to find solitude and primitive recreation. As noted in the visitor use and experience section, climate change is expected to shift visitation patterns and may lead to an increase in shoulder season visitation (Fisichelli et al. 2015). Such changes in visitation patterns, particularly in the shoulder or winter season, may increase the number of people on trails at a time and, therefore, could reduce opportunities for solitude and negatively impact this quality of wilderness character. Furthermore, climate change increases the risk of ecological disturbances, such as wildfires and flooding events, which could result in temporary park or area closures for safety reasons. These closures would degrade opportunities for solitude and primitive or unconfined type of recreation in Rocky Mountain National Park Wilderness.

While there are ample opportunities for primitive or unconfined types of recreation in designated Wilderness, concentrated visitor use in key areas of the park (e.g., Bear Lake Road Corridor, Longs Peak, Fall River Pass, Wild Basin) and decreased opportunities for solitude lead to negative changes or trends in wilderness character. However, during the pilot timed entry reservation systems—which more evenly dispersed visitation throughout the day and across the season—park staff observations suggest there were overall improvements in visitor opportunities for solitude. In addition, public comments during civic engagement sessions in 2021 and 2023 indicated the importance of maintaining wilderness and backcountry experiences for current and future generations and suggested that less crowding improves visitors' overall wilderness and backcountry experience (NPS 2021b, 2023). However, the requirement to obtain a timed entry reservation to enter the park degrades the unconfined recreational aspect of this quality, reducing some of the positive trends to the resource as a result of the pilot systems.

Environmental Consequences

Common to All Alternatives

Actions common to all alternatives, such as continuing transit partnerships, technological improvements, providing visitor information, orientation, and enforcement, would not have additional impacts on opportunities for solitude or primitive and unconfined recreation. The trends would be similar to what is described above in the affected environment section.

Alternative A: No Action

Under the no-action alternative opportunities for solitude or primitive and unconfined recreation would continue to be provided to visitors to a certain extent, particularly in wilderness further away from the frontcountry areas. There would be no new impacts on opportunities for primitive recreation. Day use wilderness visitors would not be required to obtain an additional timed entry reservation, which improves opportunities for unconfined recreation because day use visitors would be able to access wilderness on a first-come, first-served basis. However, temporary area restrictions adversely impact opportunities for unconfined recreation in wilderness, as described below.

The concentrated visitor use that the park received before 2020, particularly in the Bear Lake Road Corridor and its nearby wilderness, led to high encounter rates and thus degraded visitor opportunities for solitude in wilderness. Without a reservation system, visitation patterns would likely result in more visitors on wilderness trails at the same time, thus increasing hourly encounter rates and adversely impacting opportunities for solitude. Under the no-action alternative, access to sections of the park would continue to be temporarily restricted, which can potentially lead to pulses or surges of visitation to other wilderness areas of the park. This situation would likely lead to a reduction in opportunities for solitude across other wilderness destinations in the park. Furthermore, wilderness users may not be able to access the trailhead during temporary closures, thus degrading opportunities to access desired wilderness areas and, therefore, would adversely impact unconfined recreation. Under this alternative, visitation would be expected to continue to increase as seen before 2020. This level of visitor use leads to crowding and congestion on wilderness trails, particularly near the frontcountry, which would further degrade the solitude quality of wilderness character.

Cumulative Impacts. Past, present, and reasonably foreseeable future actions, such as overnight use regulations and permit requirements, have improved opportunities for solitude but degrade unconfined recreation, as described above in the affected environment section. When paired with these impacts and impacts from actions common to all alternatives, the adverse impacts of the no-action alternative would result in cumulative adverse impacts on these aspects of wilderness character.

Common to Alternatives B, C, and D

Across alternatives B, C, and D, the reservations for Bear Lake Road Corridor would have beneficial impacts on visitor opportunities (day use and overnight use) for solitude and primitive or unconfined recreation in wilderness that is accessed via the Bear Lake Road Corridor. A reservation permit would guarantee visitor access to their desired destination, thus improving opportunities for solitude or primitive and unconfined recreation in wilderness, specifically for permit holders. However, the reservation system would adversely impact opportunities for unconfined recreation for day users in these wilderness areas due to the requirement to obtain a permit to access wilderness during certain times. Because overnight wilderness users are exempt from obtaining a timed entry reservation, there would be no additional impacts on overnight unconfined recreation from this action.

For alternatives B, C, and D, park staff may adjust components of the reservation system such as the seasonality and timing. If reservations for Bear Lake Road Corridor are expanded to the shoulder season (e.g., April and November) or to winter weekends, there would be no new impacts compared to what is described above. The impacts would occur for the time period and location (i.e., wilderness areas access from Bear Lake Road Corridor) that the reservation system is in effect.

Park staff would implement a zoning scheme and associated desired conditions for visitor use management parkwide. The visitor use management zones provide updated management direction across the various park landscapes, providing consideration and inclusion of equitable, accessible, and inclusive experiences and facilities that support a diverse range of visitor interests and preferences, including wilderness opportunities. The development of zones, desired conditions, and monitoring strategies to ensure that desired conditions are maintained would benefit opportunities for solitude or primitive and unconfined recreation, as they provide clear

direction for long-term management of the park. In addition, park staff would identify and manage to visitor capacities by implementing the actions described in chapter 2, which are analyzed in this chapter.

Alternative B

Alternative B would have beneficial impacts on opportunities for solitude and unconfined recreation, but some of these benefits would be reduced from adverse impacts on unconfined recreation. Impacts from this action would be similar to what is described above in common to Alternatives B, C, and D, but the impacts would be expanded and applied parkwide, as the rest of park reservation system would be applicable to all other entrance stations. In general, a timed entry reservation system would result in fewer visitors on wilderness trails at one time, thus increasing opportunities for solitude and the ability for visitors to reach their desired location, which improves unconfined recreation. On the contrary, alternative B would impact unconfined recreation due to the requirement to obtain a reservation while the system is in place. However, visitors who are able to obtain a reservation or visit the park outside of the reservation hours would have outstanding opportunities for solitude or primitive and unconfined type of recreation. With a reservation system in place, it is more likely that anticipated surges in visitation would occur before and after the reservation system. These surges would negatively impact this wilderness character because visitor pulsing can decrease opportunities for solitude and unconfined recreation.

Cumulative Impacts. Past, present, and reasonably foreseeable future actions, such as overnight use regulations and permit requirements, have improved opportunities for solitude but degrade unconfined recreation, as described above in the affected environment section. However, ongoing routine maintenance projects in wilderness can benefit opportunities for solitude and primitive experiences. When paired with these impacts, the impacts of alternative B would result in positive cumulative impacts due to improved opportunities for solitude and unconfined recreation for reservation holders. Overall, there would be cumulative beneficial impacts under alternative B.

Alternative C

Under Alternative C, the number of reservations available for the rest of the park would be fewer than under alternative B. Upon implementation, this would positively impact opportunities for solitude in wilderness because fewer daily reservations would potentially lead to reduced visitor encounters along wilderness trails. In addition, visitors who obtain a permit would have improved opportunities for unconfined recreation, as they would be more likely to reach their desired locations. The park would likely experience visitation surges before and after the reservation system is in effect (i.e., before 9:00 a.m. and after 3:00 p.m.). This visitation pattern would decrease opportunities for solitude or primitive and unconfined type of recreation during certain times of the day.

Park staff may adjust components of the reservation system such as the seasonality and timing. If the daily reservation system for the rest of the park is expanded to the shoulder season (e.g., April and November) or to winter weekends, there would be no new impacts compared to what is described above. The beneficial impacts would occur for the time period and location (i.e., wilderness areas) that the reservation system is in effect.

The requirement to obtain an education permit to hike Longs Peak would likely improve visitor behavior and enhance visitors' commitment to practicing Leave No Trace principles, thus improving wilderness character. However, requiring an additional permit to hike or climb Longs Peak adversely impacts the unconfined quality of wilderness character.

Cumulative Impacts. Past, present, and reasonably foreseeable future actions, such as overnight use regulations and permit requirements, have improved opportunities for solitude but degrade unconfined recreation, as described above in the affected environment section. When paired with these impacts and impacts common to alternatives B, C, and D, alternative C would result in overall cumulative beneficial impacts on opportunities for solitude or primitive and unconfined recreation, particularly during times in which the reservation system is in effect. Conditions of this resource would likely improve compared to what is described in the affected environment. Overall, there would be cumulative beneficial impacts under alternative C.

Alternative D

In addition to the impacts described above in the common to alternatives B, C, and D, the required reservation for the Bear Lake Road Corridor may lead to increased visitation at times and areas of the park that do not require a reservation. Concentrated use in other wilderness areas may result in decreased opportunities for solitude and unconfined recreation and would adversely impact this wilderness character quality in wilderness outside of Bear Lake Road Corridor. Visitors would be able to access wilderness via the rest of the park without a reservation, providing beneficial impacts on unconfined recreation. However, under this alternative, park staff would implement temporary entrance gate closures as needed when visitation levels exceed desired conditions. This management strategy would adversely impact opportunities for solitude or primitive and unconfined recreation during the times in which closures are in effect, similar to what is described under the no-action alternative. During temporary entrance gate closures, visitors would be unable to experience wilderness. Furthermore, when these closures are lifted and access is permitted, there may be a pulse in visitation to key destinations that degrades opportunities for solitude and unconfined recreation if visitors are not able to access their desired destination.

Cumulative Impacts. Past, present, and reasonably foreseeable future actions, such as overnight use regulations and permit requirements, have improved opportunities for solitude but degrade unconfined recreation, as described above in the affected environment section. When paired with these impacts and impacts common to alternatives B, C, and D, alternative D would result in adverse impacts on this resource due to temporary entrance gate closures, and there would be adverse impacts on opportunities for solitude in wilderness areas outside of the Bear Lake Road Corridor. Conditions of this quality of wilderness character would likely be degraded compared to current conditions, as described in the affected environment section. Overall, there would be cumulative adverse impacts under alternative D.

Comparative Conclusion Across Alternatives

The no-action alternative would result in conditions and opportunities for solitude or primitive and unconfined recreation similar to what was experienced before 2020. Concentrated use on trails, particularly those that provide access to wilderness, would likely lead to increased hourly encounter rates that degrade opportunities for solitude. However, there would be beneficial impacts on unconfined recreation compared to current conditions (i.e., 2020–2023) due to the

first-come, first-served visitor access to the park. Across alternatives B, C, and D and when compared to the no-action alternative, the requirement for visitors to obtain a reservation to access Bear Lake Road Corridor degrades unconfined recreation but improves opportunities for solitude in wilderness areas accessed via this road corridor. Impacts on this wilderness character quality would be similar for alternatives B and C, with increased opportunities for solitude under alternative C when compared to the no-action alternative due to the anticipated lower number of daily reservations for the rest of the park compared to alternative B. However, data analysis suggests a surge in hourly visitation the hour before the system and after it (i.e., if a reservation is required from 9:00 a.m. to 3:00 p.m., there is a surge in visitation at 8:00 a.m. and just after 3:00 p.m.). This surge can degrade opportunities for solitude along wilderness trails. The no-action alternative would result in a similar surge and therefore similar negative effects to solitude. However, the no-action alternative would have the most beneficial impacts on unconfined recreation. Alternative D would result in increased opportunities for solitude in wilderness accessed via the Bear Lake Road Corridor, but other wilderness areas may receive higher use and solitude could be impacted. Similarly, temporary entrance gate closures are a likely management strategy under alternative D, which prevent visitors from having wilderness experiences in areas accessed via entrance gates.

WILDERNESS CHARACTER: NATURAL

Affected Environment

Among the park's wilderness values are its natural qualities that provide abundant conditions for flora and fauna to survive. This quality is referenced extensively in the plan/environmental assessment analyses of alpine tundra environments, lakeshores, streambanks, and wetland areas. Although generally in good condition, ecological systems in Rocky Mountain National Park Wilderness Area have been and continue to be affected by actions beyond and within the wilderness boundary.

Data collection during timed entry reservation pilots indicate that daytime visitor arrivals surged before and after the timed entry period. Highly sensitive wildlife species, including those that reside primarily deep within the park's wilderness, may be vulnerable to these surges in human activities. While some wildlife, such as elk, are not as sensitive to human-caused noise and activities from visitors, other wildlife can be profoundly sensitive to human disturbance from off-trail activities, including the presence of visitors and human-caused noise. Notably sensitive wilderness wildlife includes raptors, bighorn sheep, and many migratory bird species.

Other notable impacts on the natural environment in the park's wilderness include human-caused soil compaction and erosion over time in and near wetland vegetation that prevent native plants from thriving and increases incidence of nonnative, exotic plants. Erosion from human activity has led to sedimentation in surface water bodies and altered hydrology in the project area. Park staff monitor these impacts and mitigate, when necessary, through minimal management techniques to improve trails that access lakes, streams, and wetlands to minimize direct impacts on these resources.

Trends and Planned Actions

Park staff have reported that human-caused fragmentation of the wilderness is not currently a major issue and the natural quality of the park's designated Wilderness is generally in good

condition. However, the intensity of visitor numbers and visitor use in one place at one time has gradually, yet noticeably, trampled and lay bare vegetation in alpine tundra environments, as well as lakeshores, streambanks, and other wetland areas in designated Wilderness and non-wilderness areas. These conditions are expected to continue and even worsen. For example, the compaction of bare soil would continue to aid in transporting human waste and contaminants, where runoff can more easily flow into water.

The toll of human use expanding beyond roads, trails, parking lots, and other park facilities into wilderness is increasingly a concern. High visitation has resulted in abundant amounts of human waste on the ground, which can impact soil and water quality, aquatic species, and other natural qualities of wilderness (Pettebone 2014) and present a human health and sanitation concern. Ongoing visitor use and, in some cases, visitor behavior, further stresses ecological systems and degrades the natural quality.

Stressors such as climate change and regional sources of nitrogen deposition and bioactive contaminants also adversely impact the park's designated Wilderness. General increases in runoff rates in the spring and summer, combined with less snowpack and fewer freeze days, all impact flora and fauna, especially in alpine tundra. Multiyear studies under different visitor use management strategies may inform trends in anthropogenic watershed impacts on the qualities of natural wilderness character, as suggested in recent studies (Battaglin et al. 2018; Morris et al. 2014; Baron and Richer 2011; Wetherbee 2016). Related to climate change, the high-use visitor season at the park no longer coincides with summer but extends into the fall.

Similarly, the widespread occurrence of pharmaceuticals in wilderness—deposited by visitors in terrestrial environments and winding up in park waters—may threaten the reproductive success and survival of native aquatic species, benthic communities, and food webs (Battaglin et al. 2018). Some wildlife, for example, may seek out human waste as a source of vital minerals (Sarmiento and Berger 2017) and can subsequently be exposed to the concentrations of pharmaceuticals and hormones that can be present in human feces and urine. The presence of pharmaceuticals, hormones, pesticides, and other bioactive contaminants in designated Wilderness (and around the park) also threatens the reproductive success and survival of native aquatic species. These chemicals and contaminants have been found in both accessible and very remote wilderness locations in the park, which is indicative of widespread contamination and future instability of the natural environment. In a study by Battaglin et al. (2018), contaminants were detected, including caffeine and oxycodone, which are directly attributable to local human input, whereas others may be transported into the park atmospherically (e.g., atrazine).

In addition to the piloted timed entry reservation system (2020–2023), park staff currently manage wilderness use such that visitors must obtain wilderness permits for overnight use at designated sites. These restrictions help ensure that natural wilderness character quality (and other wilderness character qualities) are preserved. Designated campsites and restrictions on overnight group size reduce the impact of human-caused noise from spreading deep into the interior of the wilderness, where some species are most sensitive to human disturbance.

Environmental Consequences

Common to All Alternatives

Actions common to all alternatives, such as overnight use regulations and permit requirements, would not have additional impacts on the natural wilderness character quality. Similarly,

implementing ongoing actions, which include educational messaging for best practices for human waste management (e.g., Longs Peak and Lumpy Ridge), would help mitigate impacts of human waste on park water sources and provide beneficial impacts on the natural quality when these best practices are followed. The trends would be similar to what is described above in the current and expected future conditions of the resource section. When paired with past, present, and reasonably foreseeable future actions, there would be no new cumulative impacts on the natural quality from actions common to all alternatives.

Alternative A: No Action

Under the no-action alternative, visitor impacts in wilderness (e.g., informal trails, human waste contamination, noisy groups) would continue to occur, which would adversely affect the natural wilderness character quality. Within park wilderness, which is generally not subject to the effects of modern civilization, these more concentrated human impacts incur a relatively high imprint on the natural quality. The intensity of visitor numbers and visitor use in one place at one time would continue to denude vegetation in alpine tundra and along lakeshores, streambanks, and other wetland areas. The compaction of bare soil would continue to aid in transporting human waste and contaminants, where runoff can more easily flow into water.

Under the no-action alternative, on warm winter weekend days, park visitation spikes, which would extend disruptive noise impacts from higher numbers of visitors on sensitive wildlife species into late fall and the winter shoulder seasons. Like impacts from concentrated visitation during peak summer days, elevated levels of human waste from high numbers of visitors in one place at one time could add to contaminants and water quality impacts that would occur in these areas during the following spring runoff.

Cumulative Impacts. Actions that have beneficial effects to the natural wilderness character quality include current policies and guidance, such as overnight use regulations and permit requirements.

Past park actions, including the congressional designation of Rocky Mountain National Park Wilderness, the management of wilderness permits and parkwide regulations, and the piloted timed entry reservation system (2020–2023). These actions have resulted in both short- and long-term impacts on the natural wilderness quality. Designated campsites and restrictions on overnight group size reduce the impact of human-caused noise from spreading deep into the interior of the wilderness, where some species are most sensitive to human disturbance. Ongoing and reasonably foreseeable future actions include continued communications and educational messaging regarding wilderness stewardship best practices, which would mitigate impacts of human waste to park water sources and provide beneficial impacts on the natural quality.

When combined with past, ongoing, and reasonably foreseeable future projects, the cumulative impacts from actions in this plan are not expected to adversely affect the natural wilderness character quality.

Common to Alternatives B, C, and D

Across all action alternatives, required reservations for the Bear Lake Road Corridor would have a beneficial impact on the natural character of wilderness quality that is primarily accessed via the Bear Lake Road Corridor. The timed entry reservation system distributes visitation throughout the day, reducing the number of visitors at one time and lessening impacts on natural resources in

wilderness. Reducing the number of visitors at one time would reduce crowding and compaction on sensitive vegetative environments (e.g., alpine tundra). Therefore, implementing actions in each of these alternatives would potentially minimize the widening of congregation areas and reduce impacts on vegetation.

For alternatives B, C, and D, park staff may adjust components of the reservation system such as the seasonality and timing. If reservations for Bear Lake Road Corridor are expanded to the shoulder season (e.g., April and November) or to winter weekends, impacts on the natural quality would occur for the time period and location (i.e., wilderness areas access from Bear Lake Road Corridor) that the reservation system is in effect. As noted, on warm winter weekend days, park visitation spikes, which would extend disruptive noise impacts from higher numbers of visitors on sensitive wildlife species into late fall and winter shoulder seasons. Like impacts from concentrated visitation during peak summer days, elevated levels of human waste from high numbers of visitors in one place at one time could add to contaminants and water quality impacts that would occur in these areas during the following spring runoff.

In addition to timed entry, park staff would manage three day-use zones across all action alternatives in this plan. The development of zones, desired conditions, and monitoring strategies to ensure that desired conditions are maintained would benefit the natural wilderness character quality because they provide clear direction for long-term management of designated Wilderness, including the preservation of the natural character quality. In addition, park staff would identify and manage to visitor capacities by implementing the actions described in chapter 2, which are analyzed in this chapter.

Alternative B

Alternative B would have slightly beneficial impacts on the natural character of wilderness. As noted in the affected environment, data collection during timed entry reservation pilots indicate that daytime visitor arrivals surged before and after the timed entry requirement. By this measure, the potential benefits of the timed entry reservation system to the natural quality would have a small, beneficial impact on the natural wilderness character quality. The projected lower visitation numbers through the duration of the timed entry hours under alternative B would likely result in less impact on natural sounds due to the broader distribution of visitors throughout the day compared to the no-action alternative. On the other hand, while the volume of noise would potentially be lower at one time, human sounds may potentially occur for a longer duration during the day, possibly neutralizing beneficial impacts on the natural acoustic environment.

However, on warm winter weekend days, park visitation would spike, which would extend disruptive noise impacts from higher numbers of visitors on sensitive wildlife species into late fall and winter shoulder seasons. Like impacts from concentrated visitation during peak summer days, elevated levels of human waste from high numbers of visitors in one place at one time could add to contaminants and water quality impacts that would occur in these areas during the following spring runoff.

Cumulative Impacts. When paired with impacts from past, present, and reasonably foreseeable future actions, the impacts of the actions common to alternatives B, C, and D would result in conditions similar to what is described in the affected environment section.

The impacts of past, present, and reasonably foreseeable future actions are described above in the trends and planned actions section. Conditions in the natural wilderness environment are

generally good but are declining. Actions under alternative B would result in slightly beneficial cumulative impacts on the natural wilderness character quality because they would reduce surges of visitors who would more intensely impact vegetation, natural sounds, and other natural components of wilderness discussed in this chapter. This alternative, when paired with ongoing actions and actions common to alternatives B, C, and D, would result in conditions that are similar to what is currently experienced, as described above. As a result, overall cumulative impacts on the natural wilderness character quality would be beneficial under alternative B.

Alternative C

Under alternative C, the number of reservations available for the rest of the park would be fewer than under alternative B. This overall lower visitation compared to other alternatives would likely result in less visitor crowding and congregation, lessening impacts on vegetation and bare soil, and fewer human noise impacts at one time, reducing disturbances to sensitive wildlife compared to the other action alternatives. If the daily reservation system for the rest of the park is expanded to the shoulder season (e.g., April and November) or to winter weekends, there would be no new impacts compared to what is described above.

The requirement to obtain an education permit to hike Longs Peak would likely improve visitor behavior and enhance visitors' commitment to practicing Leave No Trace principles, thus improving the quality of the natural character of wilderness.

Cumulative Impacts. When paired with impacts from past, present, and reasonably foreseeable future actions, and the impacts of the actions common to alternatives B, C, and D, conditions would result in conditions similar to what is described in the affected environment.

Alternative D

In addition to the impacts described above in the common to all action alternatives, the required reservation for the Bear Lake Road Corridor may lead to increased visitation to times and areas of the park that do not require a reservation. Concentrated use in other wilderness areas may result in some impacts on the natural character of wilderness in areas outside of the Bear Lake Road Corridor. Under this alternative, it is reasonable to assume that closures would occur at peak times, which would result in similar impacts on the natural wilderness character quality as those indicated in the no-action alternative.

Cumulative Impacts. When paired with impacts from past, present, and reasonably foreseeable future actions and the impacts of the common to all action alternatives (i.e., reservations for Bear Lake Road Corridor), conditions would result in conditions similar to what is described in the affected environment.

Comparative Conclusion Across Alternatives

The no-action alternative would result in conditions and opportunities for the natural character of wilderness similar to what was experienced before 2020. Concentrated use on trails, particularly those that provide access to wilderness, would likely lead to increased hourly encounter rates that degrade the natural soundscape, for example. Like the analysis indicated in the solitude and unconfined character of wilderness, data suggest a surge in hourly visitation the hour before the system and after it (i.e., if a reservation is required from 9:00 a.m. to 3:00 p.m., there is a surge in visitation would occur at 8:00 a.m. and just after 3:00 p.m.). This surge can degrade natural sounds along wilderness trails. In this regard, across alternatives B, C, and D and

when compared to the no-action alternative, requiring a timed entry reservation to access the Bear Lake Road Corridor would have slightly beneficial impacts on the natural character of wilderness.

However, while the volume of noise would potentially be lower at one time under alternatives B, C, and D, human sounds may potentially occur for a longer duration during the day, possibly neutralizing beneficial impacts on the natural acoustic environment. Nonetheless, the projected lower visitation numbers through the duration of the timed entry hours under alternative B would result in a slightly less impact on natural sounds due to the broader distribution of visitors throughout the day compared to the no-action alternative. Alternative C permits lower visitation throughout the duration of the daily reservation action, which would likely result in less visitor crowding and human noise impacts at one time compared to the other action alternatives. However, on warm winter weekend days, park visitation would continue to spike, which would extend disruptive noise impacts from higher numbers of visitors on sensitive wildlife species into late fall and winter shoulder seasons. Like impacts from concentrated visitation during peak summer days, elevated levels of human waste from high numbers of visitors in one place at one time could add to contaminants and water quality impacts that would occur in these areas during the following spring runoff. Alternative D would result in reduced human-caused noise in wilderness accessed via the Bear Lake Road Corridor compared to the no-action alternative, but other wilderness areas may receive higher use, and the natural soundscape would be adversely impacted in those areas.

Chapter Four Consultation and Coordination

4



This page intentionally blank.

CHAPTER 4: CONSULTATION AND COORDINATION

The National Park Service consulted with and received comments from various agencies, Traditionally Associated Tribal Nations, organizations, and interested persons in preparing this document. The process of consultation and coordination is an important part of this project. Following are the federal and state agencies and Tribes that were consulted during this process.

Traditionally Associated Tribal Nations:

- Assiniboine and Sioux Tribes
- Cheyenne and Arapaho Tribes
- Comanche Nation
- Northern Arapaho Tribe
- Northern Cheyenne Tribe
- Eastern Shoshone Tribe
- Southern Ute Indian Tribe
- Ute Indian Tribe of the Uintah and Ouray Reservation
- Ute Mountain Ute Tribe
- White Mesa Ute Board

Government Agencies and Representatives:

- Colorado State Historic Preservation Office
- US Fish and Wildlife Service
- Town of Estes Park
- Town of Grand Lake
- Boulder County
- Grand County
- Larimer County
- Colorado Tourism Office, State of Colorado
- Office of US Senator for Colorado Michael Bennet
- Office of US Senator for Colorado John Hickenlooper
- Office of US Representative Joe Neguse (Second Congressional District of Colorado)

- Office for Governor of Colorado Jared Polis
- NOCO 2050 Partners (collaborative group of representatives from eight public land management agencies in the Northern Colorado Front Range mountains, including the National Park Service).

Appendixes



This page intentionally blank.

APPENDIX A: HISTORY OF DAY USE VISITOR MANAGEMENT AT ROCKY MOUNTAIN NATIONAL PARK

INTRODUCTION

Rocky Mountain National Park (the park) has managed increasing day use visitation for decades and continued to adapt to changes in visitor use patterns over the past half century. Throughout its history, park staff proceeded with long- and short-term visitor use management strategies appropriate for visitation patterns of its time. Management actions were informed by internal and external research, planning efforts, visitor and staff feedback, and lessons learned from previous management actions. Park staff implemented shuttle services, upgraded and redesigned parking lots and roadways, and constructed infrastructure in the 1960s through the early 2000s. However, annual visitation rapidly increased by the mid-2010s, and park staff implemented reactive day use visitor strategies to adapt to traffic congestion, crowding on trails, resource impacts, operational capacities, and rising safety concerns for visitors and park staff. Park managers recognized the challenges of these temporary management strategies and formed a day use visitor access strategy interdisciplinary team in 2017 to assess impacts of visitation. After an approximately three-month closure in early 2020 due to the COVID-19 pandemic, park staff implemented a pilot timed entry permit system in June 2020 to adhere to safety precautions and reduce crowding in the park. Park staff piloted the system for the following three years during peak visitation season, gathered data and feedback, and made changes to the system based on lessons learned from each previous pilot. During this time, the National Park Service began long-range day use visitor access planning that included two phases of pre-National Environmental Policy Act (NEPA) public outreach and comment periods.

Visitor use and visitation patterns are unpredictable and often difficult to proactively manage. Adaptation is key in visitor use management, and, over the past century, park management demonstrated their ability to adapt to changing social and ecological conditions for which it manages. This summary provides an overview of the history of day use visitor management at Rocky Mountain National Park and includes examples from the robust catalog of internal and external research and data that accompanied NPS decisions on visitor use management.

DAY USE VISITOR MANAGEMENT: 1960–2000

After World War II, national parks across the country experienced a rush of visitors, and that increase led to a nationwide effort to transform parks for visitation called Mission 66. Congress provided funds to parks to build infrastructure that supported park visitors. At Rocky Mountain National Park, this infrastructure included new visitor centers—Beaver Meadows, Alpine, and Kawuneeche—and new trails like the Forest Canyon Overlook Trail and the Moraine Park Discovery Center Trail. Road and parking lot improvements also helped ensure visitors could access the park. During the Mission 66 period, park staff constructed the Beaver Meadows entrance and reconstructed the Fall River and Grand Lake entrances. Visitation into the backcountry also soared during this period. Visitation continued to climb steadily, and park managers needed to understand how best to balance the protection of resources with visitor use (Bzdek and Ore 2010).

From the 1960s through the 1990s, scientists studied park visitors and the impacts of visitation, including resource impacts, visitor attitudes on day use and overnight use management, visitor values and experiences in the park, and visitor demographics (Willard and Marr 1963, 1974; Brickler 1969; Fazio 1974; Trahan 1978; Henderson 1983; Biedleman 1988; Valdez 1996; Flick and Taylor 1998). These studies mirrored visitor use management actions implemented during this time, including the implementation of the backcountry (now wilderness) camping permit system and the Bear Lake Road shuttle system. Visitor surveys highlighted the values that visitors placed in resource protection and visitor experience, affirming the NPS mission and park management plans implemented to preserve park resources and experiences.

Research on visitor impacts on resources largely began in the 1960s (Willard and Marr 1963, 1970, 1971). Most notable is the work of Dr. Beatrice Willard, a botanist who spent 40 years studying high alpine tundra in the park.¹⁷ In a multiyear study, Willard and Marr (1963) documented visitor-caused resource impacts in high-use recreation areas near Bear Lake, including visitor-created trails, trail widening, braiding, trampling of sensitive plants, and campfire impacts. The study tested the efficacy of closing areas and paving trails to reduce impacts and found that these mitigations were a useful management tool. Dr. Willard also emphasized education as a protection measure. In a 1970 study, Willard and Marr documented trampling of alpine tundra vegetation along Trail Ridge Road and other visitor behaviors that negatively impact the alpine tundra environment, such as littering, driving on vegetation, and picking flowers. The authors' designated protected plots in the alpine tundra to document vegetation recovery and estimated that some trampled areas would take hundreds of years to recover (Willard and Marr 1971). A visitor survey conducted in the summer of 1968 found that visitors were concerned about traffic, crowds, littering, and inadequate visitor facilities (Brickler 1969). These studies raised park staff's awareness of recreation-resource dynamics, experiences, and management options.

A significant management change occurred for the park when a recommendation to officially designate much of Rocky Mountain National Park as wilderness under the Wilderness Act of 1964 was first introduced to Congress by President Richard Nixon on June 13, 1974. The Wilderness Act defines attributes of "wilderness character" and requires public land and water managers to protect wilderness by prohibiting specific uses of designated areas, analyzing actions taken in wilderness, and maintaining wilderness character inclusive of visitor use and experiences. The proposal only assigned these areas as potential designated Wilderness; however, potential wilderness areas are managed as designated Wilderness (NPS 2023d). Approximately 95% of the park's landscape, and most trail segments and wilderness campsites, were subsequently managed in accordance with the Wilderness Act.

Longs Peak is the highest summit in the park at 14,259 feet with world-class technical climbing routes, making it a popular destination for hikers and climbers and an iconic wilderness resource and experience. Visitor use on Longs Peak increased in the mid-century as the technical climbing community expanded. Park management issued a regulation that prohibited climbing on the east face of Longs Peak, known as the Diamond, in the 1950s due to concerns about high-alpine rescues (Alexander and Moore 2010). The prohibition was eventually reversed, and technical climbers established routes on the Diamond, which increased its appeal. By the 1960s, the wilderness conditions of Longs Peak noticeably diminished. Staff observed crowding and resource damage, as well as serious safety concerns on the peak's technical and nontechnical

17. Dr. Willard's research plots along Trail Ridge Road are now listed in the National Register of Historic Places.

routes (Alexander and Moore 2010). This prompted park management's decision to manage Longs Peak in accordance with the Wilderness Act and to implement strategies to protect resources and experiences and enhance visitor and staff safety. Management improved communication and rescue procedures, modified routes, and communicated the importance of backcountry knowledge and responsibility (Alexander and Moore 2010). The park implemented a mandatory registration system for technical climbers and winter backcountry campers in 1963, which was incorporated into its 1964 master plan (Alexander and Moore 2010).¹⁸

Before 1974, the backcountry permit system was administered on a first-come, first-served basis. Due to overuse and resource impacts, park staff implemented a partial reservation system for backcountry camping permits with the approval of the backcountry management plan in 1975. The management plan opens with the following:

Overnight backcountry use within Rocky Mountain National Park has increased 390 percent from 1967 to 1974. In 1969, about 9,600 camper days were registered, while in 1974 the total reached 47,000. The impact of this use has resulted in a resource and wilderness experience deterioration. (NPS 1975)

The reservation system initially applied to 50% of wilderness campsites. However, park staff experienced difficulties with administering reservations for 50% of permits and moved all backcountry permits to the reservation system in 1976. Fees were not collected for backcountry permits until 1995.

Trends with overnight users coincided with and contributed to rising day use visitation levels. In the early 1970s, traffic began to exceed parking capacity along Bear Lake Road. The park's 1976 Final Master Plan recommended implementing a shuttle service for the Bear Lake Road Corridor, and park staff launched an experimental shuttle service in 1978. A social science research study on visitor perception of the new pilot shuttle system described visitation in the corridor as follows:

There is a large 200-plus car parking lot of Bear Lake which is normally full from 10:00 A.M. to 3:00 P.M. daily during the summer months. The day-use of the Bear Lake area is extremely heavy. The park visitor often has difficulty finding a place to park and will typically encounter crowds of other visitors on trails. (Trahan 1978, 9)

The pilot shuttle system proved to be a successful tool to manage day use visitation in the Bear Lake Road Corridor, and, in the early 1980s, park staff drafted plans for its formal implementation. The Development Concept Plan – Bear Lake (1982) established a permanent shuttle service to operate during the summer months.

In the 1980s and 1990s, social science research on park visitors continued to provide the park with relevant information for management decisions. For instance, Henderson (1983) studied patterns of day use visitation at Longs Peak to inform visitor capacity analyses. Results from a survey of Longs Peak visitors, conducted as part of this study, found that 87% of respondents supported or strongly supported day use limits if conditions on Longs Peak were determined to be deteriorating beyond an acceptable level, but just over one-third of respondents supported day use limits to increase the quality of hiking experiences. Beidleman (1988) surveyed frontcountry

18. The mandatory registration system was abandoned in the 1980s (Alexander and Moore 2010).

campers to evaluate support for existing and alternative visitor use management actions designed to protect park resources. Respondents favored current management actions, but most respondents opposed additional management actions. However, nearly half of all respondents identified overuse as the greatest problem facing the park.

A second area-specific development concept planning effort began in 1992 following a 1990 visitor use survey conducted in the Longs Peak and Wild Basin areas, both with unstaffed entrance stations. Findings of the survey outlined average visitor use and patterns at Wild Basin and Longs Peak but also collected responses to additional management-related questions (NPS 1992). For instance, survey results showed that respondents agreed with a possible management action that would establish a zone system to allow only a certain number of users for a certain time and that visitors preferred staffed contact stations over unstaffed stations. The Management Development Concept Plan for Longs Peak/Wild Basin/Lily Lake (NPS 1996) approved installing an entrance station, with fee collection, in Wild Basin; broadening and implementing earlier operation hours for the Longs Peak Ranger Station; and removing the Lily Lake Visitor Center to use its parking lot for access to the Twin Sisters Peak Trail. Park staff made several other infrastructure and facility improvements, including upgrading the Lily Lake and Sprague Lake Trails and redesigning/replacing comfort stations.

Park staff conducted a visitor use study in 1994–1995 with help from volunteers who interviewed nearly 4,000 visitors over a one-year period, making it one of the largest surveys of this type conducted in the National Park Service at this time (Valdez 1996). When asked to select the “most acceptable method of restricting vehicles in the park,” 51% of respondents were in favor of a “required use of shuttle service” action, followed by 23% in favor of “space-available entry” and 20% in favor of “entry by reservation only.” Respondents identified funding and crowding as the most important problems facing the National Park Service. However, 80% of respondents did not believe the park was crowded. Annual visitation levels to the park varied between 1980 and 2000 but generally hovered between 2.5 million and 3 million visits per year and surpassed 3 million visits in the late 1990s.

DAY USE VISITOR MANAGEMENT: 2000–2010

Research studies in the 2000s included quantified data of visitor use on trails, visitor perceptions of wilderness and crowding, resource impacts, socioeconomic impacts, and research specifically designed to inform transportation planning (Parsons et al. 2000; Vaske et al. 2002; Schuster et al. 2004; Wallace et al. 2004; Bates et al. 2006; Pettebone et al. 2006; Tayler and Grandjean 2009; Cook 2010; Newman 2010). Park staff continued to gather information about visitor experiences and perceptions by promoting visitor feedback via comment cards obtained at visitor centers, and research in the park proliferated with the establishment of the Continental Divide Research Learning Center at the park. Visitor use management planning over the decade integrated new research and feedback and built upon previous management plans, including for the shuttle system, road infrastructure, and backcountry/wilderness management.

Rocky Mountain National Park staff initiated a transportation study in 1999. The study provided a snapshot of existing visitor use, transportation-related problems, and modeled future visitation and transportation scenarios (Parsons et al. 2000). Findings stated that a shortage of parking spaces juxtaposed to visitor demand was the greatest transportation problem for the park. The study also found that when parking lots were full, visitors often parked illegally in spaces designated for accessibility parking, on road shoulders, and on alpine tundra (Parsons et al. 2000).

With findings from the transportation study, other research, data, and observations, park staff made major improvements to the shuttle system and infrastructure in the Bear Lake Road Corridor in the early and mid-2000s.

The Bear Lake Road Improvement Project Environmental Assessment (2001) analyzed a new shuttle system and infrastructure improvements designed to address resource impacts, safety concerns, and growing visitation. In the past, school buses were used for the shuttle service, but in 2000/2001, the park entered a service contract that included new shuttle buses exclusively used for the park shuttle bus service. The Bear Lake Road Improvement Project Finding of No Significant Impact was signed in 2002 and approved the addition of 142 parking spaces (expanding from 208 to 350 spaces) in the park-and-ride lot to adapt for vehicle and shuttle capacities. The plan also formalized select roadside pullouts and redesigned sections of the road to accommodate the new shuttle buses and address safety concerns. The environmental assessment analyzed an additional 39 parking spaces beyond the park-and-ride lot. Because the public expressed concerns about increasing parking capacity in the corridor, these parking spaces were not approved in the finding of no significant impact nor developed. In subsequent years, park staff approved additional plans to improve conditions in the Bear Lake Road Corridor, including improvements to shuttle bus stops (NPS 2003). The Bear Lake Road Phase 2 Improvement Project (2009) realigned sections of Bear Lake Road; reconfigured the Tuxedo Park parking lot to accommodate a shuttle bus stop; reclaimed, improved, or paved pullouts; and moved the Glacier Gorge parking area and trailhead, adding a shuttle stop.

The Hiker Shuttle service began in 2006, providing limited service between the town of Estes Park and the park. Rather than entering the park in a private vehicle, visitors had a choice to park in town and board the Hiker Shuttle from the Estes Park Visitor Center. The Hiker Shuttle provided a direct route to the park-and-ride lot, allowing visitors to transfer to any park shuttle route. Park staff adjusted the shuttle bus schedules, stop locations, and frequencies throughout the duration of its operations. For instance, in 2017, park staff discontinued the Beaver Meadows Visitor Center shuttle stop due to a high volume of riders parking in the lot all day, which disrupted regular visitor services at the visitor center.

Even with these physical transportation improvements, visitation outpaced demand, especially in the Bear Lake Road Corridor. A more comprehensive transportation and visitor use study was conducted in 2008 and 2009 to inform transportation planning at the park and to optimize the operational efficiency of the system while protecting resources and the quality of visitors' experiences (Newman et al. 2010). The study used visitor surveys, resource condition assessments, visitor counts, sound level monitoring, and visitor use and transportation modeling to produce several individual reports and recommendations for visitor use management. Integrated research methods provided staff with a thorough snapshot of current and future potential visitor use and patterns.

As transportation studies and planning were underway, park staff were also engaged in wilderness management planning. The Rocky Mountain National Park Wilderness Area, nearly 250,000 acres within the park, was permanently protected from human impacts when officially designated under President Barack Obama in March 2009. However, before the designation, park staff managed areas of proposed wilderness as if the lands were designated Wilderness when planning for day and overnight visitors, per NPS policy.

In 2001, the Backcountry/Wilderness Management Plan (the plan) was approved and superseded previous backcountry management documents because it encompassed more details on wilderness use and administration. Management classes were zoned and defined by desired type and amount of use, accessibility/challenge, opportunity for solitude, management use, and resource conditions. For instance, Management Class 1, approximately 170,236 acres, is designated for day use only, to be without designated or maintained trails, and with a desired condition for day user group sizes of seven people or less (NPS 2001, 2-2). Schuster et al. (2004) conducted a wilderness experience survey one year after the plan was approved. This research helped identify what constitutes as wilderness experience in the park, identify features and experiences of wilderness, and determine what aspects may detract from wilderness experiences. Respondents emphasized the importance of wilderness aesthetics, escapism, and solitude and expressed negative views of human disturbances, such as inappropriate behaviors, human-caused resource impacts, crowding, and human-generated sounds (Schuster et al. 2004). The intent of the plan is to manage for the desired qualities of experience and values reflected in the results of the survey, including standards for acceptable resource conditions and opportunities for solitude per management class. The plan set forth guidance for overnight backcountry use but also set expectations for day use visitation and the management of wilderness, and ultimately informed long-range day use visitor monitoring and planning efforts.

Annual visitation levels slightly declined between the early and mid-2000s but steadily increased in the latter end of the decade.¹⁹ In 2010, Rocky Mountain National Park welcomed approximately 3 million visitors. Visitation levels exceeded 3 million visits for the first time since 2003 in 2011. Except for 2013, annual visitation has since remained at more than 3 million, with a dramatic spike occurring in 2015—Rocky Mountain National Park’s centennial year—that required subsequent visitor use management actions.

DAY USE VISITOR MANAGEMENT: 2010–2019

While the strategies implemented in the 2000s managed for day use visitation, annual visitation rates continued to increase in the 2010s. As mentioned, annual visitation to the park in 2010 was approximately 3 million visitors; however, Rocky Mountain National Park reached a record-breaking 4.67 million visits in 2019. Park staff experimented with several pilot day use visitor management strategies from 2016 through 2019 to address crowding and congestion, as well as residual impacts. These pilot programs provided valuable information for possible long-term management strategies. The Continental Divide Research Learning Center implemented trail counter and traffic counter programs to monitor visitation, and these data were complemented by research studies (Lawson et al. 2011; D’Antonio et al. 2013; HDR, Inc. 2015; Schultz and Svajda 2016; Lawson et al. 2016; RSG 2017; Battaglin et al. 2018; Graham and Monz 2019; Wesstrom et al. 2021). New technologies and research methods enhanced staff’s ability to gather information on day use visitation and prepare for a long-range day use visitor access plan.

Impacts of day use visitation were apparent throughout the park. For example, trail braiding on the Deer Ridge Trail not only damaged vegetation but also caused visitors to lose their way on the designated trail. Staff and visitors observed human waste along trails, such as in Wild Basin. Visitors commented on the conditions of park restroom facilities, as staff described difficulties of

19. The decline in visitation in the early 2000s was attributed to changing travel patterns after the terrorist attacks on September 11, 2001.

routine maintenance of facilities due to the volume of use and difficulties accessing facilities due to traffic congestion. Visitor comments also described negative park experiences because of crowding and congestion; visitor-caused resource damage; and negative interactions with other visitors who were uninformed, unprepared, or violating park regulations.

In addition to physical improvements, environmental analyses, and research, park staff increased its effort to educate visitors and enforce regulations. Along all park roads, park staff used signs, parking delineators, fences, and striping to keep vehicles in designated parking areas. These actions were designed to mitigate damage to resources but also ensure visitor and staff safety. For instance, as designated parking spots filled in the Bear Lake Road Corridor, visitors would park along the roadside, which trampled vegetation and led to visitors walking along narrow roadways. Along Wild Basin Road, cars parked outside of designated spaces and blocked driving lanes. Park staff employed a variety of communication tools and messaging to create awareness about crowding, congestion, safety, and resource damage. Messaging emphasized the importance of planning ahead, the realities of full parking lots and long lines, and advice about hiking early and late in the day as an attempt to spread use out throughout the day. To reduce congestion, park staff promoted the shuttle service, with variable message signs located before park entrances and along highways to the park such as in Drake and Lyons, Colorado; park staff eventually partnered with Estes Park to include park-related variable messaging in town. Park staff also installed webcams at main eastside entrances to demonstrate real-time length of lines. In 2016, staff shared tips on how to behave in the park, with emphasis on fire regulations, human waste etiquette, approaching wildlife, illegal parking, and dogs on trails. The Rocky Pledge information campaign started in 2017 and encouraged all those who cared about the park to commit to actions to protect it.

Visitor demand continued to increase in the Bear Lake Road Corridor, and the corridor remained a focal area for day use visitor management. Crowding and resource impacts in the Bear Lake Road Corridor were recorded in a 2015 draft report using visitor surveys, people-at-one-time observations, trail counts, shuttle bus ridership, GPS data, Bluetooth data from vehicles, and visitation levels (HDR, Inc. 2015). Additional research found that resource impacts on attraction sites in the corridor were unacceptable for significant portions of visitors' hikes (D'Antonio et al. 2013), and some visitors experienced crowding and conflict at the Bear Lake Trailhead during the winter (Schultz and Svajda 2016).

Beginning in 2016, park staff tried restricted access to the Bear Lake Road Corridor when parking lots reached capacity. Variable message signs at park entrances and along roadways informed visitors that lots were full and to return later. Temporary restrictions were reactive and could be in effect as early as 7:00 a.m., be implemented intermittently throughout the day, or stay in effect until late afternoon. Restrictions occurred midday from late spring through fall and were occasionally used on busy winter days (e.g., on holidays and weekends).²⁰ Westrom et al. (2021) conducted a vehicle spatial-temporal study during Bear Lake Road Corridor restrictions in the summer of 2017 and found that 21% of vehicles returned to the corridor after being redirected, and 9% left the park. As a result of redirection, vehicles visited other areas of the park, such as Moraine Park and Trail Ridge Road; increased traffic in these areas; made more stops; and traveled further and longer distances.

20. Frequency and dates of restrictions were not formally recorded by park staff.

Visitation levels at other key destinations necessitated similar reactive management strategies. From 2016 through 2019, park staff and volunteers actively managed parking at the Alpine Visitor Center by queuing vehicles or temporarily closing the entrance when the parking lot was full. In 2017, Wild Basin Road restrictions were implemented when parking met capacity. Vehicles would be turned around at the entrance station or, when staffing allowed, vehicles were managed through a “one-in, one-out” restriction at the entrance gate. Pilot strategies in the latter part of the 2010s were unsustainable for park operations and staff but also negatively impacted visitor experiences.

Although the shuttle system improved visitor experience and supported day use visitation, the system was not fully capable of accommodating the steadily increasing visitation levels of the mid-2010s. During peak times, visitors waited in long lines to board a shuttle, causing a surge of crowding at trailheads and parking lots. Rocky Mountain National Park partnered with the State of Colorado regional shuttle system, Bustang, in 2019 to pilot a transportation option from the Denver metro area to the park for six weekends over that summer. Expanding the Hiker Shuttle and the park shuttle systems were not a feasible option to resolve congestion because unintended impacts from the expansion would stress the trail capacity in the corridor, stress other areas of the park, and would not address the overall visitation demands (Lawson et al. 2011, 2016). Opportunities to experience wilderness, including solitude, would diminish. Furthermore, recreation ecology research provided evidence of visitor-created resource impacts, including human inputs of pharmaceuticals, hormones, pesticides, and other bioactive contaminants in park waters and sediment, even in more remote areas of the park (Battaglin et al. 2018) and visitor-created impacts on trails and sites around high-elevation lakes (Graham and Monz 2019).

Rocky Mountain National Park established a day use visitor access strategy interdisciplinary team in 2017 to assess visitation impacts on natural and cultural resources, visitor experience, visitor and staff safety, and park operations. Internal and external research and data collection, visitor feedback, and staff input gave the day use visitor access strategy interdisciplinary team and park leadership foundation blocks for discussions and the development of tools and projects. Public comments were reviewed by park managers to help identify key issues and impacts of visitation as experienced by visitors, such as conditions of facilities and congestion. The Rocky Mountain National Park Foundation Document (NPS 2013) and the Backcountry/Wilderness Management Plan (NPS 2001) provided guidance for the day use visitor access strategy team. Valuable tools included a “visitation scenario management tool,” which is a dynamic modeling program to analyze capacity and potential congestion with inputs from vehicle, shuttle, and parking volumes (HDR, Inc. 2015). One project collected and summarized park visitor use management research and data and obtained feedback from park staff to identify gaps in research and data needed for day use visitor access planning (RSG 2017). With new experiences and information and established guidance, the day use visitor access strategy team began to describe issues and draft desired conditions, indicators, and thresholds for a long-range day use visitor access plan (IVUMC 2016).

DAY USE VISITOR MANAGEMENT: 2020–PRESENT

Annual visitation at the park reached a record high in 2019 with 4.6 million visitors. The transportation study from 2000 calculated day use visitation predictions using a 1.8% increase in visitation per year to estimate 4.9 million visitors to the park in 2020 (Parsons et al. 2000). Parsons et al. crafted four scenarios of management options that considered funding and feasibility to

recommend management strategies. Scenarios are differentiated by percentage of desired vehicle reduction (e.g., 40%) and costs to implement recommended strategies. One scenario (the “High Scenario”) includes recommendations for the shuttle system and parking lots but also includes “Visitor Management Policies” recommendations for 2020:

To achieve a 40% reduction in congestion, about 2,930 vehicles per peak-season day would be allowed into the park with reservations during the reservation period of 10 a.m. to 4 p.m. This is about 41% of the 7,100 vehicles in 2020 that would normally enter the park during this period. The remaining 59% of park visitors who would normally visit during the reservation period could either use the shuttle system to enter the park or could choose to visit the park during non-peak times (e.g., earlier or later in the day). For calculation purposes, it is assumed that a certain percentage of visitors would shift the time of their park visit if a Vehicle Reservation System were implemented, a percentage that varies with entrance location . . . (Parsons et al. 2000)

It is important to note that a vehicle reservation system may not actually be required in the High Scenario. However, based on the data on park shuttle usage, visitor surveys, and other information available at the time of this study, it appears that a parkwide shuttle system alone would not result in the 40% vehicle reduction goal of this scenario, thus requiring the implementation of additional vehicle reduction measures, such as a vehicle reservation system, by 2020.

A more recent study on visitor use management and capacity in the Bear Lake Road Corridor also recommended reservation systems and outlined three reservation-based recommendations: a parking lot-specific reservation with timed entry; a corridor access pass with timed entry; and/or a guaranteed access pass for the Hiker Shuttle (Dietze et al. 2019). Recommendations from both studies address the peak times for visitation to disperse visitors throughout the day and to address the impacts of high visitation in the Bear Lake Road Corridor—two reoccurring day use visitation issues throughout the park’s history.

Reactive pilot strategies implemented from 2016 through 2019 were ultimately replaced by temporary timed entry pilot programs. Rocky Mountain National Park first piloted a timed entry permit system (TEPS) in 2020 (TEPS 1) as a proactive strategy to manage crowding and maintain public health and safety during the COVID-19 pandemic. With ongoing public health and safety challenges in 2021, staff implemented a second pilot TEPS (TEPS 2) for peak visitation times. Based on observations and data from TEPS 1 (NPS 2020b), park managers adjusted portions of the system for pilot TEPS 2, including a separate permit for Bear Lake Road Corridor access and increasing the number of daily reservations available. Because these pilots coincided with park efforts to address day use visitation, park staff implemented pilot TEPS in 2022 and 2023, gathered data and feedback, and made changes to the system based on lessons learned from each previous pilot. Long-range day use visitor access planning and pilot strategies were concurrent. The National Park Service met with Tribes, stakeholders, and local government representatives; held public meetings and an open house; and provided opportunities for public comment on day use visitation in spring/summer of 2021 and winter of 2022–2023.

The first pilot, TEPS 1, was planned in a short time frame between March 2020 and May 2020, during the time when the park was shut down in response to the COVID-19 pandemic. The park reopened in May 2020, and the system was implemented from June 12 through October 31, 2020.

Visitors obtained a timed entry permit to enter the park during a two-hour window between 6:00 a.m. and 5:00 p.m., with no limit on the length of stay. The number of available reservations was based on a relatively low percentage of park infrastructure capacity: 60% of parking and transit capacity over a 24-hour period, or approximately 4,800 vehicles and approximately 13,500 visitors per day. During pilot TEPS 1, 90% of reservations were sold one month in advance while the remaining 10% were made available 48 hours in advance. Before the implementation of this pilot strategy, most day use was concentrated from 10:00 a.m. to 2:00 p.m.; pilot TEPS 1 helped spread that use throughout the day. Hiker Shuttle and Bustang operations were suspended in 2020 due to safety precautions at the height of the COVID-19 pandemic. However, the Bear Lake and Moraine Park shuttle services operated at 20% capacity, or 15 passengers per shuttle.

Under pilot TEPS 1, the Bear Lake Road Corridor continued to be the most sought-after area in the park, as the parking lots filled before or just after the reservation start time on most days. On some days, temporary restrictions in the Bear Lake Road Corridor were needed to manage vehicle volumes. Meanwhile, areas of the park outside the Bear Lake Road Corridor had significant reductions in use, and visitation increased during times outside of the reservation period.

Because of concentrated use in the Bear Lake Road Corridor during pilot TEPS 1, the system design in pilot TEPS 2 (NPS 2021) created two options for reservations: a parkwide permit that allowed Bear Lake Road Corridor access and a “rest-of-park” permit that excluded access to the Bear Lake Road Corridor. Reservations under pilot TEPS 2 were increased to 80% of parking and transit capacity over a 24-hour period, or approximately 6,830 vehicles and approximately 19,125 visitors per day. The timed entry periods were from 5:00 a.m. to 6:00 p.m. for the option that included the Bear Lake Road Corridor and from 9:00 a.m. to 3:00 p.m. for the rest-of-park. For pilot TEPS 2, 75% of reservations were sold one month in advance while the remaining 25% were made available the night before at 5:00 p.m. Reduced reservation hours for the rest-of-park permit allowed more options for visitors who showed up without reservations, for those of residential proximity to the park, and for cross-park travel. Even with this pilot in place from May 28 through October 11, 2021, annual visitation was the second highest on record at 4.4 million visitors.

As in pilot TEPS 2, park staff used the two-permit system in 2022 for pilot TEPS 3. Staff increased timed entry permit numbers to target 90% of parking and transit capacity, or approximately 7,200 vehicles and approximately 20,000 visitors per day. The timed entry periods remained the same as were implemented in 2021, and the pilot was in place from May 27 through October 10, 2022. Park staff increased the percentage of day-before reservations to 30%. In 2020 and 2021, the shuttle system was limited to the Bear Lake and Moraine Park routes. However, Hiker Shuttle and Bustang operations resumed in 2022. Visitors using the Hiker Shuttle were required to obtain a timed entry shuttle permit. Bustang riders were not required to have a timed entry permit.

Park staff implemented pilot TEPS 4 from May 26 through October 22, 2023. Staff piloted several modifications for TEPS 4 based on data, observations, and staff and public feedback. As in pilot TEPS 3, pilot TEPS 4 provided the same 90% of parking and transit capacity, the Bear Lake Road Corridor permit, now called the “Park Access+ Timed Entry Permit,” period remained the same, and all shuttle services were operational. However, the rest-of-park permit, renamed the “Park Access Timed Entry Permits,” period was reduced an hour, beginning at 9:00 a.m. but adjusted to end at 2:00 p.m. Pilot TEPS 4 also increased the number of reservations released for purchase the night before to 40%.

Pilot TEPS prompted robust research collection, monitoring, and planning efforts. Newly published research provided important information for long-range planning, including parking lot turnover rates (Lawhon 2022), emergency evacuation models (Akyildiz et al. 2023), and impacts of human waste on park ecosystems (Scott et al. 2021, Baron et al. 2023, and Scott et al. 2023). Since 2020, surveys have been conducted with park staff, volunteers, and partners to learn about their operational experiences and ways to improve the system. The Continental Divide Research Learning Center continued to monitor trail and traffic counters but also implemented a program that maps visitor-created bare ground and evidence of human waste. The Continental Divide Research Learning Center partnered with Utah State University to conduct surveys on visitor attitudes on desired park experiences and visitor experiences during TEPS (Creany and Monz 2023). Long-range planning included refining desired conditions and visitor use management zones (appendix B), developing indicators and thresholds (appendix C), capacity analyses for areas/locations in the park (appendix D), and conducting two phases of pre-NEPA civic engagement and outreach.

CONCLUSION

The National Park Service has a mission to conserve park resources and to provide for their use and enjoyment in such a manner that leaves resources unimpaired for future generations. Visitor use management planning is dynamic, as social and ecological conditions evolve and visitation patterns change. The history of day use visitor management at Rocky Mountain National Park demonstrates how park staff adapted to changing conditions with both long- and short-term strategies; each phase of management informed by prior strategies, internal and external research, planning, and visitor and staff feedback. Implementing the shuttle bus service in the 1970s was the first significant day use visitor management action taken by park management. Shuttle operations continued to adapt over the following decades, most notably with the changes made in the early to mid-2000s. The Backcountry/Wilderness Management Plan (2001) outlined desired conditions and experiences for much of the park. Subsequent temporary pilot strategies, such as area restrictions, became unsustainable and did not meet desired conditions. Therefore, park staff formed the day use visitor access strategy interdisciplinary team to evaluate conditions and begin day use visitor access planning. Pilot TEPS ensured visitor safety when the COVID-19 pandemic disrupted social engagements and as people sought outdoor activities as an alternative to indoor gatherings. Pilot TEPS coincided with long-range planning and furnished the day use visitor access strategy team with additional information to analyze the alternatives presented in the Rocky Mountain National Park Day Use Visitor Access Plan and Environmental Assessment. With record-high visitation over the past decade and unknown changes to future visitor use patterns, park staff are committed to continued monitoring and adapting to day use visitation.

This page intentionally blank.

APPENDIX B: DESIRED CONDITIONS AND ZONING

INTRODUCTION

This appendix outlines the management direction and desired conditions associated with day use visitor access for Rocky Mountain National Park. This appendix provides additional information about day use visitor management zones and desired conditions and answers the question of “what are we managing for?”

DESIRED CONDITIONS

Desired conditions are defined as statements of aspiration that describe resource conditions (including fundamental resources and values), visitor experiences and opportunities, and facilities and services that an agency strives to achieve and maintain in a particular area. Desired condition descriptions paint a picture of how the area will look, feel, sound, and function when under optimal conditions. They do not answer the questions of how conditions will be maintained or achieved but serve as a foundation to help guide management strategies. The following desired conditions are presented across four categories (i.e., natural and cultural resources, visitor use and experience, park operations and facilities, and staff and visitor safety) to align with the planning objectives associated with day use visitor access as described in chapter 1.

PARKWIDE DESIRED CONDITIONS

The following desired conditions apply to all zones in the park.

Natural and Cultural Resources

- Visitors honor park values to preserve natural and cultural resources for future generations. Visitors are involved and engaged in actively preserving ecosystems and feel empowered as stewards.
- Native wildlife populations thrive and freely use their habitats with minimal human influence or conflicts.
- High-elevation ecosystems retain natural integrity, and alpine tundra vegetation thrives in its natural environment. Trails in the tundra remain minimal and as designed with surrounding vegetation remaining intact. Vegetation and soil trampling along lakeshores and stream banks is minimized.
- Water quality is within the range of natural conditions and supports native plant and animal communities in the park’s vast ecosystems. Human sources of water pollution in the park that adversely affect conservation are mitigated or minimized.
- Visitors learn about and practice the seven principles of Leave No Trace outdoor ethics.
- Park staff identify, document, and evaluate cultural resources. Staff monitor significant cultural resources for natural and human-caused impacts.

- Park staff respond to visitor-caused impacts on cultural resources and consult with partners on opportunities for minimizing and mitigating adverse effects.
- Resources in the park are protected, and Tribal Nations and members maintain access to those resources used for traditional purposes.
- Emissions from idling vehicles along roadways and in parking lots are minimized to reduce deposits and air pollution to protect wildlife and ecosystem functions.
- Stressors from visitor use, such as habitat fragmentation, do not impede species' ability to adapt to climate change.

Visitor Experience

- The park fosters an inclusive culture for a diverse group of users to experience a variety of recreational opportunities.
- Visitors have opportunities to connect with nature, learn from park staff, and develop a personal connection to the park that inspires stewardship beyond park boundaries.
- The park offers a variety of recreational opportunities to suit the desires and skills of all visitors and that provide access to scenic views, wildlife viewing, natural features and processes, cultural resources, and unimpaired qualities of wilderness character.
- Visitor densities on trails are conducive to providing opportunities for solitude, particularly in wilderness. Interactions among trail users are positive, with a sense of unity in the opportunity of having access to a beautiful place.
- Visitors have access to information and resources to plan for their visit. Access to the park is reliable and predictable to the extent practicable.
- Traffic and parking in the park move efficiently, and visitors have reasonable access to their primary destinations at most times throughout the day, with some periods of congestion during peak times.
- Interpretive and educational programs provide opportunities for visitors to increase their understanding of and appreciation for park landscapes, resources, and history.
- Commercial use operators may provide, to varying degrees, visitors with a range of experiences in appropriate recreational activities.
- Visitors are empowered stewards, aware of the impacts of climate change to park ecosystems and how visitor uses and behaviors could be stressors.

Staff and Visitor Safety

- Visitor and staff interactions are pleasant and respectful.
- Conditions in the park facilitate an environment where all park regulations, closures, and park policies are easily followed.

- The pace of visitation allows park staff to interact with visitors and inform them about best safety practices.
- Visitors have opportunities to enjoy wildlife viewing from safe distances. Human-wildlife conflicts are avoided so that animals and people are not harmed.
- Park staff manage pedestrian and vehicular congestion in a manner that does not compromise safety or emergency response and allows them to efficiently respond to search and rescue operations.
- Visitors' awareness of climate change fosters safe practices to avoid elevated risks, such as carefully managing campfires to prevent wildfires.

Park Operations and Facilities

- Public facilities and park information resources are readily available and accessible to visitors through a variety of means, including trailhead bulletins, wayside exhibits, online resources, and one-on-one staff interactions.
- Visitors experience clean and well-maintained facilities, and staff have needed access for routine servicing and maintenance.
- Staff can travel throughout the park to perform a wide variety of tasks in a timely fashion to care for resources and infrastructure and provide a positive visitor experience.
- Established trails do not exceed design specifications, and visitor-created trails and trail widening are minimal to nonexistent.

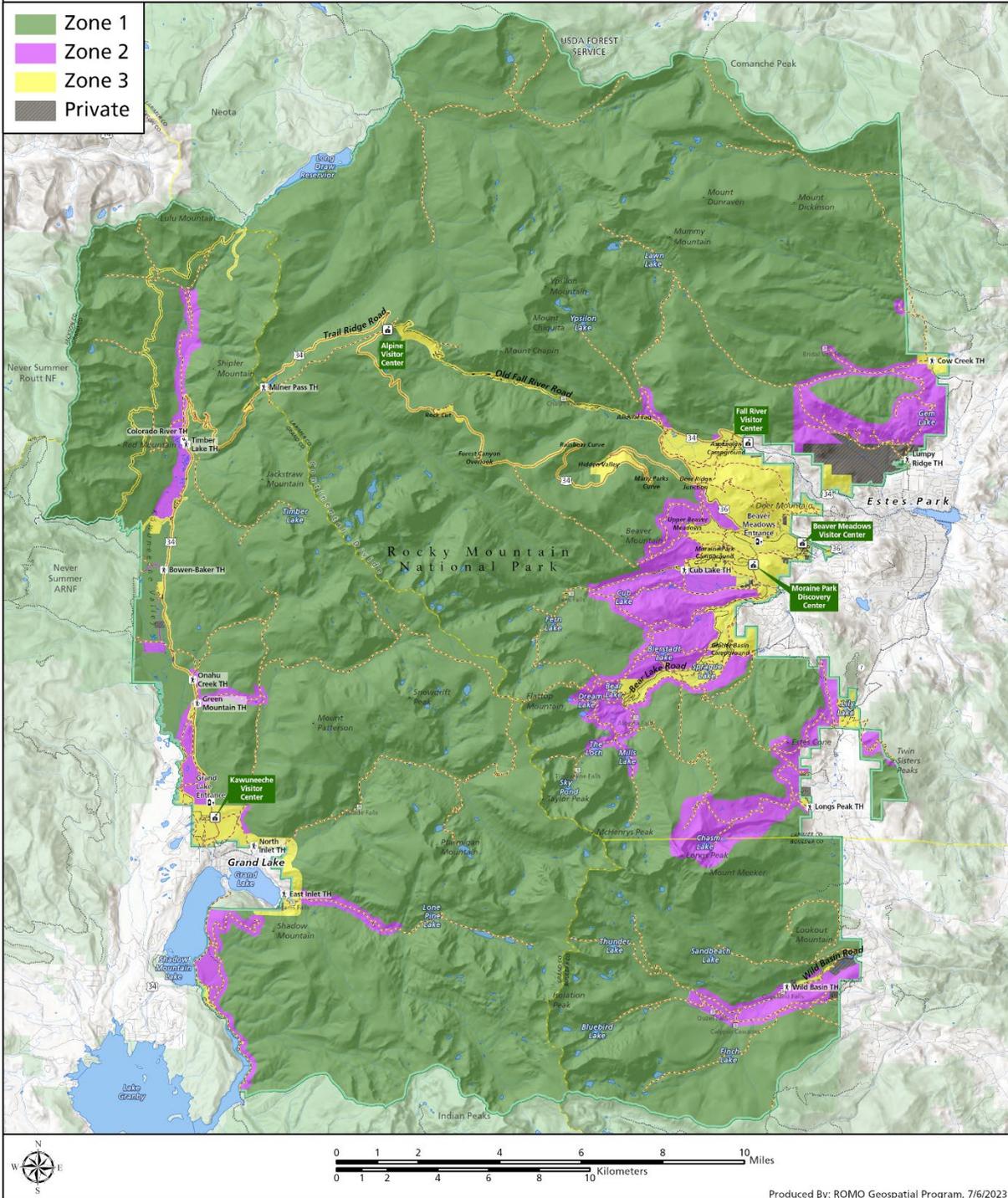
DESIRED CONDITIONS BY MANAGEMENT ZONE

Proposed actions for day use may vary spatially to achieve the parkwide desired conditions as described above. As described in chapter 2, this plan proposes new visitor use management zones (figure B-1) to describe visitor use and traffic by zone. The following sections provide a description of each zone and its associated desired conditions.



Day Use Zones

- Zone 1
- Zone 2
- Zone 3
- Private



Produced By: ROMO Geospatial Program, 7/6/2023
Projection: NAD 1983 (2011) UTM Zone 13N

FIGURE B-1. PROPOSED VISITOR USE MANAGEMENT ZONES FOR ROCKY MOUNTAIN NATIONAL PARK

Visitor Use Management Zone 1

Visitor Use Management Zone 1 encompasses low-traffic trails and the most sensitive and remote areas of the park. The park is about 95% designated and potential wilderness, meaning the park is required to preserve wilderness character (natural, solitude or primitive and unconfined recreation, undeveloped, untrammeled, and other features) per the Wilderness Act and NPS *Management Policies 2006*. All of zone 1 falls within designated Wilderness (Public Law [PL] 111-111, 2009). In the alpine environment, park staff emphasize the protection of tundra landscapes to ensure the greatest preservation of the unique characteristics in designated Wilderness. Ecological systems are substantially free from the effects of modern civilization and essentially unhindered by modern human actions that control or manipulate ecosystem processes and natural landscapes. Visitor Use Management Zone 1 provides moderate-to-outstanding opportunities for solitude and self-reliance. Visitor access in these areas is moderate to difficult, and much of the zone requires considerable travel from paved areas (e.g., parking lots and roadways). Zone 1 comprises minimally maintained designated trails and designated routes (i.e., require self-sufficiency and navigational skills) and restricted access areas such as Research Natural Areas. Minimal evidence of permanent improvements and recent human occupation retains the primeval influence and character of the park.

Natural and Cultural Resources

- Three Research Natural Areas—Specimen Mountain (1973), West Creek (1973), and Paradise Park (1973)—are managed to provide the greatest possible protection of ecosystem integrity and are restricted to nonmanipulative research, education, and other activities that will not detract from the areas' values.
- Natural processes and landscapes outside of the Research Natural Areas are minimally managed, with structural development and trail management only where necessary. Some natural resources may be altered to protect cultural resources.
- Natural ecosystems, such as alpine tundra environments, forests, lakeshores, and stream banks, are protected with little to no evidence of recent human impacts. High-elevation ecosystems retain natural integrity.
- Native wildlife populations flourish, and visitor use does not compromise wildlife habitats or migration behaviors.
- Wilderness provides a natural haven for native flora and fauna to thrive, and competition with invasive exotic species is minimized.
- Soundscapes reflect natural processes and are conducive for critical wildlife habitats.

Visitor Experience

- Visitors enjoy exceptional access to wild places by way of moderate-to-difficult trails that provide access to remote destinations, where natural viewsheds dominate.
- Visitors can travel on Trail Ridge Road to experience a high-elevation ecosystem with minimal to no disturbance of alpine tundra, both as a part of the scenic driving experience and through short hikes on established trails into the landscape.

- Opportunities for solitude are abundant and conducive to visitor expectations. Overall encounters with other visitors are less frequent in this zone when compared to other areas in the park, although visitors should anticipate encounters with visitors and park staff during peak visitation.
- The wilderness experience offers moderate-to-difficult opportunities for personal challenge and self-reliance, as well as a place for personal reflection and inspiration.
- Visitors involve themselves and are engaged in actively preserving ecosystems and feel empowered as stewards.
- Visitors have opportunities to experience more natural and intact environments compared to other areas of the park.
- Authorized commercial operators provide visitors with appropriate guided recreational activities that may otherwise be intimidating or unattainable, with a focus on wilderness values and wilderness safety.

Staff and Visitor Safety

- Visitors have opportunities to develop technical skills through personal challenges and self-reliance in wilderness.
- Because the zone is farther from facilities, visitors have a high degree of self-reliance, and more advanced wilderness skills may be necessary.
- Visitors maintain a safe distance from wildlife and follow appropriate protocols to store and dispose of food, trash, and other wildlife attractants.
- Interpretation and visitor protection staff interactions include educational opportunities, with a focus on safe park experiences.
- Backcountry patrols are commensurate with backcountry visitor use and provide effective responses to incidents.
- Safety risks for visitors due to natural hazards are mitigated to the extent possible through educational and operational protocols with minimal disturbance to wilderness character.

Park Operations and Facilities

- Established trails meet design criteria for wilderness trails. Visitor-created trails are nonexistent.
- Signage is minimal and only in areas where park staff deem necessary to provide information, such as navigational direction, for visitor safety.
- Stock use is limited, with strict adherence to park guidelines and park policies.
- Landing of aircraft and the use of motorized equipment for administrative purposes is prohibited in wilderness except when determined to be the minimum activity necessary through minimum requirements analyses.

- Park waste management operations at wilderness toilet facilities are sustainable as park routine operations.

Visitor Use Management Zone 2

Visitor Use Management Zone 2 provides easy-to-moderate access to wilderness. Well-maintained trails give visitors a wide variety of recreational opportunities in closer proximity to facilities and paved areas (e.g., parking lots and roadways) than Visitor Use Management Zone 1 but provide more solitude with less modern human impact than Visitor Use Management Zone 3. Park staff moderately manage natural landscapes and resources to ensure visitor safety and optimize resource protection. Facilities are reasonably accessible compared to zone 1, and visitors are likely to encounter park staff on trails. The zone generally includes formal trail corridors and designated backcountry campsite areas. This zone is composed of designated Wilderness (PL 111-111, 2009) but borders areas outside of wilderness.

Natural and Cultural Resources

- Resource impacts from visitor use are limited outside of the trail corridor. Traces of modern human impacts on wilderness are minimal.
- Park staff moderately manage natural processes and landscapes with structural development and trail management, where necessary.
- Visitor use does not compromise wildlife habitats or migration behaviors. Visitor-wildlife conflict is minimized, and park staff educate visitors to avoid feeding, approaching, or disturbing wildlife.
- High-elevation ecosystems retain natural integrity, and alpine tundra remains unimpaired.
- The wilderness provides a natural haven for native flora and fauna to thrive, and competition with invasive exotic species is minimized.

Visitor Experience

- Visitors only travel on formal trail corridors, and development of visitor-created trails and trail widening is minimal.
- Day use is moderate to high, depending on time of year, day of week, time of day, and weather. Encounters with other visitors are common in this zone, but those encounters do not distract from opportunities to view scenery or travel freely along trails.
- While this zone has a good trail network, visitors should expect to be moderately self-reliant as they experience this zone.
- Interpretation and visitor protection staff interactions include educational opportunities, with a focus on safe park experiences.
- Incidents with natural processes hazardous to human safety are mitigated, when possible, through educational and operational protocols with minimal disturbance to wilderness character.

- Visitors have opportunities to experience landscapes with only moderate evidence of human impacts.
- Authorized commercial operators provide visitors with appropriate guided recreational experiences that may otherwise be intimidating or unattainable, with a focus on wilderness values and wilderness safety.

Staff and Visitor Safety

- Visitors may feel increased safety and security from moderate visitor use levels in wilderness areas of attraction.
- Visitor and staff interactions are pleasant and respectful, and conflicts between visitors do not occur.
- Park information is accessible to visitors. Staff are available to provide information and educational opportunities for visitors and to ensure public safety.

Park Operations and Facilities

- Privies, hitch rails, and attractions are near many trail segments to support visitor comfort and needs.
- Established trails meet design criteria for moderate use while maintaining wilderness character. Visitor-created trails and trail widening are minimal and of short distance and/or easily rehabbed.
- Signage is minimal and appropriate to aid visitors to their desired destination and provide critical visitor safety.
- Administrative aircraft and motorized equipment are prohibited except during emergency operations or when necessary. Park operations that may require a prohibited use in wilderness are evaluated through minimum requirement analyses. Stock use is allowed on designated trails and maintained accordingly.
- Necessary public facilities are available to visitors and are maintained in good condition.
- Park staff can sustain trail maintenance according to trail design specifications.

Visitor Use Management Zone 3

Visitor Use Management Zone 3 encompasses paved areas such as roads, parking lots, roadside pull-offs, visitor centers, campgrounds, and the most accessible and maintained trails. Most visitors travel through zone 3 to access zones 1 and 2. Trail Ridge Road offers spectacular views from the comfort of established infrastructure and overlooks. Dramatic elevation gain, iconic peaks and river systems, and historic and cultural significance make zone 3 accessible and capable of accommodating different visitor expectations and individual desires for connection to nature.

Natural and Cultural Resources

- Surfaces are typically paved and formally developed to isolate use to specific areas and minimize resource impact.

- Resource impacts are limited to the immediate trail corridor, specific viewpoints, or layover spots. Paved roads and parking lots, as well as dirt roads, are the designated vehicle travel corridors in this zone.
- Visitor use has little impact on wildlife habitats or migration behaviors. Visitors feeding, approaching, or disturbing wildlife is minimal and disturbances are infrequent.
- Park staff use paved trails to prevent impacts on vegetation and reduce the spread of exotic plant species.
- Roadside parking occurs on designated pullouts and developed parking areas only, with minimal unendorsed roadside parking. Trampling of alpine tundra along Trail Ridge Road is minimal or nonexistent.
- Visitors properly dispose of trash and human waste to maintain low human impact and reduce a modern human footprint.
- Historic and cultural resources, such as historic trails, roads, and buildings, are well maintained and minimally impacted by visitation.

Visitor Experience

- Well-maintained roads provide ready access to visitors' primary destinations and access to a wide variety of recreational opportunities.
- Visitors are informed about travel options and have access to park information through a variety of means to plan for their desired activities.
- Encounters with other visitors are frequent in this zone. Crowding at key destinations and along trails may occur but with minimal impact on visitor experiences and opportunities to view scenery.
- Visitors have the multimodal opportunities to access the park that support a high-quality visitor experience and provide access to popular destinations in the park.
- Visitors have a reasonable opportunity to access their primary destination in the park, but there may be periods during the day when they experience minimal-to-moderate traffic or parking congestion.
- Scenic drives and iconic views are accessible for visitors and provide opportunities for a deep and unique connection with nature.
- Authorized commercial operators provide visitors with appropriate guided recreational experiences that may otherwise be intimidating or unattainable.

Staff and Visitor Safety

- Visitors are provided with opportunities to enjoy wildlife viewing from safe distances, and wildlife-related traffic congestion is manageable or avoided.
- Traffic and congestion during peak times permit efficient public services and responses.

- Public facilities and park information resources, including park staff and interpretive programs, are accessible to visitors throughout the day.
- Visitor and staff interactions are pleasant and respectful, and conflicts between visitors rarely occur.
- Adequate levels of staff are available to provide information and educational opportunities for visitors and to ensure public safety.

Park Operations and Facilities

- Staff can move efficiently around this zone to attend to day-to-day operations.
- Park staff are able to sustain the life cycle of buildings and facilities.
- Park staff maintain appropriate trail conditions and paved areas, which provide the widest access to visitors of all experience levels.
- The availability and variety of facilities in this zone meet the needs and desired services for the largest number of park visitors. Park staff maintain and make available facilities such as restrooms, trails, picnic areas, visitor centers, concession operations, and scenic overlooks.
- Road, trail, and destination signs are well-marked and efficiently communicate information.

APPENDIX C: INDICATORS AND THRESHOLDS

INTRODUCTION

Establishing indicators and thresholds are key components of the Visitor Use Management Framework (IVUMC 2016) applied by the National Park Service (NPS). Indicators operationalize aspects of desired conditions by measuring conditions that are related to visitor use and experience and monitoring conditions over time. Condition quality is evaluated using thresholds, which are the minimally acceptable conditions for each indicator. Conditions beyond these thresholds are considered unacceptable impacts and must be addressed (*NPS Management Policies 2006* 8.2.1, 1.4.7). Monitoring results ensures that strategies and actions implemented within this planning effort achieve and maintain desired conditions. This may include the implementation of actions that manage to an identified visitor capacity. Visitor capacity is identified as the maximum amount and type of use that can be accommodated while managing desired conditions, including the likelihood of maintaining acceptable conditions.

Potential management strategies are described for each of the following indicators and would be applied in conjunction with the actions presented in this plan. This iterative practice of monitoring, implementing adaptive strategies, and then continuing to monitor to gauge effectiveness of management actions allows park managers to maximize benefits for visitors while achieving and maintaining desired conditions for resources and visitor experiences in a dynamic setting.

This appendix presents indicators that will be monitored over time at Rocky Mountain National Park. It also identifies associated thresholds for those indicators and potential adaptive management strategies that could be used when thresholds are reached.

Indicators

Indicators translate desired conditions into measurable attributes (e.g., people at one time at key locations, number of visitor-created trails) that can be tracked over time to monitor change in those conditions. The planning team considered many potential issues and related indicators that would operationalize desired conditions, but those adopted below are considered the most noteworthy, given the importance and vulnerability of the resource and/or visitor experience affected by visitor use.

Thresholds

Thresholds that represent the minimum acceptable condition for each indicator were established, taking into consideration the qualitative descriptions of the desired conditions, data on existing conditions, relevant research studies, and staff management experience. Although defined as “minimally acceptable,” thresholds still represent acceptable conditions. Also, establishing thresholds does not imply that no action would be taken prior to reaching the threshold. For some indicators, triggers have been developed. A trigger reflects a condition of concern for an indicator that is enough to prompt a management response to ensure that desired conditions continue to be maintained before the threshold is crossed (figure C-1).

Management Strategies

For each indicator, potential management strategies are identified. These strategies represent the range of actions that the National Park Service may take to meet the goals and desired conditions of this plan. If it is determined through monitoring that thresholds are being approached or exceeded, the National Park Service would use one or more of these management strategies. Several of these strategies are currently or have recently been in use at the park and may be increased in response to changing conditions.

Other management strategies vary across alternatives described in this environmental assessment and would be implemented on completion of the plan to ensure thresholds are maintained and desired conditions are achieved. The direct implications of indicators, thresholds, and potential management strategies are considered as part of the actions common to all alternatives (and described in chapter 2) and, therefore, are analyzed as part of the alternatives in chapter 3. If additional strategies are needed to manage within thresholds beyond those listed in chapter 2, details of their application would be developed, and the appropriate level of environmental analysis completed, when the need, location, and scope of that action are identified.

Monitoring

Visitor use management is an iterative process in which management decisions are continuously informed and improved through monitoring to determine the most effective way to manage visitor use to attain desired visitor experience and resource conditions. As monitoring of conditions continues, managers may decide to modify or add indicators if better ways are found to measure important changes in resource and experiential conditions. A monitoring plan will be developed to establish protocols and schedule monitoring frequencies to ensure that areas remain within their applied threshold.

Other Considerations

Because the transportation infrastructure and associated systems serve as the primary mechanism for trail access in many locations, it is important to ensure that the transportation system does not deliver more people to a trail than the trail can accommodate, given its desired conditions and related thresholds. Exploring active and passive management strategies to disperse visitors to different locations served by the transportation systems as thresholds are approached is a part of the iterative process of visitor use management.

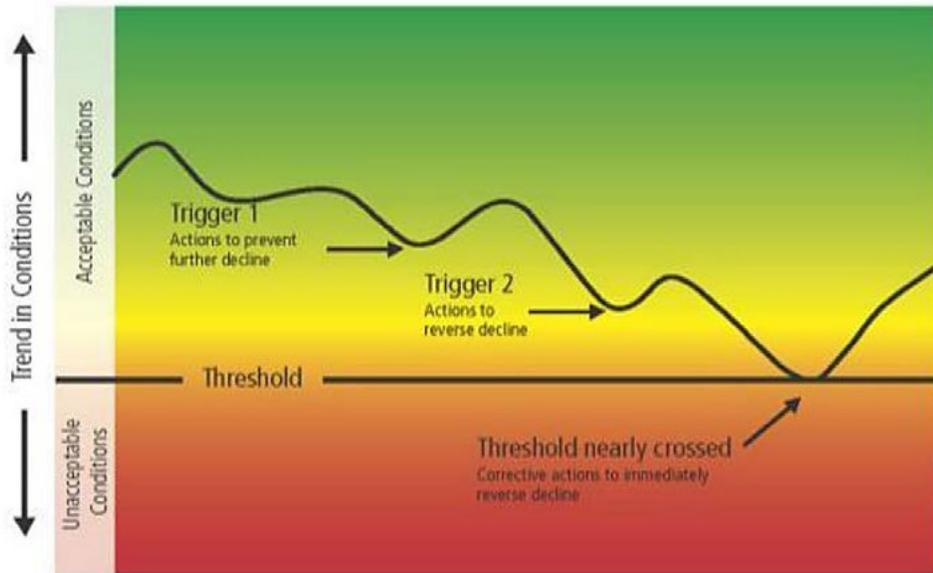


FIGURE C-1. MANAGEMENT TRIGGERS AND THRESHOLDS IN RELATION TO TREND IN CONDITIONS

Future Updates

This analysis uses the best available information to make decisions for current management of visitor use. Should there be meaningful changes, such as those outlined below, the park may reevaluate and update the following thresholds. The following criteria may warrant reevaluating thresholds or updating strategies to manage within thresholds:

- evidence that thresholds are being approached is present;
- evidence that park conditions are trending away from desired conditions is present;
- the park has meaningful new knowledge or understanding of the relationship between visitor use and impacts on resources or visitor experiences; and
- changes to the desired conditions have occurred.

INDICATORS AND THRESHOLDS FOR THE DAY USE VISITOR ACCESS PLAN

Park managers identified five indicators to monitor and ensure that the park is meeting desired conditions. Several criteria were used to select these indicators, including sensitivity to change, connectedness to visitor use, importance, reasonableness, and reliability.

- Indicator 1 – Encounter rates on wilderness trails in zone 1
- Indicator 2 – People per viewshed
- Indicator 3 – Frequency of unendorsed parking
- Indicator 4 – Vehicular use in the Bear Lake Road Corridor
- Indicator 5 – Disturbed areas in congregation areas

INDICATOR 1: ENCOUNTER RATES ON WILDERNESS TRAILS IN ZONE 1

Rationale

This indicator measures the number of groups that visitors encounter as they travel along the trail. Zone 1 encompasses low-trafficked trails and the most delicate and remote areas of the park. Opportunities for solitude are part of the desired conditions for visitor experiences in zone 1, which is composed entirely of designated Wilderness. Monitoring visitor flows in zone 1 provides a reasonable basis on which the quality of visitor experience on zone 1 hiking trails can be inferred. Wilderness is to be a place where solitude and intimacy with nature play a key role in shaping the human experience. Observing too many other visitors can reduce a person's ability to access these wilderness experiences and thus might have a limiting effect on the amount of use that could be provided (c.f. Cole and Hall 2005). The indicator would allow NPS staff to monitor visitor experience quality along trails, as well as opportunities for solitude along trails in this zone. This indicator will help determine whether implementing actions to reduce encounters on trails is necessary.

For this indicator, three general categories of trails were used to identify thresholds and to align this indicator with both this day use visitor access plan and the Backcountry/Wilderness Management Plan (2001).

Thresholds

Thresholds for this indicator were identified to align with both desired conditions for visitor experiences in zone 1 and are expressed by trail class (as identified the 2001 Backcountry/Wilderness Management Plan).

- Low-use wilderness areas (Class 1: e.g., tundra areas, such as summits in Wild Basin (or the Mummy Range): no more than two group encounter per hour 90% of the time
- Moderate-use wilderness areas (Class 2: e.g., cross-country routes, such as Chapin-Chiquita-Ypsilon Route or Forest Canyon, or Boulder-Grand Pass): no more than four encounters per hour 90% of the time
- High-use trails (Class 3; e.g., Sandbeach Lake Trail, Pear Lake Trail, North Inlet Trail): no more than seven group encounters per hour 90% of the time.

Triggers

Preliminarily triggers will be monitored using trail counters. While this fixed-point monitoring method is a different method than encounter rate monitoring, it can be used as a method to identify if specific trail segments may be approaching their threshold. If any individual trail segment reaches these trigger points, park managers will implement encounter rate monitoring in that location to assess if conditions are approaching thresholds and if management actions are needed to correct the condition.

- Low-use wilderness areas (Class 1: e.g., tundra areas, such as summits in Wild Basin (or the Mummy Range): no more than two groups passing the counter per hour 90% of the monitored time.

- Moderate-use wilderness areas (Class 2; e.g., cross-country routes, such as Chapin-Chiquita-Ypsilon Route or Forest Canyon, or Boulder-Grand Pass): no more than four groups passing the counter per hour 90% of the monitored time.
- High-use trails (Class 3; e.g., Sandbeach Lake Trail, Pear Lake Trail, North Inlet Trail): no more than seven groups passing the counter per hour 90% of the monitored time.

INDICATOR 2: PEOPLE PER VIEWSCAPE AT KEY VISITOR USE SITES

Rationale

People per viewscape (PPV) will be used as an indicator of visitor experience quality. People per viewscape is a measure often used by park managers and researchers to quantify visitor crowding (Lawson et al. 2011, 2009; Manning et al. 2011; Lawson, Newman, and Monz 2017). Crowded conditions have been documented that adversely affect the quality of visitor experience in national parks (Whittaker and Shelby 2010). Research suggests that visitors can identify site-specific standards for crowding (Manning et al. 2011). These visitor-based standards can be used to guide the development of social indicators and thresholds for crowding. People per viewscape is also used by park managers and researchers to quantify visitor crowding impacts along higher-use hiking trails, walking paths, and other scenic nonmotorized transportation corridors in national parks (Lawson et al. 2009, 2011; Lawson, Newman, and Monz 2017).

The Visitor Use Survey for Alternative Sites to the Bear Lake Road Corridor – Data and Analysis from May 2014 (HDR, Inc. 2015) provides analysis for establishing people per viewscape at several locations in Rocky Mountain National Park. The proposed thresholds are consistent with minimum acceptability findings from visitor surveys for those locations. In addition to studies at Rocky Mountain National Park, people per viewscape on trails in other national parks can provide a range in which acceptable PPV levels for typical viewsapes on trails in Rocky Mountain National Park might fall. Although differences (e.g., geography/topography, vegetation) exist between Rocky Mountain National Park and other NPS locations, these sites provide important management guidance to ensure reasonableness. Results of a 2005 study in Muir Woods National Monument included a visitor-based acceptability threshold of 16 people per viewscape for higher-use or “primary” hiking trails and a visitor-based acceptability threshold of 7 people per viewscape on lower-use or “secondary” hiking trails (Manning et al. 2005). Results of a 2003 study of Yosemite National Park visitors included a visitor-based acceptability threshold of 26 people per viewscape on the trail to Vernal Fall, a high-use hiking trail in Yosemite Valley (c.f. Lawson et al. 2009; Manning et al. 2011). The Yosemite study is especially relevant because it is a popular trail in designated Wilderness, which also occurs at Rocky Mountain National Park.

Thresholds

No more than the following PPV amount for each location below, 90% of the sampled time:

- Alluvial Fan Trail: 17 PPV
- Gem Lake Trail: 11 PPV
- Lumpy Ridge Trail: 11 PPV
- Glacier Gorge Trail: 7 PPV

- Alberta Falls (at base of falls): 24 PPV
- Dream Lake: 7 PPV
- Emerald Lake: 15 PPV
- Ouzel Falls: To be determined (TBD)
- Sun Valley Trail: TBD
- Colorado River Trail: TBD
- Longs Peak Trail: TBD

INDICATOR 3: VEHICLE USE LEVELS IN THE BEAR LAKE ROAD CORRIDOR

Rationale

Crowding, conflicts, and congestion at the Bear Lake destinations and along the road corridor lead to natural resource damage, diminished visitor experience, limited access and egress for emergency vehicles, and impacts on routine facility maintenance. During peak times, vehicle levels in the corridor exceed parking capacity. Prior to the pilot timed entry reservation systems, staff closed the road to visitor traffic until sufficient parking became available. This management strategy (temporarily restricting vehicle access to the area) is sometimes needed outside the reservation system, such as on weekends and holidays, to manage the area consistent with desired conditions and within identified visitor capacities. To better understand visitor use levels and the delivery of visitors to associated trails in the corridor, park staff have monitored vehicle use on Bear Lake Road for many years. Permanent inductive loop vehicle counters are installed on Bear Lake Road and will inform park staff on vehicle flows in the corridor. This indicator is included to help monitor if vehicle volumes, outside of the reservation system days or hours, are consistent with management goals. The action alternatives take a proactive and conservative approach to managing access to the most popular areas of the park. Per the action alternatives, reservations will only be required during the highest-use time of day and days of year for areas of the park (as described in the alternatives). Should monitoring of the parking areas under permit systems reveal that the desired conditions for roadway flows (ability for visitors and staff to safely enter and egress) and visitor experiences of these areas are not being met, park staff would expand times of day or days of the year when reservations are needed to maintain desired conditions. In the event of fire, global pandemic, or other anomaly that is outside normal operations, park managers may take other actions, but allowing triggers to include multiple years allows smaller single-year events to be factored out.

Thresholds

- Days during the reservation season: Vehicles per day does not exceed the design capacity²¹ of the corridor more than 20% of the time.

21. A fixed number of allowable vehicles per day is not presented here, as this number will change depending on how many lots are open and if there are any other constraints on vehicle parking (such as construction activities). During the reservation period, this number is most often 2,250 vehicles at one time.

- Days outside of the reservation season: Vehicles per day does not exceed the design capacity²² of the corridor (i.e., parking lots, roadway and authorized roadside parking areas) more than three days per week for three consecutive years.

Triggers

- Trigger 1: Days during the reservation season: Vehicles per day does not exceed the design capacity of the corridor more than 15% of the time.
 - Management response: Expand days of the year or times of day when reservations are required for entry.
- Trigger 2: Days outside of the reservation season: Vehicles at one time exceeds the design capacity of the parking lots or authorized roadside parking areas more than two days per week for three consecutive weeks.
 - Management response: Expand days of the year or times of day when reservations are required for entry. Increase monitoring for trails and parking areas to ensure that desired conditions are being met in those areas.
- Trigger 3: Days outside of the reservation season: Vehicles at one time exceeds the design capacity of the parking lots or authorized roadside parking areas more than two days per week for two consecutive years.
 - Management response: Expand days of the year or times of day when reservations are required for entry.

Rationale for Triggers

These triggers reflect conditions of concern for this indicator that are enough to prompt a management response to ensure that desired conditions continue to be maintained before the threshold is crossed. These triggers set up a series of management progressions that aid park managers in identifying changing conditions and prompting when action should be taken to address trends that are departing from desired conditions and approaching thresholds. These management responses are further described in chapter 2, “Actions Common to All Action Alternatives” section.

INDICATOR 4: FREQUENCY OF UNENDORSED PARKING

Rationale

This indicator is related to both natural resource conditions and visitor experience. It measures the demand for parking in excess of available, designated parking by tracking the number of individual vehicles parked in unendorsed areas (on the side of the road, outside the bounds of a designated parking lot or formalized road pulloffs). Unendorsed parking damages vegetation and contributes to an increase in bare soil and erosion. Additionally, unendorsed parking decreases

22. A fixed number of allowable vehicles per day is not presented here, as this number will change depending on how many lots are open and if there are any other constraints on vehicle parking (such as construction activities). Outside the reservation period, this number is most often 1,250 vehicles at one time.

the roadway level of surface grade by creating hazards such as reduced road lane width, an increased number of pedestrians in the roadway, and at times, pavement damage at the road's edge. Unendorsed parking is also related to a decreased quality of visitor experience because it detracts from scenic views and impacts historic design along the roadway, creates difficult visitor mobility and circulation (see safety rationale above), and indicates a higher risk of surpassing other indicator thresholds (such as people per viewscape). By monitoring where and when unendorsed parking occurs, the National Park Service will be able to make informed management decisions related to the timing and level of visitor use that occurs in an area.

Threshold

- Unendorsed parking occurs no more than 20% of sampling events per location.

Note: An instance of unendorsed parking is three or more vehicles parked in the same non-designated parking area.

Triggers

- Trigger 1: Unendorsed parking occurs no more than 10% of the sampling events per location.
 - Management response: Enforce parking and access restrictions, as well as site management (signage, curbing, paving, revegetation) to resolve overparking and visitor-created parking in specific locations where this is occurring.

INDICATOR 5: ECOLOGICAL DISTURBANCE IN CONGREGATION AREAS

Rationale

Ecological disturbances in congregation areas include trampling of vegetation, which causes bare ground, soil erosion, and potential damage to the natural processes in sensitive environments, such as along lakeshores, streams, or in alpine tundra. Areas of bare ground are mapped, and changes over time are recorded.

Data collected for this indicator would help NPS staff prioritize restoration efforts and prompt adaptive actions related to reducing off-trail use. An increase in the percent of bare ground from the prior year would suggest that management efforts need to continue focusing on vegetation restoration and reducing further bare ground impacts. A switch between condition categories would suggest that park managers need to take more focused and stringent protective measures. Monitoring bare ground will help determine whether natural resources are impacted by current patterns of visitor use. Monitoring of this indicator would help track the condition of vegetation health and the effectiveness of management strategies aimed at reducing off-trail use. Monitoring bare ground is important to understand the location and extent of visitor-caused impacts in congregation areas.

In 2001, park staff completed a Backcountry/Wilderness Management Plan and environmental assessment, with management decisions on acceptable levels of bare ground based on four management classes. Public scoping was part of that planning process. This plan identifies an objective to help achieve the standards set forth in the Backcountry/Wilderness Management Plan.

Objective: Total bare ground, per day use zone, should decrease over the duration of the plan until standards are met.

This page intentionally blank.

APPENDIX D: VISITOR CAPACITY

OVERVIEW

This section provides additional information about the visitor capacity identification as it relates to the visitor use management framework for the Rocky Mountain National Park Day Use Visitor Access Plan. For a full description of the Interagency Visitor Use Management Council (IVUMC) Framework and additional resources, please visit <https://visitorusemanagement.nps.gov>.

The Interagency Visitor Use Management Council defines visitor capacity as the maximum amounts and types of visitor use that an area can accommodate while achieving and maintaining the desired resource conditions and visitor experiences that are consistent with the purposes for which the area was established. By managing amounts and types of use, the National Park Service can help ensure that resources are protected and that visitors have the opportunity for a range of high-quality experiences. Visitor capacities will be used to inform and implement the management strategies selected as part of this plan.

Identifying visitor capacity is directed by legal mandates that require the National Park Service to identify visitor capacities and implementation commitments for all areas of a park unit per the National Parks and Recreation Act of 1978. The approach for identifying visitor capacities is based on the Interagency Visitor Use Management Council's Visitor Use Management Framework and Visitor Capacity Guidebook (IVUMC 2016), as well as other IVUMC supporting guidance.

The process for identifying visitor capacity follows four guidelines: (1) determine the analysis area, (2) review existing direction and knowledge, (3) identify the limiting attribute, and (4) identify visitor capacity and implementation strategies. This section of the plan outlines the considerations and processes used to identify visitor capacity for key destinations.

This analysis uses the best available information to make the decision for current management of visitor use. Should there be meaningful changes, such as those outlined below, the park may reevaluate and update the visitor capacity. The criteria that may warrant a reevaluation of capacity or updating strategies to manage to capacity are as follows:

- evidence that thresholds are being approached is present;
- evidence that park conditions are trending away from desired conditions is present;
- the park has meaningful new knowledge or understanding of the relationship between visitor use and impacts on resources or visitor experiences; and
- changes to the desired conditions have occurred.

Visitor Capacity Analysis Areas

Analysis areas are destinations where visitor use is concentrated and impacts on resources or visitor experiences are likely. Several studies have demonstrated that use of an area will impact many of the values for which the area was established. For these locations, a detailed analysis has been conducted to identify the appropriate level of use. Current use levels are informed by relevant studies and data, and the actions contained in this plan were considered as part of the visitor capacity identifications.

The sites listed below where the majority of use in the park occurs (i.e., trailheads, viewpoints, areas within a short distance from parking areas) were selected to have defined visitor capacities. Where applicable, specific management strategies outlined in this plan that will be used to implement visitor capacities are included. Indicators will be monitored to ensure desired conditions and visitor capacities are met as described, and if associated thresholds are exceeded, adaptive management strategies will be implemented to ensure that desired conditions are maintained. Table D-1 presents the analysis areas in the park that have an identified capacity through this planning effort.

Table D-1. Identified Analysis Areas for Implementing Visitor Capacity at Rocky Mountain National Park

Eastside Areas	Westside Areas
Wild Basin Area	Colorado River and Timber Lake Trailheads and Trails
Fall River Pass Area	East Inlet Trailhead and Trail
Longs Peak Area	Timber Creek Campground
Bear Lake Road Corridor (summer and winter)	Milner Pass (closed in winter)
Twin Sisters Peak and Lily Lake Trails and parking lots	Green Mountain and Onahu Trailheads and Trails
Forest Canyon Overlook	Bowen-Baker Trailhead
Rainbow Curve	North Inlet Trailhead and Trail
Many Parks Curve	Sun Valley Trail
Rock Cut Parking Areas and Toll Memorial Trail	–
Deer Ridge Junction and Trails	–
Lumpy Ridge Area	–
Old Fall River Road Corridor	–
Endovalley Road Corridor	–
Hidden Valley	–
Upper Beaver Meadows Trailhead	–

Following guidance from the Interagency Visitor Use Management Council, the level of analysis that occurs during visitor use management planning and visitor capacity identification is determined on a sliding scale, depending on the complexity and context of the plan. The sliding scale of analysis is used to ensure that the investment of time, money, and other resources for identifying visitor capacity is commensurate with the complexity of the project and the consequences of the decision. The sliding scale focuses on four criteria: issue uncertainty, impact risk, stakeholder involvement, and level of controversy/potential for litigation (IVUMC 2016). Future monitoring of use levels and indicators will inform the National Park Service if use levels

are nearing visitor capacities. If so, adaptive management strategies, as outlined in this plan, will be taken.

There are other areas of the park (trails, summits, and other destinations) that are subject to this legal requirement to define visitor capacity. However, as decisions about the management of these areas are out of scope for this plan, these capacities will be identified in subsequent planning.

Methodological Considerations

Park managers must understand multiple inputs and use sound professional judgement to identify visitor capacities (IVUMC 2019; Whittaker et al. 2011). Resource inputs include sensitivity of the surrounding natural and cultural resources such as rare plants, cultural sites, and wildlife. Social inputs include crowding, safety, soundscape, conflict between visitor uses, wildlife-human conflict, trail conditions, and quality of view (IVUMC 2019). Monitoring of visitor use to understand if existing use levels and visitation patterns are achieving desired conditions for resource protection and visitor experience is an important component of identifying visitor capacity. This is often true in Rocky Mountain National Park, where the sensitivity of natural and cultural resources and wilderness prevent parking lot expansion in some areas. When appropriate, alternative transportation is also considered. Rocky Mountain National Park has visitor use data, social science, and ongoing resource monitoring to inform decision-making for this plan.

Park staff collect visitor use data, including traffic counts, trail counts, and campground visitation yearly. Resource conditions are also monitored. Since 1979, a series of visitor studies have focused on crowding-related aspects of the visitor experience (Landreth 1979; Flick and Taylor 1998; Vaske et al. 2002; Schuster et al. 2004; Wallace et al. 2006). Although much of this research was completed prior to the large visitation numbers seen today, they provide an important baseline for decision-making. Research suggests that visitors can identify site-specific standards for crowding (Manning et al. 2011). These visitor-based standards can be used to guide the development of social indicators and thresholds for crowding, which inform capacity and have been identified as part of this planning process. People per viewscape is also used by park managers and researchers to quantify visitor crowding impacts along higher-use hiking trails, walking paths, and other scenic nonmotorized transportation corridors in national parks (Lawson et al. 2009, 2011; Lawson, Newman, and Monz 2017).

Recently, perceptions of crowding in the Bear Lake Road Corridor were measured using visitor surveys (NPS 2015). Other relevant reports and studies specific to Rocky Mountain National Park visitor capacity include the following:

- Pettebone et al. (2019): modeling visitor use on high-elevation mountain trails, Rocky Mountain National Park
- Lawhon (2022): parking lot turnover in Rocky Mountain National Park
- Newman et al. (2010): integrated approach to transportation and visitor use management at Rocky Mountain National Park

Other studies have also used photographs as a method to estimate crowding conditions (Manning 2003, 2007; Manning et al. 2002) in national parks and can inform management decision-making

at Rocky Mountain National Park. Park managers use these reports to inform decision-making around capacity but adjust for site specific desired conditions.

General reports and studies relevant to Rocky Mountain National Park visitor capacity include the following:

- Lawson et al. (2009): Yosemite National Park visitor study people per viewscape at high-use hiking trails
- Manning et al. (2005): Muir Woods National Monument visitor study people per viewscape on secondary-use hiking trails
- Cole and Hall (2008): wilderness visitors, experiences, and management preferences
- Vaske and Shelby (2008): crowding as a descriptive indicators and an evaluative standard

The action alternatives were assessed for the primary differences related to the amounts, timing, distribution, and types of use. The primary difference for visitor-use issues between the alternatives would have little impact on the amounts and types of visitor use that can be accommodated in the analysis areas. Therefore, the visitor capacity would remain consistent across the alternatives.

Review of Existing Direction and Knowledge

During this step, the planning team reviewed existing direction and knowledge, including (1) applicable law and policy; (2) prior applicable planning and guidance; (3) existing conditions in the analysis area; (4) existing indicators, triggers, thresholds, and objectives; (5) applicable existing management strategies and actions; and (6) use patterns for commercial and other allocation categories. An overview of visitor use issues and current use levels for each key area can be found below under each analysis area.

The amount, timing, distribution, and types of visitor use in Rocky Mountain National Park influences both resource conditions and visitor experience. The park saw significant increases in visitation (44% since 2012), resulting in congestion, resource damage, safety issues, and a diminished visitor experience. In 2020, the COVID-19 pandemic led to temporary park closures in the spring, while wildfires in the summer and fall caused area closures. From 2020 to 2023, park staff managed visitor use through pilot timed entry permit systems (TEPS). Through this pilot program, park managers learned how a reservation system with timed entry would affect visitor use patterns. Each year, park managers made changes to increase efficiency and improve the visitor experience using a timed entry permit system. For example, park managers determined a need to pilot a specific reservation system for the Bear Lake Road Corridor due to crowding and congestion in this area during the parkwide pilot permit system in 2020. More information on the evolution and adaptation of these piloted systems may be found in appendix A.

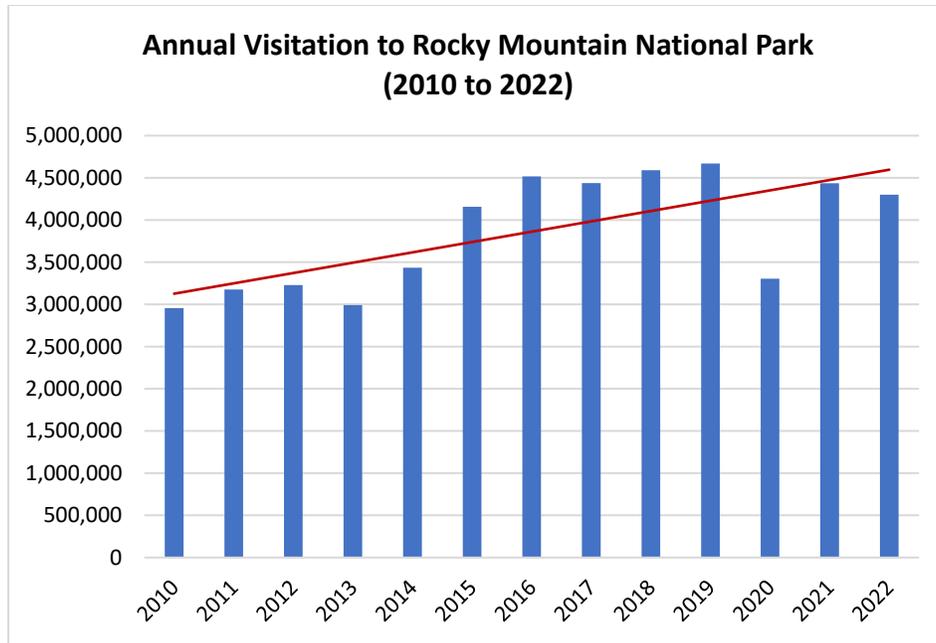


FIGURE D-1. ANNUAL VISITATION TO ROCKY MOUNTAIN NATIONAL PARK FROM 2010 TO 2022 (NPS VISITOR USE STATISTICS)

Visitors arrive at Rocky Mountain National Park in a variety of ways, including by personal vehicle, authorized commercial services, and alternative transportation. The levels and patterns of visitor use are causing negative impacts on visitor experience and resources and are influencing the ability of the National Park Service to maintain desired conditions. Identifying visitor capacity can direct managers on how and when visitors access the park. Appropriate management strategies can then be selected and implemented to maintain desired resource conditions and visitor experience consistent with the purposes for which the park was established.

Rocky Mountain National Park and research partners have conducted significant studies informing park management on a variety of topics directly related to visitor use management, including visitor studies, visitor use studies, recreation ecology, and transportation.

In addition to the park’s data collection efforts, the project team used the following relevant planning efforts to help inform the capacity analyses:

- Rocky Mountain National Park, Final Master Plan (1976)
- Final Land Protection Plan (1984, 1985)
- Wild and Scenic River Addendum to Master Plan (1986)
- Statement for Management (1988)
- Commercial Horse Use Management Plan and Environmental Assessment (1993)
- Finding of No Significant Impact: Backcountry/Wilderness Management Plan and Environmental Assessment (2001)
- Vegetation Restoration Management Plan, Volume 2 (2006)

- Foundation Document (2013)
- Guided Climbing Strategy (2014)

The Backcountry/Wilderness Management Plan (2001) contains management strategies for elements such as group size limits, private stock use, administrative minimum requirements, aircraft use, a backcountry permit system, campsite standards, climbing management, trails management, and facilities in the backcountry. Decisions about types and intensities of overnight use are described in the Backcountry/Wilderness Management Plan and have been incorporated in this visitor capacity analysis by reference. The day use visitor access plan complements the Backcountry/Wilderness Management Plan by providing management direction in areas primarily accessed by day users. Some overlap between the Backcountry/Wilderness Management Plan and day use visitor access plan does occur in the zoning. In those cases, the day use visitor access plan would supplement the Backcountry/Wilderness Management Plan to account for current visitor use patterns and resource conditions. In addition, this capacity analysis includes overnight users, where appropriate, because many campers access these key destinations during the day, thus contributing to crowding on trails and at viewpoints.

Identify the Limiting Attribute

Step three requires the identification of the limiting attribute, defined as the specific resource or experiential attribute(s) that most constrains the analysis area's ability to accommodate visitor use. The limiting or constraining attribute(s) may vary across the analysis area and is described under each key area. This is an important step, given that a key area could experience a variety of visitor use challenges.

Identify Visitor Capacity

To determine the appropriate amount and types of use at key areas, data were reviewed to understand current conditions compared to goals and objectives for the area. Annual visitation data collected by the National Park Service staff include levels of visitor use parkwide and by area. Park managers also collect detailed visitor use data, including traffic counts, trail counts, campground visitation, resource conditions, and other data that show trends in conditions over the years. Where applicable, the person-per-vehicle multiplier can be used to help calculate capacity; however, the analysis focuses on desired conditions for resources and experiences along trails because the person-per-vehicle multiplier is subject to change.

Visitor capacity includes consideration of the amount and types of visitor use, including the timing and distribution of visitor activities and behaviors as they relate to desired conditions. Visitor capacity also takes into consideration management objectives, desired conditions, and other management actions for an area. For Rocky Mountain National Park, visitor capacities are most frequently expressed as people at one time. Delineations of sites may vary depending on the specific location, and monitoring can be done in a variety of ways but should serve to approximate as best as possible the total number of people present at a location. The visitor capacities and strategies to manage to capacities would be implemented as part of this planning effort. The strategies to manage to visitor capacities are described in chapter 2 of this document. For all visitor capacity analysis areas, park managers would monitor indicators to ensure desired conditions are being achieved, as described in Appendix C: Indicators and Thresholds or other appropriate monitoring protocols (e.g., tube sensors).

VISITOR CAPACITY ANALYSIS BY AREA

Wild Basin

Determine the Analysis Area

The Wild Basin analysis area includes the zone 3 Wild Basin Road (yellow) from the entrance to the summer parking area, all zone 2 (purple) areas and trail corridors, and all areas and trail corridors in zone 1 (green) (see appendix B). Overarching desired conditions, as well as zones 1, 2, and 3 desired conditions, will help guide the management and visitor capacity analysis of this area. The analysis area provides visitor access to 27 wilderness campsites.

Review of Existing Direction and Knowledge

Wild Basin is an area of Rocky Mountain National Park on the southeast side of the park about 18 miles south of Estes Park on Highway 7. Wild Basin serves as a key destination for many visitors because of the trail network, waterfalls, and rustic driving experience in the historic district. The area has a narrow unpaved road from the entrance kiosk to the parking areas along the road corridor. The entrance area includes a ranger station, a vault toilet, drinking water (seasonally), and a gravel parking area at the Sandbeach Lake Trailhead. Nearby, Copeland Lake is a designated wedding location in zone 3. Wild Basin Road is just over 3.5 miles long and has numerous unimproved shoulder pulloffs, a few formal parking areas, and picnic tables. At the end of the road, the summer parking area hosts the main Wild Basin Trailhead, vault toilets, and a ranger station. Key destinations from this trailhead include Ouzel Falls, Calypso Cascade Falls, and high-elevation lakes. Figure D-2 illustrates the average number of hourly visitors to Wild Basin Trailhead, specifically from 2019 to 2022, representing July only.

This area's recreation is primarily driven by hiking, but bouldering, fly fishing, horseback riding, and photography are also popular activities here. The area has a high number of visitor-created trails that may be associated with visitors trying to access the North St. Vrain Creek and its tributaries. Primary use of the area occurs between June and September. During the winter months, park staff plow Wild Basin to the designated winter trailhead, which is approximately 1 mile from the Wild Basin entrance; however, the park may close the road in its entirety due to seasonal conditions. The closure at the winter parking area eliminates vehicular access to most parking areas in the corridor (e.g., Wild Basin Trailhead, Finch Lake Trailhead).

Commercial operators provide services in this analysis area. The most popular experiences include, but are not limited to, guided hiking, guided fishing, guided horseback riding, and guided backpacking.

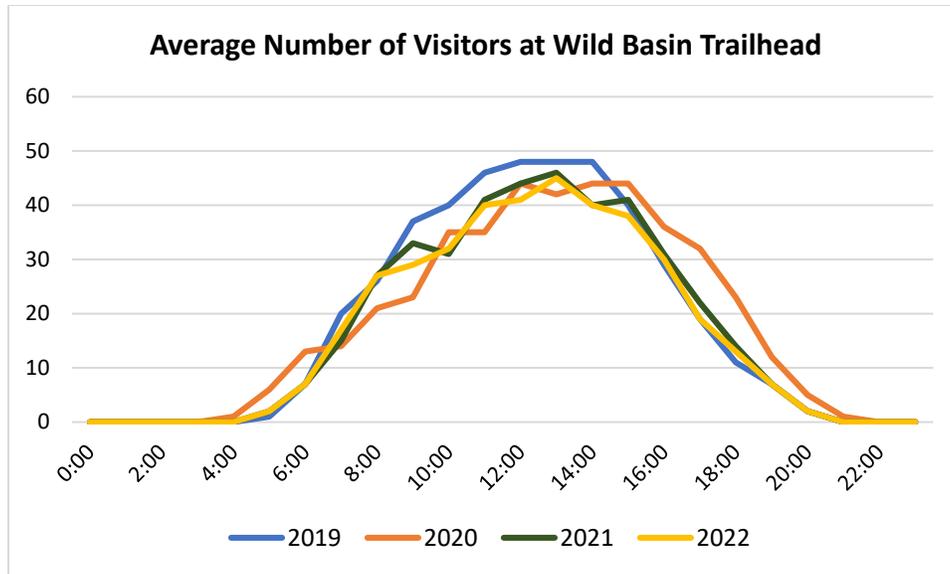


FIGURE D-2. AVERAGE NUMBER OF HOURLY VISITORS AT WILD BASIN TRAILHEAD ONLY, FROM JUNE THROUGH AUGUST OF EACH YEAR (NPS PERS. COMM. 2023c)

Identify the Limiting Attribute

The quality of visitor experience on trails and resource impacts from unsanctioned parking most constrain the area’s ability to accommodate visitor use. The need to restrict roadside parking so visitors can exit quickly if needed or so emergency vehicles can respond also affect the amount of use visitor use that can be accommodated. Managing for the most constraining conditions in zone 2 will manage for desired conditions in all zones in the area and help the park achieve the desired conditions set forth in this plan. The desired conditions allow for encounters with other visitors but ensure that those encounters do not distract from opportunities to view scenery or travel freely along trails. In addition, resource impacts should be minimized outside the trail corridor. Wild Basin is a unique driving experience on the east side of Rocky Mountain National Park. Changes to the infrastructure, such as road paving, would negatively impact the unique experience for visitors and historic character of the corridor. Furthermore, there are sensitive natural resources on both sides of the roadway preventing expansion, including the North St. Vrain Creek. The indicators that are most relevant to ensure desired conditions are being achieved are people per viewshed, visitor flows in zone 1, and frequency of unendorsed parking.

Identify Visitor Capacity

While assessing existing conditions and limiting attributes in relation to the desired conditions for the area, park staff identified the need to maintain current visitor use levels in the area to ensure quality experiences, protect sensitive resources, and maintain emergency egress and response. Visitor use levels under the piloted timed entry reservation system are about 300 people at one time based on current visitation patterns, typical group size, and the supply of associated opportunities and facilities in the analysis area. During the piloted timed entry systems, park staff noticed a reduction in unendorsed parking along the roadway corridor, which is associated with protection of resources and desired visitor experiences along the trail due to less people at one time hiking. As noted, this level of use has been assessed to support desired conditions, but continuous future monitoring would help ensure that this capacity aligns with the protection of

resources. In summary, the visitor capacity for Wild Basin has been identified as 300 people at one time.

Fall River Pass

Determine the Analysis Area

The Fall River Pass Historic District analysis area includes the area near the Alpine Visitor Center and approximately half-mile sections of Trail Ridge and Old Fall River Roads. At an elevation of 11,796 feet, the two roads merge. Facilities include the Alpine Visitor Center, Trail Ridge Store (which is run by a concessionaire), a paved parking area, comfort stations, and a hiking trail in zone 3. The zone 3 areas are adjacent to zone 1 wilderness and provide access to the Ute Trail, which is located primarily in zone 1. Parkwide desired conditions, as well as zone 3 desired conditions, will help guide the management and visitor capacity analysis of this area.

Review of Existing Direction and Knowledge

Visiting the Fall River Pass area is a popular visitor activity at Rocky Mountain National Park. The area is generally open from Memorial Day to mid-October, depending on weather and road conditions. The Fall River Pass is listed as historic park landscape in the National Register of Historic Places. The main types of visitor use include a stop during a scenic driving experience, experiencing tundra landscape, visiting both the Alpine Visitor Center and Trail Ridge Store, and hiking the Alpine Ridge Trail. The visitor center complex provides the only opportunity for visitors to buy food in the park. The desired conditions for this area include scenic drives and iconic views, which are accessible for visitors and provide opportunities for a deep and unique connection with nature. Although less busy in the mornings, its peak visitation occurs during midday. Most visitors to this area access it from the east side of the park—either by Old Fall River Road or Trail Ridge Road—and then return to either Grand Lake or Estes Park. Park staff actively managed the parking lot from 10:00 a.m. to 3:00 p.m. before the pilot timed entry system. Figure D-3 illustrates the occupancy levels, or how often the parking lot is full during a three-day sampling period in 2021. The average turnover rate for a car in the lot is about 60 minutes, and the parking lot is considered full at 90% to decrease accidents and visitor conflicts (Lawhon 2022).

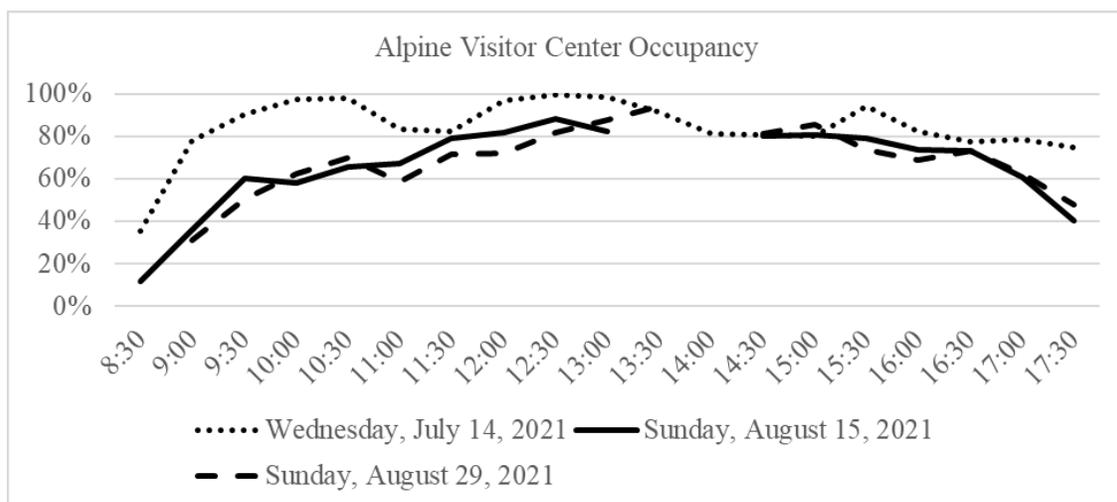


FIGURE D-3. ALPINE VISITOR CENTER PARKING LOT OCCUPANCY RATES DURING A SAMPLING PERIOD IN 2021 (LAWHON 2022)

Several factors influence how visitors experience this area related to infrastructure, parking lot capacity, water use, and safety. The parking lot has space for 167 cars and 9 buses and recreational vehicles. All buildings and systems are off-grid and self-supporting. A generator provides electricity to the complex. The water system in the area is limited to the use of a well on Old Fall River Road that fills two underground tanks. Because there is no sewage treatment facility, the park contracts sewage pumping and hauling, which is needed up to three times per day. Finally, the park must consider current facilities' capacity and ability to address incidents with visitors due to altitude-related sickness. Some visitors experience altitude-related sickness or are unprepared to spend time at an elevation of 11,796 feet, and the park must ensure that emergency services are available and emergency vehicles can access the area.

Identify Limiting Attribute(s)

The attributes that most constrain this area's ability to accommodate visitor use are its surrounding alpine tundra environment, which is managed to retain its natural integrity (as described in the parkwide desired conditions and foundation document); protection of designated Wilderness (100 feet from the parking area); and the preservation of the district's historic integrity. Although the park has expanded the parking lot several times, resource protection of the alpine tundra, wilderness, and historic character prevents an expansion of facilities and restricts additional development to accommodate more use. The Alpine Ridge Trail is accessed from the Alpine Visitor Center parking lot. The trail is narrow and surrounded by tundra and wilderness, and additional parking areas at the Alpine Visitor Center could impact wilderness character and zone 1 desired conditions. Weather and safety conditions could change rapidly due to high elevation and open exposure of the area. Lightning strikes are common during the operational season (May through October), which can seriously endanger visitors' well-being and life. Adding more visitors to a narrow trail would create safety issues in an emergency, and the number of visitors seeking shelter from storms in facilities may cause additional safety concerns. Wastewater facilities are already operating at or near capacity and must be pumped up to three times per day. The indicators that are most relevant to ensure that desired conditions are being achieved are percent of bare ground in congregation areas and frequency of unendorsed parking.

Visitor Capacity

Previous visitor impacts on resource conditions and the piloted timed entry system suggest that dispersal in visitation throughout the day better improves the experience and results in less visitors stepping off trail, damaging the fragile alpine environment. Given the sensitive natural and cultural environment and the importance of maintaining use patterns in provided facilities, the visitor capacity for the Fall River Pass area has been identified as 420 people at one time. This capacity would help prevent visitor displacement, crowding and damage from roadside parking, and overwhelmed facilities.

Longs Peak

Determine the Analysis Area

The Longs Peak analysis area includes the parking lot to the summit, associated trails and routes, and Longs Peak Campground, which has 26 sites and 18 backcountry sites. The analysis area is primarily in zone 2; this includes the Longs Peak trail system and the summit of Longs Peak. The Longs Peak Trailhead parking area and Longs Peak Campground are in zone 3. The summits of

Mount Meeker and Mount Lady Washington are not included in the analysis area. Parkwide desired conditions, as well as zone 2 desired conditions, will help guide the management and visitor capacity analysis of this area.

Review Existing Knowledge and Direction

Longs Peak is an iconic park experience, and “climbs up lofty Longs Peak” is specifically mentioned in the park’s fundamental resource and values as a recreational opportunity. Longs Peak’s proximity to Denver and fame as one of Colorado’s mountains over 14,000 feet make the trailhead very popular for those wishing to summit the mountain or hike on the trails near the base of the mountain. Visitor use on the routes on Longs Peak is typically seasonal in nature, with the vast majority of visitation taking place from early July to mid-September when snow and ice are minimal or not present. Generally, during the rest of the year, summiting requires mountaineering experience and specialized equipment. Several trailheads provide access to Longs Peak, but most routes and variations start from the Longs Peak Trailhead and parking lot, which includes vault toilets and a ranger station. The trailhead does not have a water source and visitors are required to bring their own. Primary summer recreational uses include hiking and technical rock climbing. Figure D-4 illustrates the average hourly count of visitors at the trailhead from 2020 to 2022 and when averaged showed daily use below 200 people.

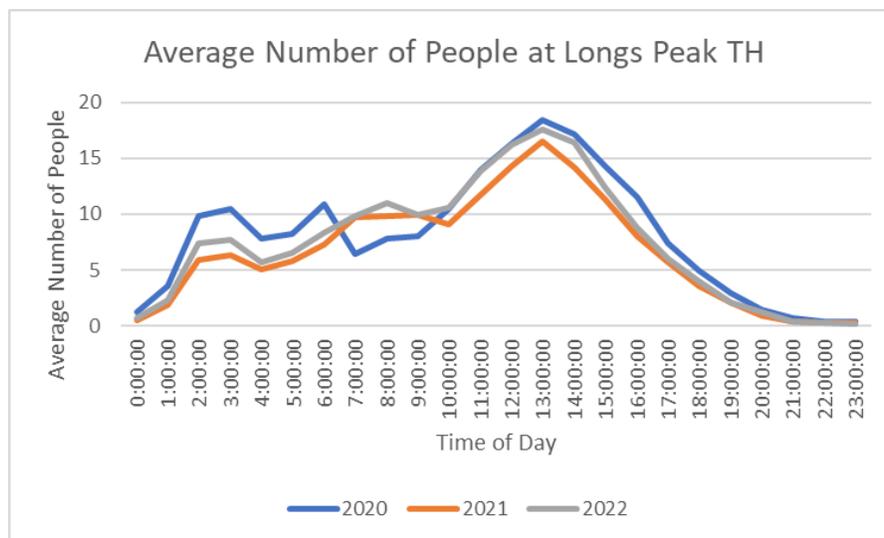


FIGURE D-4. AVERAGE HOURLY COUNT OF VISITORS INBOUND ON LONGS PEAK TRAILHEAD FROM 2020 TO 2022 (SOURCE: NATIONAL PARK SERVICE)

The Longs Peak area provides visitors with the opportunity to visit subalpine and alpine landscapes, including Longs Peak summit, the Boulder Field, Chasm Lake, and the Diamond. Chasm Lake sits at the base of the sheer east face of Longs Peak. The Longs Peak Trail splits at a junction that takes hikers to Chasm Lake or to the rocky designated trail through the Boulder Field. Toilets that are open for two to three months during the summer are located at Chasm Lake, Chasm Junction, and the Boulder Field. The east face of Longs Peak, known as the Diamond, offers world-class technical climbing with many routes and variations. Only one nontechnical route to the summit from the Longs Peak Trailhead exists, the Keyhole Route, which is the most popular route to the summit and most often accessed by continuing through the Boulder Field. Although the Keyhole Route does not require climbing rope during most times of the year, it does require scrambling across narrow ledges, sheer rock faces, and steep cliffs, and

exposes visitors to loose rock and potential rockfall. Not all visitors to the trailhead are trying to summit the mountain, with approximately 11% of trailhead users reaching the Homestretch, the narrow and final section of trail along the Keyhole Route to the summit (Pettebone et al. 2019). Queuing along the Keyhole Route is common, and GPS tracking and camera data identified possible “choke points” (Kidd et al. 2016). Although “choke points” exist, queuing at current levels does not impact emergency response.

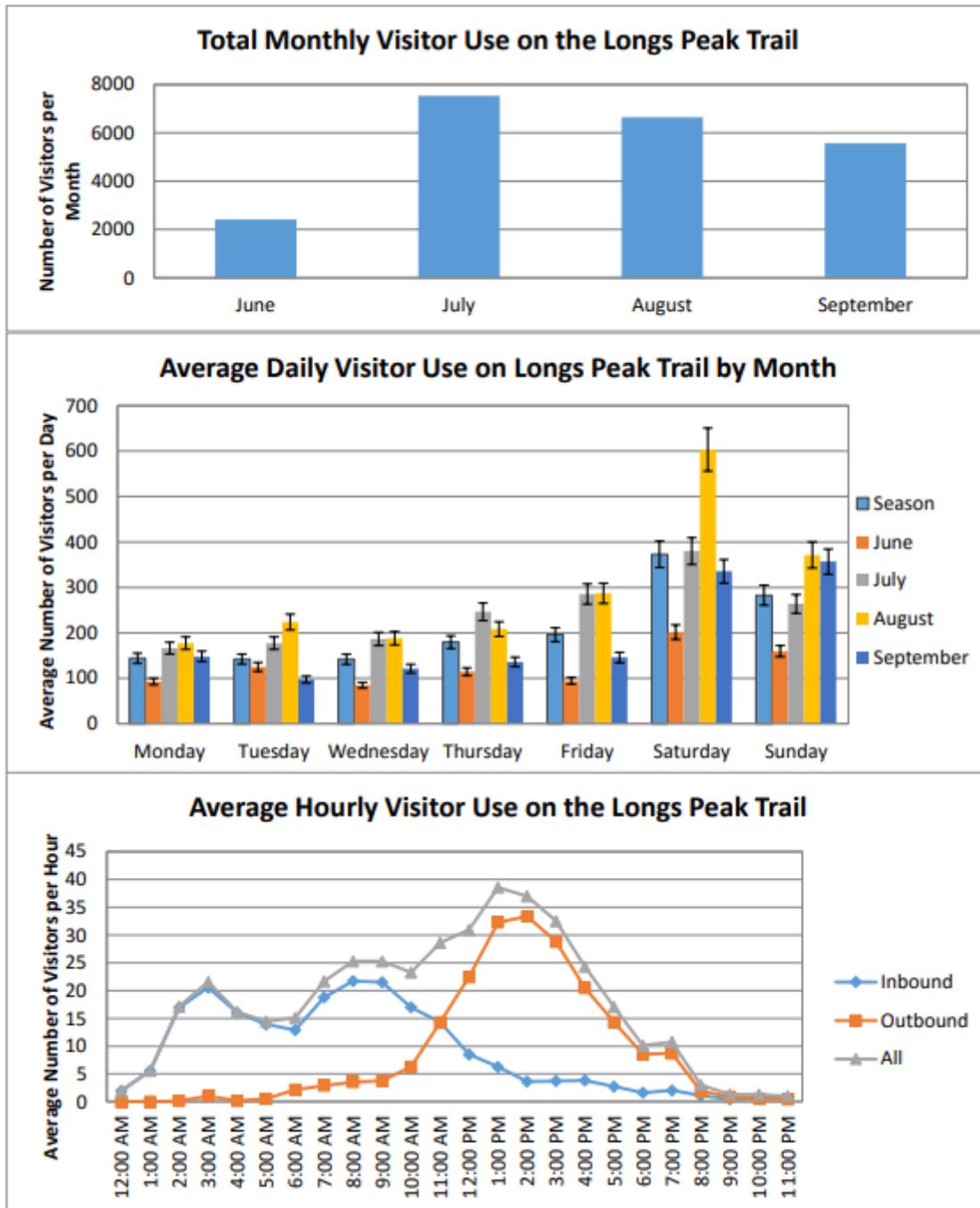


FIGURE D-5. TOTAL MONTHLY, AVERAGE DAILY, AND AVERAGE HOURLY VISITATION ON THE LONGS PEAK TRAIL IN 2015. NOTE: ERROR BARS REPRESENT 95% CONFIDENCE INTERVALS. ERROR BARS FOR HOURLY USE HAVE BEEN REMOVED FOR CLARITY (KIDD ET AL. 2016).

Afternoon thunderstorms are common, meaning that most visitors seeking to summit and/or climb Longs must start their day early in the morning (e.g., from 3:00 a.m. to 4:00 a.m.). In contrast, visitors who are hiking to Chasm Lake typically start later in the day. Visitor numbers on the Homestretch peak at 8:00 a.m. in the summer, and visitation on Longs Peak Trail peaks around 1:00 p.m. in the summer (Kidd et al. 2016). Despite park messaging, it is not uncommon for visitors to arrive at the trailhead with little water, inadequate footwear, and limited knowledge of basic safety precautions. Rescue and recovery on Longs Peak is complex and can be dangerous for first responders. The park received several comments during public scoping expressing concern about visitor safety and crowding on Longs Peak. Human waste management is a public health concern in the area. The toilet facilities in Longs Peak area were upgraded in 2019 to better support use levels with urine separation technology to reduce the frequency of waste removal. Human waste is removed by llamas, and operations are restricted seasonally to conditions that support llama use. Carry-out bags are also available at the wilderness office, but resource impacts from improper disposal of human waste are still found in water testing (Scott et al. 2022).

The parking lot at Longs Peak Trailhead accommodates approximately 70 vehicles. Visitor demand for the parking lot often exceeds supply, resulting in visitors parking along Longs Peak Road, which is owned and managed by Larimer County. Roadside parking exacerbates vehicular congestion along the roadway during peak visitation months; however, the county does not actively manage vehicle use. If the county decided to change roadway parking, it could impact future visitor capacity.

In addition to day use, Longs Peak Campground is situated near the trailhead. Currently, the campground is managed as a tent-only, primitive campground that requires visitors to bring their own water. It is open to visitors during the peak season (typically July to September) and operates on a first-come, first-served basis. Camping by permit is also available in the Boulder Field.

Identify Limiting Attributes

Attributes that most constrain the amounts and types of visitor use that can be accommodated in the Longs Peak analysis area are the visitor experience in wilderness and the management of human waste, both in facilities (cleaning and pumping) and along trails to protect park resources. Although additional facilities could be added, ongoing maintenance would be costly due to complications of backcountry waste management. Maintaining opportunities for solitude or primitive and unconfined recreation in this analysis area is important to achieve desired conditions. Park staff have identified that this analysis area cannot accommodate additional days when desired conditions are exceeded to preserve wilderness character and protect resources. To better understand impacts on wilderness and when choke points occur, future monitoring could include regression analysis similar to past studies (Kidd et al. 2016).

Visitor Capacity

Park staff identified that under current visitor use levels, desired conditions for Longs Peak are being achieved most of the time, and current use levels should be maintained. On occasional sunny weekend days, staff have noted that desired conditions are exceeded, and additional monitoring may be helpful, especially to better understand queuing levels and the number of people at the summit. Climbing Longs Peak is a unique experience where conditions can be expected to be more social during a condensed season when specialized equipment is not needed. Based on recent trail use data, past visitor use studies (Kidd et al. 2016; Pettebone et al. 2019), and the number of available campsites, the visitor capacity for Longs Peak has been identified as 580

people per day. If the number of days the area exceeds or the desired conditions increases beyond occasional weekends, a limited use permit system may be implemented to protect park resources and the visitor experience. Any required limited use permits would be subject to additional compliance. Due to the complexity of the analysis area and the unique temporal and seasonal distribution of visitors throughout it, additional data could inform capacities for specific areas (e.g., the Homestretch).

Bear Lake Road Corridor: Summer

Determine the Analysis Area

The analysis area extends from the Bear Lake Trailhead parking lot to the junction with Beaver Meadows Road and all zone 3 areas plus zone 2 areas along the corridor. Many of the trailheads provide visitor access to zone 1 wilderness. The analysis area includes two frontcountry campgrounds with 390 sites (Glacier Basin Campground and Moraine Park Campground) and trailheads that provide access to wilderness campsites. Desired conditions for all zones will help guide the management and visitor capacity analysis of this area.

Review of Existing Direction and Knowledge

The Bear Lake Road Corridor is a focal point and must-see attraction for many visitors to Rocky Mountain National Park. The paved road was built in 1928 and has been a major draw for visitors ever since, as it provides access to many of the park's fundamental resources and values, including high-elevation ecosystems, wilderness, and various recreational opportunities. From the junction with Beaver Meadows Road to the Bear Lake Trailhead parking lot, Bear Lake Road winds through meadows and forests with outstanding views of mountains for approximately 9 miles. The road is narrow and contains few turnarounds outside of parking lots. Bear Lake Road provides access to several popular trailheads and iconic park features, including Bear Lake, Dream Lake, Emerald Lake, and Alberta Falls. The corridor contains multiple creeks and lakes situated in subalpine and mountain ecosystems. Primary visitor use in this area includes hiking, wildlife viewing, climbing, picnicking, snowshoeing, camping, fishing, and scenic driving.

Prior to piloting timed entry permit systems, the parking lots in this analysis area typically filled by 7:00 a.m. To manage visitor use, the park would temporarily close the corridor to vehicle traffic once parking lots were filled, which led to frequent visitor and staff frustration. Parking lot turnover in this area can take several hours, meaning vehicles may circulate multiple parking lots in search of a space or park in unendorsed spaces. The turnover rates by key parking lot follow (Lawhorn 2022):

- The average length of stay for vehicles in the Park & Ride parking lot was 4 hours and 38 minutes.
- The average length of stay for vehicles in the Sprague Lake parking lot was 1 hour and 16 minutes.
- The average length of stay for vehicles in Bierstadt Lake Trailhead lot was 2 hours and 34 minutes.
- The average length of stay in the Glacier Gorge Trailhead lot was 4 hours and 10 minutes.

Figure D-6 shows the average number of hourly vehicles entering Moraine Park. Given the location of the vehicle counter, these vehicles represent those accessing Bear Lake Road Corridor and can be used to inform management of the corridor. The graph illustrates the change in pattern of visitor access from 2017 to 2022, specific to the month of July.

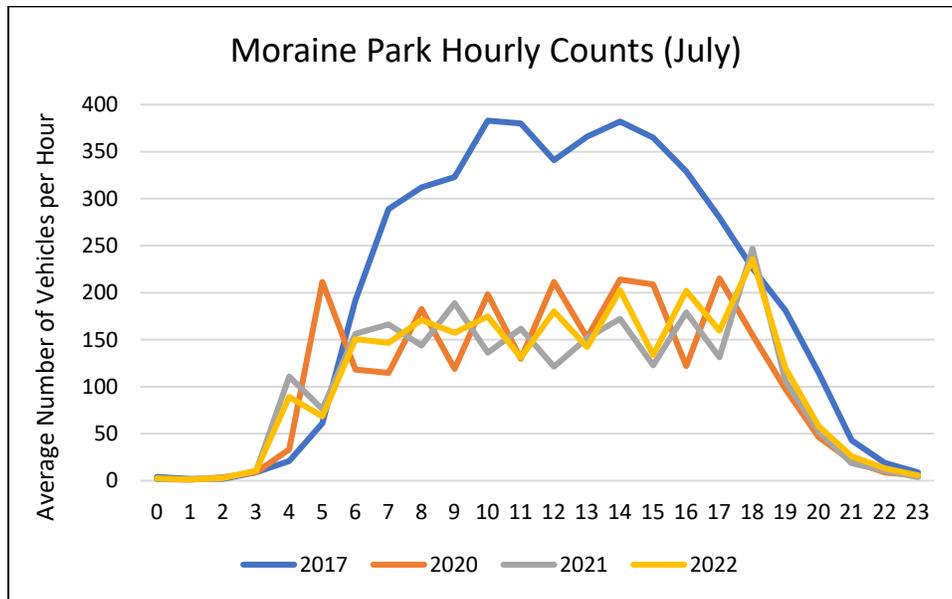


FIGURE D-6. AVERAGE HOURLY NUMBER OF VEHICLES ACCESSING THE BEAR LAKE ROAD CORRIDOR IN JULY FOR SELECT YEARS (NPS PERS. COMM. 2023c)

Findings from research conducted in 2008 suggests that 60% of visitors to the Bear Lake Corridor felt that crowding degraded their visitor experience (Newman et al. 2010). However, from 2008 to 2022, annual visitation has increased by 56% (NPS 2023a), indicating that visitors may feel more crowded now compared to when the survey was completed. Similarly, the report identified that at many of the key destinations in this corridor (e.g., Emerald Lake, Alberta Falls), the amount of people at one time, or people per viewscape often exceeds the minimally acceptable condition, as shown in figure D-7 below.

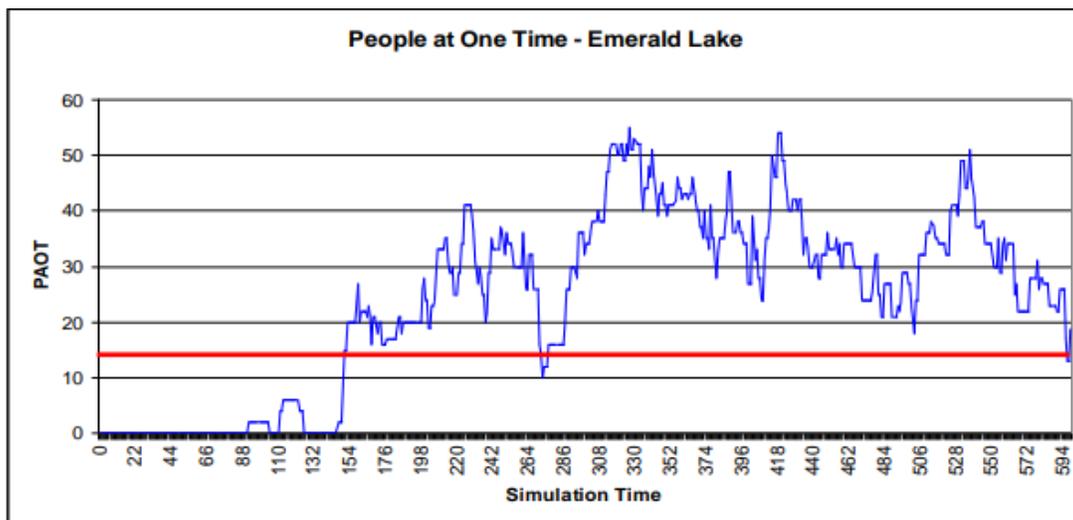


FIGURE D-7. RESULTS FROM MONITORING OF PEOPLE AT ONE TIME (PAOT) AT EMERALD LAKE DURING 2015 (NEWMAN ET AL. 2010)

In addition to access by private vehicle, there are three shuttle routes in this analysis area that provide visitor access. The Bear Lake route provides access to Bierstadt Lake, Glacier Gorge, and Bear Lake trailheads from the Park & Ride parking lot, which is located in the analysis area. The Moraine Park route provides access to trailheads and campgrounds in Moraine Park, and other areas along Bear Lake Road such as Tuxedo Park, Glacier Basin Campground, and Sprague Lake. Lastly, the Hiker Shuttle transports visitors from the Estes Park Visitor Center, located in town, to the Park & Ride lot, and provides visitors with the opportunity to board any shuttle route to reach their destination. The Hiker Shuttle departs Estes Park every 45 minutes from 9:00 a.m. to 2:15 p.m. and typically runs daily from Memorial Day weekend through Labor Day, with weekend service running Labor Day through mid-October.

Overnight use opportunities in this analysis area are plentiful and provide a diverse range of experiences. Overnight use is included in this analysis because these users access key destinations in the corridor during the day, contributing to crowding on trails and at key viewpoints. Two campgrounds are in the area: Moraine Park Campground and Glacier Basin Campground. Moraine Park Campground provides easy access to many trailheads that lead into wilderness, such as Cub Lake and Fern Lake; alternatively, overnight users may board the Moraine Park shuttle route to access other areas in the analysis area. Sites at this campground are reservable via Recreation.gov except in the winter, when one loop of the campground is open on a first-come, first-served basis (see “Bear Lake Road Corridor: Winter” for more information). Glacier Basin Campground is located across Bear Lake Road from the Park & Ride lot, meaning that campers here can board the shuttle for access to trailheads at the Park & Ride or the shuttle stop in the campground. This campground is open from May to mid-September, and all sites must be reserved via Recreation.gov. During pilot timed entry systems, a reservation for either campground also serves as a timed entry permit to the Bear Lake Road Corridor. In conjunction with overnight use at the campgrounds, visitors may also obtain wilderness camping permits for designated campsites that are accessed via trailheads in this analysis area.

Lastly, commercial use in this analysis area is relatively higher compared to other areas of the park. Although commercial use as a percentage of overall use is low in the park, staff noted that commercial operators often provide visitor services in this analysis area. The most popular experiences include, but are not limited to, guided hiking, guided fishing, guided horseback riding, and guided backpacking.

Identify the Limiting Attribute

The attribute that most constrains this area’s ability to accommodate use is the visitor experience along the trails and viewpoints, as well as the historic integrity of the roadway. When concentrated visitor use occurs, it degrades the visitor experience at key destinations, impacts the natural viewshed, impacts visitor safety for emergency responses, and has the potential to cause damage to resources due to unendorsed roadside parking and/or visitors stepping off trail to accommodate other people. The indicators that are most relevant to ensure desired conditions are being achieved are all five indicators: people per viewshed, encounter rates on wilderness trails in zone 1, frequency of unendorsed parking, disturbed areas in congregation areas, and vehicular use in the Bear Lake Road Corridor.

Identify Visitor Capacity

Park staff identified that in recent years, visitor use levels have increased in a manner that no longer achieves and maintains desired conditions for resources and visitor experiences. Research

suggests that people per viewscape at key destinations and vegetation cover loss, particularly near alpine lakes (The Loch, Dream Lake, Bear Lake), are exceeding the minimally acceptable condition (Newman et al. 2010). In addition, park staff noticed frequent occurrences of unendorsed roadside parking, which has the potential to impact resources and visitor experience.

During the piloted systems, park staff noticed a reduction in instances of unendorsed parking along the Bear Lake Road Corridor. From this, the National Park Service can infer that use levels during the piloted systems better achieved and maintained desired conditions not only along the roadway, but also along the trail systems because less people were parking illegally and accessing the trails. While the piloted timed entry reservation system mitigates these impacts due to proactive managed access, visitor use levels need to continuously be monitored to ensure the preservation of resources. Based on use levels during the timed entry reservation system, the visitor capacity for the Bear Lake Road Corridor is identified as 6,000 people at one time.

Although the visitor capacity is identified for the entirety of the corridor, monitoring of indicators at key destinations (i.e., people per viewscape at Emerald Lake, percent of bare ground at the Loch) will ensure that visitor capacity is not exceeded in a manner that degrades resources. If needed, park managers can further refine this analysis area by key destinations. For strategies to manage to visitor capacity, see chapter 2 of the plan and “Appendix C: Indicators and Thresholds.”

Bear Lake Road Corridor: Winter

Determine the Analysis Area

The analysis area is the same as described above for Bear Lake Road Corridor: Summer.

Review of Existing Direction and Knowledge

In the winter, the Bear Lake Road Corridor offers recreational opportunities including, but not limited to, hiking, snowshoeing, and backcountry and cross-country skiing. Previous research indicates that snowshoeing and hiking are the primary winter recreational activities at the Bear Lake Trailhead (Schultz and Svajda 2016). Campgrounds in this analysis area (i.e., Moraine Park Campground and Glacier Basin Campground) are closed during the winter; however, the B loop in the Moraine Park Campground is open to visitors on a first-come, first-served basis. Although open, this campground loop does not receive much overnight visitor use in the winter. Aside from the campgrounds, visitors may also venture into the backcountry for camping at designated campsites. However, visitors engage in day use activities. During this time of year, visitors primarily visit on weekends and holiday weeks (e.g., around New Year’s and spring break). From November 2022 to February 2023, the average number of vehicles on weekends (Saturday and Sunday) was approximately 1,000 cars. During the same time frame, the average number of vehicles during winter weekdays was approximately 500 cars. Figure D-8 shows the number of vehicles accessing the Bear Lake Road Corridor from June 2022 to May 2023. The noticeable spikes during winter months generally represent weekend days.

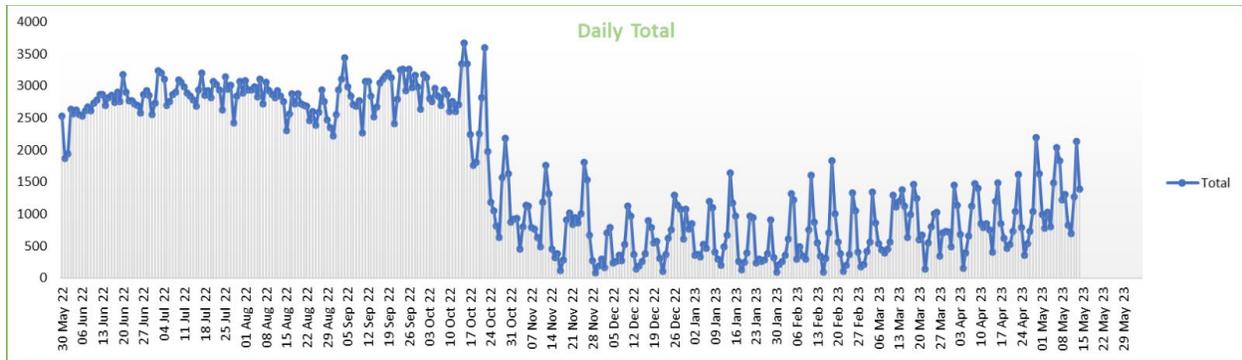


FIGURE D-8. DAILY TOTAL OF VEHICLES ON BEAR LAKE ROAD CORRIDOR BETWEEN JUNE 2022 AND MAY 2023 (NPS PERS. COMM. 2023c)

The shuttle system operations vary depending on the shuttle route, but they typically are not in operation from approximately October to May. While portions of the Park & Ride lot is plowed in the winter, the shuttle does not provide visitor transportation to key trailheads. Consequently, when parking lots in the corridor fill on busy days, park staff will close access to the Bear Lake Road Corridor at the kiosk, near the junction with Beaver Meadows Road, until more spaces and spots become available.

Commercial service operators provide opportunities for visitors to participate in guided services such as snowshoeing. In addition, the number of avalanche training courses that are conducted in the Bear Lake Road Corridor during the winter has increased in recent years. If needed, park managers may conduct a necessary and appropriate analysis for this emerging commercial use to ensure the number of courses does not impact or conflict with visitor experiences.

Identify the Limiting Attribute

Visitor access to this area of the park during the winter is typically influenced by weather conditions, seasonal restrictions (e.g., limited daylight hours), and the associated operational constraints to provide access. In some cases, snow accumulation or hazardous conditions may lead to closures of the area. Additionally, recreational use of this area in the winter typically requires special skills and knowledge of avalanche risk, hypothermia, and more equipment to ensure visitor safety. Therefore, visitor use is constrained by the weather and types of recreation offered in the area. The indicators that are most relevant to ensure that desired conditions are being achieved are people per viewshed, visitor flows in zone 1, and vehicle use levels on Bear Lake Road.

Identify Visitor Capacity

Park staff identified that current visitor use levels in the winter are achieving and maintaining desired conditions for resources and experiences. The visitor capacity is identified as 2,200 people at one time. During the winter, weather patterns and the types of recreation offered generally limit the number of visitors this area receives. However, when use levels begin to approach capacity, park staff temporarily restrict access to the Bear Lake Road Corridor to prevent impacts on visitor safety or experience. For additional strategies to manage to capacity, please see chapter 2.

Eastside Areas

Table D-2. Visitor Capacity Analysis for Areas Found on the Eastern Side of Rocky Mountain National Park

Analysis Area	Existing Direction and Knowledge	Limiting Attribute(s)	Identify Visitor Capacity
<p>Twin Sisters Peak and Lily Lake Area</p> <p>This analysis area includes both parking lots on either side of Highway 7. These parking areas provide visitor access to Lily Lake, US Forest Service (USFS) land, and Twin Sisters Peak Trail, which leads into wilderness. Therefore, all three visitor use management zones are included in the analysis.</p>	<p>The Lily Lake Trail loop hike is just under a mile, meaning that turnover in the parking lot is relatively frequent unless visitors stay for longer periods of time for picnics. The area is a popular wedding spot, and, therefore, special use permit requests for this location are frequent. In addition to these uses, this area provides visitor access to Jurassic Park, a popular destination for rock climbing, and other USFS lands. Visitor-created trails associated with climbing are noticeable. The Lily Lake environmental assessment proposed adding parking to the Twin Sisters/Lily Lake area that could impact overall use. This area also serves as a parking area for the Twin Sisters Peak Trail, which is roughly 7 miles roundtrip and provides access to an alpine environment, designated Wilderness, and views of the Rocky Mountains. Data collected at the park suggest that about 75 visitors use the trail per day on average. Occasionally, visitor-vehicle conflicts occur due to parking lots on both sides of the road servicing Twin Sisters and Lily Lake. The road to Twin Sisters Peak Trailhead is closed during the winter; however, during the summer, many visitors park along the unpaved roadway to access the trail.</p>	<p>The attribute that most constrains this area’s ability to accommodate use is the visitor experience along these trails, the roadway, and opportunities for solitude.</p>	<p>Park staff identified that current visitor use levels are aligned with desired conditions for visitor experience; however, there is some concern about concentrated visitor use and potential impacts on natural resources. As a result, the visitor capacity is identified as 400 people at one time. Potential indicators to monitor for visitor capacity include visitor flows along wilderness trails and unendorsed parking.</p>
<p>Rainbow Curve</p> <p>This analysis area is located in zone 3 and includes the parking area and overlook along Trail Ridge Road.</p>	<p>Rainbow Curve overlook is a popular roadside pullout for visitors along Trail Ridge Road. Currently, the overlook is only open to vehicles during the summer months (typically from June to mid-October). While there are no trailheads at this location, the viewpoint and associated facilities provide visitors with an opportunity for a quick stop from their drive.</p>	<p>The attribute that most constrains this area’s ability to accommodate use is the surrounding topography of the area and limited infrastructure to support visitor experiences.</p>	<p>Park staff identified that visitor capacity can be maintained at current use levels. The capacity is identified as 100 people at one time.</p>
<p>Many Parks Curve</p> <p>This analysis area includes the two</p>	<p>Many Parks Curve Overlook is similar to Rainbow Curve Overlook in that it provides a popular viewpoint along Trail Ridge Road. Access is typically year-round, with occasional road closures during winter weather events.</p>	<p>The attribute that most constrains this area’s ability to accommodate use is</p>	<p>Park staff identified that visitor capacity can be maintained from current use levels. The</p>

Analysis Area	Existing Direction and Knowledge	Limiting Attribute(s)	Identify Visitor Capacity
parking areas, the overlook area, and the pedestrian boardwalk. The area is located in zone 3.	Visitors may access this analysis area from two parking areas, one of which requires visitors to cross Trail Ridge Road and walk along the boardwalk. The overlook provides a quick stop for visitors to take a photo but does not provide access to trails or restroom facilities; therefore, visitor turnover rate is high.	the surrounding topography and nearby wilderness.	capacity is identified as 70 people at one time.
<p>Forest Canyon Overlook</p> <p>This analysis area includes the parking area, the Forest Canyon Overlook Trail, and the overlook itself. It falls in zone 3 and borders zone 1.</p>	Forest Canyon Overlook, located along Trail Ridge Road, is accessed via a short walk along the paved trail. The overlook provides sweeping views of the western side of Rocky Mountain National Park. Primary use occurs in the summer when Trail Ridge Road is open and includes hiking and scenic viewing. The area has no restroom facilities; therefore, visitor turnover rate is high.	The attribute that most constrains this area's ability to accommodate use is the sensitive alpine environment surrounding this area and nearby wilderness.	Park staff identified that current use levels are maintaining desired conditions. Therefore, the visitor capacity is identified as 100 people at one time, which allows visitors to remain on the trail without impacting the alpine environment.
<p>Rock Cut Area and Toll Memorial Trail</p> <p>This analysis area includes the parking areas, facilities, and the nearby Toll Memorial Trail. The area falls in zone 3, although it borders zone 1.</p>	This analysis area is located along Trail Ridge Road, approaching the Alpine Visitor Center from the east. The Toll Memorial Trail, which borders wilderness, provides a short (1 mile round trip) hiking opportunity for visitors to witness the unique alpine tundra environment of Rocky Mountain National Park. The area includes a popular overlook area and provides basic restroom facilities for visitors. Due to seasonal closures of Trail Ridge Road, this area is only open to visitation during summer months (typically from late May to mid-October). Figure 17 demonstrates the hourly number of people on the trail from 2022. Conditions are often windy, cold, and subject to the environment, leading to a high turnover rate. Due to visitor-created trails that impact sensitive alpine vegetation, much of the surrounding area is marked with signs to prevent visitors from damaging the environment. Bare ground data collected at the park indicate that nearly 200 square feet of the area is classified as a total loss of vegetation (NPS pers. comm. 2023c).	The attribute that most constrains this area's ability to accommodate visitor use is the surrounding alpine tundra environment. This is a fundamental resource and value of the park.	Park staff determined that visitor use levels under the piloted reservation system have reduced concentrated visitor use at this location. Continued monitoring of the sensitive alpine environment will help inform if capacities need to be updated in the future. The visitor capacity is identified as 150 people at one time, which allows visitors to stay on-trail and pass each other without stepping off-trail and impacting the alpine environment.

Analysis Area	Existing Direction and Knowledge	Limiting Attribute(s)	Identify Visitor Capacity
<p>Deer Ridge Junction</p> <p>This junction includes the intersection of Fall River Road (Highway 34) and Trail Ridge Road (Highway 36), and the associated parking areas that provide visitor access to the Deer Mountain Trail. Parking areas and the Deer Ridge Trail are in zone 3.</p>	<p>The primary visitor use includes hiking, trail running, or snowshoeing from the Deer Mountain Trailhead; however, parking consists of formal roadside parking on either side of the road (Highway 36) and on other pullouts off Highway 34. Consequently, there are perceived safety risks due to visitor-vehicle congestion and potential for conflict. This area contains extensive visitor-created trails, particularly near the trailhead, which result in large areas of trampled vegetation and bare ground. A potential future project at this location includes developing a small parking lot by the trailhead to reduce roadside parking and building a roundabout at the roadway intersection. Data collected during summer of 2013 suggest that the average daily usage at the trailhead was approximately 155 hikers per day, with an average of 20 hikers per hour from 9:00 a.m. to 12:00 p.m. (HDR, Inc. 2015).</p>	<p>The attribute that most constrains this area's ability to accommodate use are the desired conditions for resource protection, namely that resource impacts are limited to the immediate trail corridor and the development of roadside parking is minimized.</p>	<p>Park staff determined that desired conditions for resources and visitor experiences are maintained along the trails, but some resource impacts are occurring near the parking area. Therefore, visitor use levels should be actively managed to an identified visitor capacity of 100 people at a time.</p>
<p>Lumpy Ridge Area</p> <p>This analysis area includes the parking area and trailhead, which provides access to Gem Lake and the climbing areas of Lumpy Ridge. The area includes private land, zone 2, and zone 3.</p>	<p>Lumpy Ridge Trailhead is located in northern Estes Park and borders neighborhood communities. Visitors do not have to enter through one of the park's entrance stations to access this area. This trailhead provides ample opportunities for visitor recreation, but the primary uses are climbing and hiking. Data collected during 2013 indicates that the east trail (to Gem Lake) receives more use than the west trail, with average daily use noted as 310 hikers per day and 100 hikers per day, respectively (HDR, Inc. 2015). Key destinations from this trailhead include Gem Lake, Balanced Rock, and climbing crags along Lumpy Ridge (e.g., Twin Owls). In addition, guided climbing services are offered at this location for visitors who may be new to climbing or want to learn from an experienced guide. Sections of this trail and associated rock formations are closed seasonally, typically from February 15th to July 31st, to protect raptor nesting. However, these closures may be extended longer or rescinded, depending on raptor nesting activity. This area receives concentrated use throughout the day, given the range of opportunities it offers, and roadside parking and vehicular congestion</p>	<p>The attribute that most constrains this area's ability to accommodate visitor use is the preservation of wilderness character that is accessed via this trailhead and the protection of natural resources, namely wildlife and lake ecosystems.</p>	<p>Park staff determined that desired conditions are better met when visitation is dispersed throughout the day and erosion along Gem Lake shoreline is minimized. Current use levels should be reduced to maintain these conditions. The visitor capacity is identified as 500 visitors per day. Potential indicators to ensure that desired conditions are being maintained are people per viewshed, specifically at Lumpy Ridge, and unendorsed parking.</p>

Analysis Area	Existing Direction and Knowledge	Limiting Attribute(s)	Identify Visitor Capacity
	<p>are prominent issues. Visitor-created trailing is also prominent, with nearly 36 visitor-created trails documented in 2013 (HDR, Inc. 2015). Although this area was impacted by wildfire closures in 2020, visitor day use from the Gem Lake trail counter suggests the average number of visitors per day was 478 (2021) and 424 (2022).</p>		
<p>Old Fall River Road</p> <p>This analysis area includes the dirt road portion of Old Fall River Road, which runs somewhat parallel to Trail Ridge Road, from Endovalley to the Alpine Visitor Center. The area also includes key destinations and pullouts accessed via the roadway. This analysis area provides visitor access to all three zones.</p>	<p>This roadway was built in 1920 and served as the first auto route that offered access to alpine country in the park. The gravel road is one-way uphill and offers a unique experience in the park. Given its nature, the road is only open to visitors for a few months out of the year due to weather and safety reasons. Key visitor use areas in this analysis area include Marmot Point, Chapin Pass Trailhead, and Chasm Falls. Primary use of this analysis area includes scenic driving and hiking. As noted, the road is closed in the winter, but visitors can snowshoe and cross-country ski up the road corridor. Recent data collection (2021–2022) from vehicle encounters indicates that in July and August, the average number of vehicles per day that drive on this road is 625 cars.</p>	<p>The attribute that most constrains this area’s ability to accommodate use is the natural and steep topography of the Rocky Mountains and maintaining the roadway’s historic integrity.</p>	<p>The project team determined that current use levels are maintaining desired conditions in this analysis area. The visitor capacity is identified as 700 vehicles per day. Should visitation change in a way that desired conditions are no longer being met, park staff may identify a capacity of vehicles or visitors at one time.</p>
<p>Endovalley Road Corridor</p> <p>This area encompasses the paved portion below access to Old Fall River Road, from the intersection of Highway 34 to Endovalley Road, where the paved portion becomes dirt. This analysis area and</p>	<p>This portion of Old Fall River Road is open to vehicles year-round but is subject to temporary closures due to weather. Key trailheads in this analysis area include the Alluvial Fan (west and east) and Lawn Lake; both provide visitor access to designated Wilderness. Primary activities include hiking, backpacking and fishing, but winter use includes snowshoeing and cross-country skiing.</p>	<p>The attribute that most constrains this area’s ability to accommodate visitor use includes the nearby wilderness and visitor opportunities to experience solitude.</p>	<p>Current visitor use levels occasionally exceed thresholds for desired conditions in this area; however, visitors can often find solitude along the wilderness trails. The visitor capacity is identified as 100 people at one time across this analysis area. The potential indicators to ensure visitor use is aligned with desired conditions is people per viewshed, specifically at the Alluvial Fan and unendorsed parking.</p>

Analysis Area	Existing Direction and Knowledge	Limiting Attribute(s)	Identify Visitor Capacity
its associated trailheads provide visitor access to all three zones.			
<p>Hidden Valley</p> <p>This analysis area includes the roadway and parking area, associated infrastructure, and the accessible trail located in zone 3. However, the area provides visitor access to designated Wilderness (zone 1).</p>	<p>The Hidden Valley area is located off Trail Ridge Road, before Many Parks Curve, meaning it is accessible year-round to vehicles. Previously a ski resort (closed in 1991), this area is used primarily by visitors in the winter for backcountry and cross-country skiing, snowshoeing, sledding, and other winter recreational uses. Commercial operators provide avalanche courses in this area, with park staff reporting an increase in this use in recent years. Although summer use is relatively low compared to winter, Hidden Valley may be reserved as a wedding location via a special use permit, limited to a maximum of 30 people per event. Hidden Valley is also Junior Ranger Headquarters, where interpretation and education staff provide a variety of offerings for youth visiting the park.</p>	<p>Opportunities for solitude and low encounters with other visitors in wilderness most constrain this area's ability to accommodate visitor use, particularly in the winter.</p>	<p>Park staff determined that current use levels during the summer are maintaining desired conditions for experiences and resource protection. The visitor capacity is identified as 350 people at one time.</p>
<p>Upper Beaver Meadows Trailhead</p> <p>This analysis area lies north of Moraine Park and includes the roadway, parking area, and associated trailhead in zone 3. Visitors may easily access zones 2 and 3 via the trail network that originates at this analysis area.</p>	<p>Primary use for this area includes hiking and wildlife viewing; however, it also serves as a wedding location during the summer. This area has received increased visitor use in recent years and serves as a popular area for wildlife viewing (i.e., elk rut in the fall). The road to the trailhead is closed to vehicle use in the winter. Although the meadow to the south is outside of wilderness, visitors may access wilderness by hiking north along the trails. Visitors have been observed using this area to access the Bear Lake Corridor when reservations have sold out. Additionally, unendorsed parking has increased in recent years in this location, creating resource damage along the roadway. Finally, this is an important helicopter landing zone during major search and rescue operations, and the area is often closed for these operations.</p>	<p>The attribute that most constrains this area's ability to accommodate use is the preservation of resources in the area and visitor opportunities for solitude in nearby wilderness.</p>	<p>Overall, current visitation to this area occurs in a manner that maintains desired conditions for resources and opportunities for solitude on nearby wilderness trails. The visitor capacity is identified as 100 people at one time. If needed, park staff may implement signage or engineering (e.g., barriers to prevent roadside parking) to ensure that visitor capacity is not exceeded.</p>

Analysis Area	Existing Direction and Knowledge	Limiting Attribute(s)	Identify Visitor Capacity
<p>Aspenglen Campground</p> <p>This analysis area includes the campground road, loops, and associated trails. The area is located in zone 3.</p>	<p>Aspenglen Campground is situated just past the Fall River entrance station on the eastern side of the park. The campground is only open during the summer season, typically from late May to September. Visitors must obtain a camping reservation (from Recreation.gov) to camp at this location. The area currently has no shuttle service that provides access, so visitors must walk or drive in and then hike or drive to other locations in the park. The nearby Fall River provides additional recreational opportunities, such as fishing and wildlife viewing.</p>	<p>The attribute that most constrains this area's ability to accommodate visitor use is the protection of natural and cultural resources, which is limited to the immediate trail corridor and paved areas in zone 3. Roadside parking is contained to designated pullouts and developed parking areas.</p>	<p>Current infrastructure of the campgrounds allows for visitor use and access that maintains desired conditions. Therefore, current visitor use levels and access managed via the reservation system would continue. The visitor capacity is identified as 420 overnight use visitors per day.</p>

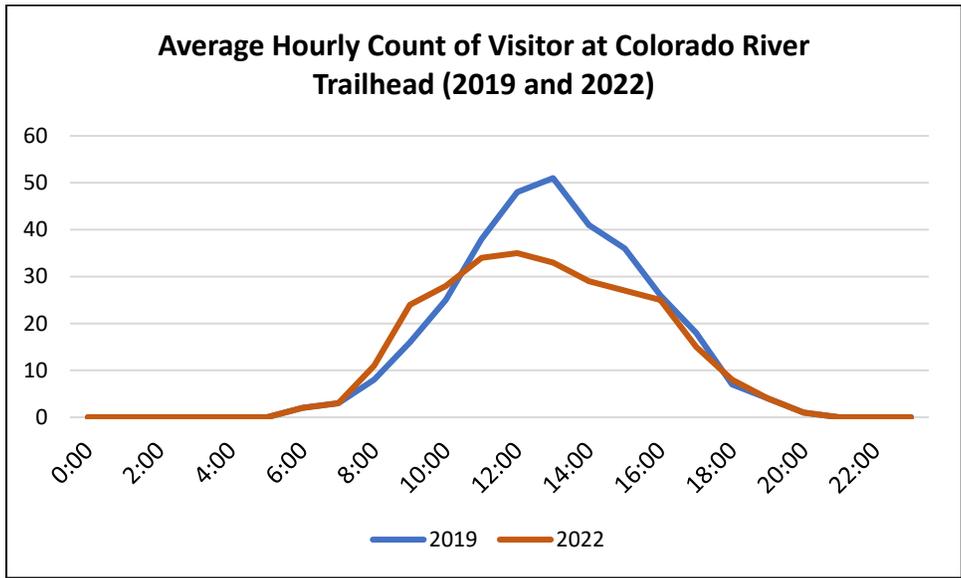


FIGURE D-9. AVERAGE HOURLY COUNT OF VISITORS ACCESSING THE COLORADO RIVER TRAILHEAD IN SUMMERS OF 2019 AND 2022 (NPS PERS. COMM. 2023C)

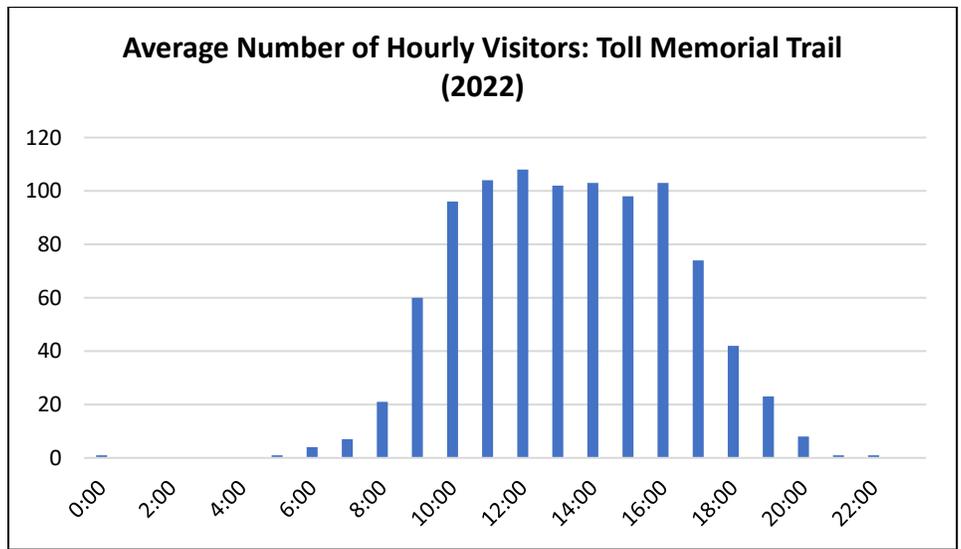


FIGURE D-10. AVERAGE NUMBER OF HOURLY VISITORS ACCESSING TOLL MEMORIAL TRAIL DURING OPERATING SEASON (NPS PERS. COMM. 2023C)

Westside Areas

Table D-3. Visitor Capacity Analysis for Areas Found on the Western Side of Rocky Mountain National Park

Analysis Area	Existing Direction and Knowledge	Limiting Attribute(s)	Identify Visitor Capacity
<p>Colorado River and Timber Lake Trailheads</p> <p>The parking areas and associated trailheads are located in zone 3, off Trail Ridge Road and north of Timber Creek Campground. The Colorado River Trail is in zone 2 but provides visitor access to zone 1 wilderness. The Timber Lake Trail is in zone 1 wilderness.</p>	<p>The Colorado River and Timber Lake Trailheads are located on either side of Trail Ridge Road and serve as primary access point for trails to the northwest corner of the park. Visitor experiences range from a short 0.5-mile hike to strenuous backpacking experiences deep into the park's rugged wilderness. From this analysis area, visitors can venture west towards the Never Summer Wilderness, located outside of the park. Alternatively, visitors can also explore east of Trail Ridge Road in the park's wilderness. Park staff noted that the Timber Lake Trailhead is rarely at capacity, while the Colorado River Trailhead typically reaches capacity on weekend days from July to September. The piloted reservation system successfully dispersed visitation throughout the day (figure 26). The average number of visitors per hour accessing Colorado River Trail did not exceed 35 people per hour in 2021 or 2022, with the average daily number ranging from 220 to 285 (excluding 2020 due to wildfire closures). Other recreational opportunities include river access for fishing and wildlife watching, climbing, picnicking, and access to the Lulu City historic site. Visitors are typically able to access these trailheads in the winter; however, weather conditions may result in temporary Trail Ridge Road closures south of these trailheads.</p>	<p>The attribute that most constrains this area's ability to accommodate visitor use is the visitor experience along trails in wilderness. Encounters with visitors are managed to be low, and natural viewsheds, particularly at key destination points, should dominate.</p>	<p>The project team identified that current visitor access and use levels under the reservation system better meet desired conditions for visitor experience along trails compared to previous use levels (2019), particularly for the Colorado River Trail. Given the extensive trail network in this analysis area, visitor capacity is identified as 250 people at one time to ensure that encounter rates are aligned with desired conditions and concentrated use does not cause resource damage.</p>
<p>East Inlet Trailhead</p> <p>This analysis area includes the parking area, associated trailhead, and the trail itself. While the trailhead is located in</p>	<p>East Inlet Trailhead is located near the western border of Rocky Mountain National Park and along the shoreline of Grand Lake. While the trailhead is located in the park, there is also nearby parking along W. Portal Road that is outside of the park boundary. When parking at the East Inlet Trailhead is full, visitors park along</p>	<p>The attribute that most constrains this area's ability to accommodate visitor use is the visitor experience along trails in wilderness. Encounters with visitors are managed to be low, and natural viewsheds, particularly at key destination points, should dominate.</p>	<p>The project team identified that current use levels are maintaining and achieving desired conditions across the three zones. The visitor capacity is identified as 400 people per day.</p>

Analysis Area	Existing Direction and Knowledge	Limiting Attribute(s)	Identify Visitor Capacity
zone 3, the trail includes both zone 2 for the first couple miles and then transitions into zone 1.	the roadside or in these other areas and can hike into the park. This area provides backcountry and wilderness access to a number of campsites, serving as a popular area for day hiking and backpacking, along with short, family-friendly hikes to Adams Falls. Consequently, it is one of the busier trails in this area of the park and experiences trail widening due to visitors stepping to the side and allowing others to pass. Data collected suggest that in July 2021, the average number of people was 770 per day, compared to 325 people per day in July 2022. In the winter, visitors primarily use this area for snowshoeing and cross-country skiing.	The paved areas in zone 3 minimize impacts on natural and cultural resources.	
<p>Timber Creek Campground</p> <p>This analysis area includes the campground facilities, roads, and associated loops. The campground is located in zone 3 but provides visitor access to zone 2.</p>	Timber Creek Campground is located north of Grand Lake along Trail Ridge Road but south of Colorado River and Timber Lake Trailheads. This is the only campground on the west side of the park and requires reservations. The campground is open seasonally, typically from late May to mid-October, and accommodates tents and recreational vehicles. The Colorado River flows near the campground, allowing for river access in addition to hiking nearby trails. Park staff have reported that the campground is typically full every night during peak season.	The campground's ability to accommodate visitor use is constrained by the surrounding topography including the roadway, Colorado River, and nearby designated Wilderness. As described in desired conditions, resource impacts outside of the paved areas are minimal to protect fundamental resources and values.	Current infrastructure of the campgrounds allows for visitor use and access that maintains desired conditions. Therefore, current visitor use levels and access managed via the reservation system would continue. The visitor capacity is identified as 800 overnight use visitors per day.
<p>Milner Pass</p> <p>This analysis area includes the parking area and associated facilities (e.g., trails) that provide visitor access to wilderness. The pass is located in zone 2 and provides visitor access to zone 1.</p>	This area is located along Trail Ridge Road on the Continental Divide of the Rocky Mountains. Like other areas along this road, it is closed during the winter when the road becomes impassable. While some visitors use this area to access the Ute Trail and hike to Mount Ida on a visitor-created trail, primary visitor use includes wildlife viewing, visiting Poudre Lake, and scenic driving. The majority of visitors stop for a quick break to take an iconic photo with the Continental Divide sign before driving to their next destination. Afternoon thunderstorms in the summer can pose a serious	The attribute that most constrains this area's ability to accommodate use is the protection of natural resources, namely the sensitive alpine environment surrounding this area.	The project team identified that current use levels are not maintaining desired conditions for resource protection in this sensitive environment. Visitor use has led to resource impacts. As a result, visitor use levels should be decreased from current levels and established to protect these fundamental resources and values. The visitor capacity is identified as 75 people at one time.

Analysis Area	Existing Direction and Knowledge	Limiting Attribute(s)	Identify Visitor Capacity
	<p>threat to visitors, meaning use is concentrated during earlier times of the day. Data collection on bare ground indicates that much of the area has experienced vegetation loss (approximately 830 square feet of damage noted in this location) (NPS pers. comm. 2023c).</p>		
<p>Green Mountain/Onahu Trailheads</p> <p>This analysis area includes the parking areas, trailheads, and trails that provide visitor access to wilderness. It includes all zones.</p>	<p>Green Mountain and Onahu Trailheads are located along Trail Ridge Road and connected via the Onahu Creek Trail. Green Mountain Trail is primarily used for hiking and provides visitor access to Big Meadows, a destination for camping and wildlife viewing. These trails provide visitor access to the backcountry and wilderness in a remote area of the park; however, the East Troublesome Fire (2020) damaged this area, and sections are still closed today. Data collected at the park indicates that nearly 70% of the visitors in this area use Green Mountain Trail, while 30% use Onahu Creek Trail (NPS pers. comm. 2023c).</p>	<p>The attribute that most constrains this area's ability to accommodate visitor use is the opportunity for wilderness experiences and the preservation of wilderness character.</p>	<p>Current visitor use levels are maintaining desired conditions for resources and visitor experience, as this area receives relatively low use compared to other areas of the park. The visitor capacity is identified as 300 people per day, which allows desired conditions to be maintained. Should visitation change in a way that desired conditions are no longer being met, park staff may identify a capacity of visitors at one time. Monitoring for encounter rates (low-use backcountry area) will help ensure that desired conditions are being maintained.</p>
<p>Bowen-Baker Trailhead</p> <p>This analysis area is located in zone 3 and provides access via the trail system to zone 1 wilderness.</p>	<p>Bowen-Baker Trailhead is located on the western side of Trail Ridge Road and primarily provides visitor access to the Never Summer Mountains and wilderness area, which is located outside of the park. The park boundary ends shortly after visitors leave the trailhead on either the Baker or Bowen Trail. Due to the possible threat of afternoon storms, visitors primarily use this area earlier in the day. In addition to NPS visitors, this area is popular with hunters; as a result, the dirt road is open to visitors during hunting season to allow access to Arapahoe National Forest (managed by the US Forest Service).</p>	<p>The attribute that most constrains this area's ability to accommodate visitor use is the opportunity for wilderness experiences and the preservation of wilderness character.</p>	<p>Because current visitor use levels are maintaining desired conditions for resources and visitor experience, the visitor capacity is determined as 75 people at one time. Encounter rate monitoring (low-use backcountry areas) will help ensure desired conditions for visitor experience are being maintained.</p>
<p>North Inlet Trailhead</p> <p>This analysis area is located in zone 3 but provides</p>	<p>This area is located just north of Grand Lake and sits on the border of Rocky Mountain National Park. This area provides visitor access to the Tonahutu Trail, and North Inlet Trail and is open to</p>	<p>The attribute that most constrains this area's ability to accommodate visitor use is the protection of natural</p>	<p>Overall, current visitor use levels are maintaining desired conditions for resources and visitor experiences. The associated infrastructure at the trailhead</p>

Analysis Area	Existing Direction and Knowledge	Limiting Attribute(s)	Identify Visitor Capacity
<p>visitor access to zones 1 and 2 via the trail system.</p>	<p>visitation year-round; however, primary use occurs in the summer and consists of day hiking and backpacking to remote wilderness. Shorter hikes in the area provide day use opportunities, while backpackers may hike further into the wilderness for solitude. The East Troublesome Fire (2020) impacted this area, which has evident burn scars. Park staff have noted some resource damage near the parking area, but have mitigated these impacts with temporary structures (e.g., cones, signage).</p>	<p>resources, namely sensitive wetlands in this area.</p>	<p>allows visitors to experience this area of the park in a manner that preserves wilderness character. Therefore, the visitor capacity is identified as 90 people at one time.</p>
<p>Sun Valley Trail This analysis area is located in zones 2 and 3 but provides visitor access to zone 1 wilderness.</p>	<p>Sun Valley Trail served as one of the park’s key destinations for equestrian use prior to its closure after the East Troublesome Fire in 2020. At the time of this analysis, the trail is currently closed to visitor use. When open to visitor use, a concessioner provides guided horseback riding along this trail from May (Memorial Day Weekend) through September 30th, with peak use occurring in 2015 with more than 2,200 visitors. Nonguided horse use is also permitted. Fishing opportunities, both guided and nonguided, also occur in this area, as the trail provides access to the Colorado River. Most of the trail is in wilderness. In the winter, this area served as a popular destination for cross-country skiing and snowshoeing; however the 2020 fire damaged the trails and winter use is less common now.</p>	<p>The attribute that most constrains Sun Valley Trail’s ability to accommodate visitor use is the preservation of wilderness character in zone 1 wilderness.</p>	<p>Current visitor access and use levels are maintaining desired conditions for resources and experiences in this section of the park. Based on reported commercial use numbers, the visitor capacity is identified as 200 people per day.</p>

This page intentionally blank.

APPENDIX E: ACTIONS AND ALTERNATIVES CONSIDERED BUT DISMISSED

The following alternatives were dismissed from further analysis because they do not meet the purpose and need and/or or are outside of the scope of the environmental assessment. The rationale for why these actions were dismissed from further analysis in the environmental assessment is described below.

Standalone Intelligent Transportation System

Park staff dismissed a standalone intelligent transportation system as an alternative because it would not meet the purpose and need for taking action and due to the economic infeasibility of the significant infrastructure improvements that would be required with limited effectiveness. Intelligent transportation systems are technology-driven systems designed to improve safety, reduce traffic congestion, and promote the efficient use of transportation resources. The use of intelligent transportation systems is discussed in the common to all action alternatives section, chapter 2, “Technology Improvements” section. In 2011, Rocky Mountain National Park staff piloted an intelligent transportation system that did not update in real time due to technology limitations. Because most park visitors come from the Front Range of Colorado within a few hours’ drive, the pilot intelligent transportation system created a false sense of how busy the park would become during drive times and led to frustration on arrival. Additionally, park managers used messaging that parking lots filled quickly in the years before the intelligent transportation system was piloted; this resulted in the same number of visitors arriving during the day and at one time but just arriving earlier in the day. While technology has improved since the 2011, the park is geographically large, and communication to key areas remains limited due to topography and distance. After completing environmental analysis as appropriate, park staff will incorporate the use of intelligent transportation systems as a complement to other alternatives, as funding and technology allows.

Expanded Infrastructure and Shuttle Services

Park staff dismissed expanded infrastructure and shuttle services because it would not meet purpose and need. To address vehicle congestion, park staff considered adding parking infrastructure, such as a parking garage in Estes Park or other underutilized parking locations, and increasing shuttle service. Each alternative has been designed with desired conditions and identified visitor capacities in mind. While the mix of vehicle and shuttle delivery could change, the number of people in each area of the park is constrained by other environmental and experiential factors (see appendix D). While expanding infrastructure would provide additional access to popular destinations like the Bear Lake Road Corridor, it would not adequately manage the number of visitors in specific areas and would cause surges of visitors not consistent with visitor capacities to achieve desired conditions for visitor experience and resource protection. Maximizing private vehicle use is also more economically feasible than adding additional infrastructure. Increasing the number of shuttles would require decreasing the number of private vehicles in the park or an area to protect resources and provide quality experiences. Reducing the number of private vehicles to allow for more shuttles would limit visitor mobility in the park, as shuttles would not be able to service all trailheads and visitor use sites. This strategy could have negative impacts on congestion in surrounding communities by increasing congestion in town.

Once inside the park, visitors would still experience crowding at popular destinations and high encounter rates on trails. Facilities (e.g., bathrooms) would not be equipped to support use levels, and staff would be unable to maintain facility cleanliness at peak times. Concentrated use would impact resources, such as vegetation, due to trail braiding and widening from crowding on trails. Staff may consider expanding infrastructure and shuttle services in the future, and they would analyze these actions under a separate environmental analysis, as appropriate.

Multiday passes

Park staff dismissed multiday reservations as an alternative, or as a component of another alternative, because it would not meet the purpose and need. Multiday reservations would significantly reduce the number of available reservations each day and would have too great of an impact on visitor use and socioeconomics. To maximize visitor access, spreading visitation throughout the day is critical. If, for example, the park had two days of rainy weather, visitation could surge on the third day. Park staff would need to manage for these surges to maintain desired conditions. Therefore, to maintain desired conditions in this scenario, the permit numbers would need to be lower on each day than any of the other alternatives analyzed in this environmental assessment.

Daily Reservations to Bear Lake Road Corridor

Park staff dismissed daily reservations to Bear Lake Corridor as alternative or a strategy in an alternative because it would not meet the purpose and need. Daily reservations would significantly reduce the number of available reservations each day to this area of the park over any of the other alternatives. The impact on visitor use would be too great to be considered. This option would allow visitors to arrive at any time on the day of their reservation. The park adjusted the pilot timed entry reservation system in 2021 to include a Bear Lake Road Corridor timed entry reservation after observing concentrated use during the parkwide 2020 pilot timed entry reservation system. During the pilot timed entry reservation systems, it was common for the reservations to the Bear Lake Road Corridor to sell out, dispersing use throughout the day while still maintaining a high level of visitor use in the corridor. This indicates that to maintain desired conditions, daily reservations would need to be allocated based on the busiest time of day, which would limit the overall number of reservations that could be sold for the Bear Lake Road Corridor. Because visiting and recreating in the Bear Lake Road Corridor is a key visitor experience in the park, it is important to maintain the greatest amount of access while meeting desired conditions.²³

23. "Restrictions placed on recreational uses that have otherwise been found to be appropriate will be limited to the minimum necessary to protect park resources and values and promote visitor safety and enjoyment" (NPS *Management Policies* 2006 8.2).

APPENDIX F: IMPACT TOPICS CONSIDERED BUT DISMISSED FROM DETAILED ANALYSIS

The following impact topics are not analyzed because they do not exist in the project area; would not be affected by the proposal; the likelihood of impacts are not reasonably expected or through the application of mitigation measures there would be no potential for significant effects; and were not a subject of contention among the public and other agencies.

Air Quality

Ongoing visitor activities discussed in the plan, including vehicular traffic and idling vehicles in and around the park, would continue to emit air pollutants through exhaust and reduce air quality in the immediate area. However, air quality impacts from vehicular traffic in the park are far less than upslope winds carrying air pollutants north from Front Range sources. Air quality would not likely be impacted among alternatives, as the plan is not substantially changing the number of vehicles entering the park but rather shifting vehicle entry throughout the day during the park's heavy visitation times of the year. Therefore, air quality is dismissed from further analysis.

Soundscapes

Impacts on the soundscape are addressed under the natural quality of wilderness character and, therefore, dismissed from further analysis.

Historic Resources

The park includes many designated historic districts and cultural landscapes, including Trail Ridge Road (a cultural landscape), Holzwarth Ranch, Fall River Pass, Fall River Entrance, McGraw Ranch, Moraine Park Museum and Amphitheater, Moraine Park Campground, and the park headquarters area. Individual historic buildings and structures, including the Agnes Vaille Shelter and Fern Lake Trail, also exist throughout the park. Collectively, these historic resources provide valuable insights into the park's multifaceted history, and their historic integrity would not be adversely affected by the proposed actions outlined in this plan.

None of the actions in this plan would modify or remove historic features of any of the buildings, structures, and sites, including those that are a part of designated cultural landscapes and historic districts. The buildings, structures, sites, landscapes, and districts that are listed in the National Register of Historic Places would continue to retain their eligibility for inclusion. As the actions of this plan will not cause any impacts on these historic buildings, structures, sites, landscapes, and districts, historic resources is dismissed from further analysis.

Archeological Resources

Archeological resources are the material evidence of human culture and activity in the past. They include artifacts, features, sites, and associated documentation. The Archaeological Resources Protection Act (ARPA) and its regulations say, "Archaeological resource means any material remains of human life or activities which are at least 100 years of age, and which are of archaeological interest." (Although 100 years is the ARPA definition, archeologists are interested in more recent history as well.)

At Rocky Mountain National Park, park staff know of more than 1,000 archeological sites. The known archeological resources include historic sites associated with homesteading, ranching, mining, and the park's own history. Still more sites are associated with people who were in the area now known as Rocky Mountain National Park before European occupation. Many of these sites have meaning and significance to Tribes today (see "Ethnographic Resources" below). Archeological resources are nonrenewable, meaning that one instance of vandalism can destroy the archeological record, and repeated visitation and soil compaction or erosion can uncover archeological features. National Park Service policies and federal law guides the management of archeological resources. Generally, protection and avoidance is the preferred treatment. Every year, archeologists identify new sites and isolated finds in the park.

Approximately 14% of Rocky Mountain National Park has been surveyed for archeological resources. This amounts to 37,025 acres out of the park's total 265,795 acreage. A majority of the surveys that have been conducted were completed by para-archeologists more than 20 years ago and are now considered inadequate. Many trail corridors and wilderness campsites have never been inventoried. The park has not pursued funding to complete additional surveys and does not have the capacity to complete surveys in house. If archeological resources were discovered as a result of visitor activities, access to the immediate vicinity of the discovery would be halted until the resources could be identified and documented and an appropriate mitigation strategy developed in consultation with the office of the Colorado State Historic Preservation Officer and associated Native Indian Tribes. In the unlikely event that human remains, funerary objects, sacred objects, or objects of cultural patrimony were discovered, provisions outlined in the Native American Graves Protection and Repatriation Act (25 USC 3001) of 1990 would be followed. Based on these best management practices and mitigation measures, the topic of archeological resources was not carried forward for further analysis.

Ethnographic Resources

Ethnographic resources are traditional park sites, structures, objects, landscapes, and natural resource features that have significance due to their importance to the present way of life of members of a sociocultural group associated with the park. The northern Rocky Mountains hold special sacred significance for several Native American Tribes. Ethnographic evidence supports historical activity in the park, and these Tribes' continued presence in their homelands and traditional places demonstrates ongoing contemporary use of the park.

Tribal consultation on the plan took place in May 2021 and November 2022. In addition, a virtual meeting with Tribal representatives interested in further discussion was held in January 2023. All Tribal consultation took place in accordance with section 106 of the National Historic Preservation Act under 36 CFR Part 800. Tribal members asked about access for traditional uses. Limitations to access described in the action alternatives would not be applicable to Tribes, and Tribes would maintain access for traditional uses. Tribal members also asked how the park will protect cultural sites from visitor impacts, and park staff continue to engage with Tribal partners on this question. Park staff have been working to improve relationships with Tribes. Efforts include sharing information so that the park and Tribes can work together to determine the significance of known cultural sites. The park has also partnered with Tribes on the information about ethnographic resources that is appropriate to share with the public. Because of these ongoing conversations and staff capacity limitations, cultural sites were not selected as an indicator for day use visitor access at this time. If a site is discovered or a known site is potentially affected by visitor use, park staff will continue to consult with Tribes about the appropriate

treatment and protection measure, including potential area closures, monitoring, or other actions.

Visitor information, orientation, and enforcement in the common to all alternatives section, chapter 2, helps protect ethnographic resources. Park staff implement area closures, as appropriate, to protect cultural sites and other sensitive resources. Across all action alternatives, reducing either the number of visitors or the concentration of visitors should help protect ethnographic sites in situ by retaining vegetation and soils and reducing visitor-created trails or trail widening. Because analyzing ethnographic resources cannot provide a meaningful difference between the action alternatives, ethnographic resources was dismissed from further analysis.

Wilderness Qualities: Untrammeled, Undeveloped, Other Features of Value

The defining qualities of wilderness from the Wilderness Act (section 2[c]) include:

(1) untrammeled, or “generally appears to have been affected primarily by the forces of nature”; (2) undeveloped, or “without permanent improvements or human habitation”; (3) natural, whereby the land is “protected and managed so as to preserve its natural condition”; (4) “outstanding opportunities for solitude or a primitive and unconfined type of recreation”; and (5) other features of value, including scientific, educational, scenic, or historical. Wilderness is managed according to these five different qualities of wilderness character. While two qualities (natural and outstanding opportunities for solitude or a primitive and unconfined type of recreation) are expected to be affected by alternatives in this plan, the remaining were dismissed from further analysis, as none of the proposed or analyzed actions would affect these qualities.

The untrammeled quality represents places where the earth and its community of life are untrammeled by peoples, and generally appear to be primarily affected by forces of nature. This definition refers to ecosystems that are unhindered and free from human control or manipulation, meaning that this wilderness quality can be degraded by human actions that control or manipulate components of processes of ecological systems in the wilderness area. Invasive exotic species management, restoration management, and fire management activities in designated Wilderness are some examples of park actions that continue to degrade the untrammeled quality. However, these actions provide benefits to other wilderness qualities, help preserve the fundamental resources and values of the park, and protect park resources for future generations. Among the alternatives in this plan, there are no actions that would intentionally manipulate the biophysical environment; therefore, this wilderness quality is dismissed from further analysis.

The undeveloped quality emphasizes the retainment of an area’s primeval character and influence, meaning a wilderness area should be preserved without permanent improvement or modern human occupation. Actions such as new trail development or building infrastructure in wilderness can degrade this quality. The alternatives in this plan do not propose any development in designated Wilderness; therefore, this wilderness quality is dismissed from further analysis.

Other features of value can include ecological, geological, or other features of scientific, educational, scenic, or historic value. There are no actions in the proposed alternatives that would impact other features of value qualities in Rocky Mountain National Park Wilderness. Therefore, other features of value quality is dismissed from further analysis.

Wildlife

According to NPS *Management Policies 2006*, the National Park Service strives to maintain all components and processes of naturally evolving park unit ecosystems, including the natural abundance, diversity, and ecological integrity of animals. Wildlife would be broadly affected by ongoing visitor use, park management, and proposed actions in this plan.

Under all plan alternatives, park managers would continue to implement existing practices for protection and management of sensitive wildlife species. The National Park Service currently addresses human-wildlife encounters and wildlife management through the use of area closures to protect sensitive resources, such as seasonal raptor closures at Lumpy Ridge, meadow closures during the elk rut, and other area closures to mitigate impacts on wildlife from visitor or vehicle interactions. Similarly, park staff would continue to post signs and use volunteer support to educate visitors about respectful behavior to minimize human-wildlife conflicts and decrease human-caused stress to wildlife.

Notably, sensitive wildlife includes raptors, bighorn sheep, and many migratory bird species. As noted in the wilderness natural quality impact topic analysis in this plan, sensitive wildlife species, particularly those that reside primarily deep within the park's wilderness, are vulnerable to visitation surges and human activities. While some wildlife is not as sensitive to human-caused noise and activities from visitors, frequent wildlife disturbance from visitors or vehicles may impede wildlife migration corridors and disrupt breeding habits.

Human-caused noise typically associated with larger groups can disrupt behaviors of sensitive wildlife, such as interfering with natural processes and limiting reproductive success in several migratory wildlife populations (Anderson et al. 2023; Richardson and Miller 1997). For example, bighorn sheep are vulnerable to human disturbances. Bighorn sheep lambing areas of the park are already closed due to sensitivity of this species. Studies show that crossing the roadways creates high levels of stress in the sheep, which can reduce their resistance to disease and thereby increase mortality (Keller and Bender 2006). In an attempt to protect the sheep, park staff created a "Bighorn Crossing Zone" in Horseshoe Park. In late spring and throughout the summer, rangers control traffic as sheep move to and from the meadow. Researchers believe this has increased the intake of important minerals by the sheep, thus improving the health of the bighorn herd.

Visitor-related impacts on wildlife would continue to occur under all alternatives, including the no-action alternative. Because this plan does not propose any actions that would result in adverse impacts on wildlife, impacts on wildlife were dismissed from further analysis.

APPENDIX G: PUBLIC INVOLVEMENT AND CONSULTATION

INTRODUCTION

The National Park Service (NPS) conducted two rounds of civic engagement and consultation during the pre-National Environmental Policy Act (NEPA) planning process to provide opportunities for the public, associated Tribal Nations, and stakeholders to learn about and contribute to the planning process throughout the project. The first period of civic engagement for a long-range day use visitor access management plan was during summer of 2021, with a second period occurring over the winter of 2022–2023. This appendix provides a summary of public involvement, Tribal consultation, agency consultation, and stakeholder outreach that occurred during planning.

PUBLIC INVOLVEMENT

Visitors to the park are welcome to submit visitor comments at any time. Prior to and throughout the planning process, park staff reviewed visitor comments, which provided insight on the conditions of visitor experiences, park resources and facilities, and safety concerns. Public involvement in the pre-NEPA civic engagement periods included 727 individual correspondences, more than 350 attendances at public meetings, and more than 900 views of virtual public meeting recordings. Notifications of public meetings and open comment periods were shared in news releases and on the park’s website, social media accounts, and on the NPS Planning, Environment and Public Comment (PEPC) website. Public input during civic engagement was used to identify potential management strategies and inform the range of alternatives carried forward for full analysis in this environmental assessment. Additional information about pre-NEPA civic engagement, including public outreach material, recordings of virtual public meetings, and public comment summary reports, can be found under the “Document List” at https://parkplanning.nps.gov/ROMO_DUVAS.

TRIBAL CONSULTATION

National Park Service staff consulted on the long-range planning efforts and met virtually with some Tribal representatives. Park staff contacted the following traditionally associated Tribal Nations and invited them to participate in the planning process:

- Assiniboine and Sioux Tribes
- Cheyenne and Arapaho Tribes
- Comanche Nation
- Northern Arapaho Tribe
- Northern Cheyenne Tribe
- Eastern Shoshone Tribe
- Southern Ute Indian Tribe

- Ute Indian Tribe of the Uintah and Ouray Reservation
- Ute Mountain Ute Tribe
- White Mesa Ute Board

The National Park Service initiated Tribal consultation on a long-range day use visitor access plan in May 2021. The park received the following questions/comments:

- How would long-term strategies impact Tribal members from accessing the park for ceremonial purposes?
- Has the park considered alternative public transportation? Transportation on a rotating schedule?
- Concern for an increase in human caused wildfires from illegal campfires.

The National Park Service continued consultation in November 2022. The letter invited Tribes to share their views about the long-range planning efforts and potential impacts on archeological sites, ethnographic resources, and cultural landscapes that may possess religious or cultural significance and to participate in the pre-NEPA planning process, which included two opportunities to participate in a virtual presentation and a question-and-answer session. The National Park Service held a virtual meeting on January 18, 2023. Three Tribes participated.

Tribal representatives expressed their concern about the lack of data that the park had about visitor impacts on cultural sites. This included the general concern about visitors encroaching on new areas if visitors could not get a permit for a certain area of the park. The Tribes requested more information on the park's plans for managing cultural resource impacts. Park staff and Tribes discussed ways to improve the sharing of information so that they can collaborate on understating significance of sites, developing thresholds and indicators for monitoring visitor impacts, and developing mitigation measures. A Tribal representative stated that "cultural sites should be treated as important, and they should be a major portion of the plan; need to be protected as equal as the visitors." Additionally, Tribal members told park staff that "What might be better for visitors is at the expense of cultural resources – threatens traditional resources/landscapes and sacredness" Tribal members also asked, "Which strategy is better for protecting cultural sites?"

SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT

During civic engagement, the public did not express concerns related to cultural resources. Park staff initiated consultation with Tribes as described above and has conducted informal conversations with the Colorado State Historic Preservation Office. Based on these efforts and conversations, NPS staff determined that none of the action alternatives have the potential to cause effects in accordance with section 106. To confirm this determination, consultation under section 106 of the National Historic Preservation Act is being conducted with the Tribes and the public concurrently during the NEPA planning process.

SECTION 7 OF THE ENDANGERED SPECIES ACT

Section 7 of the Endangered Species Act requires federal agencies to ensure that the actions they authorize, fund, or carry out do not jeopardize the continued existence of listed species or destroy or adversely modify critical habitat. None of the alternatives in this plan would modify critical habitat, and the alternatives would likely provide beneficial impacts on threatened and endangered species. Management and use restrictions may occur under all alternatives to protect threatened and endangered species, as well as to prevent rare species from becoming listed. Park staff provided informal briefings and updates to the US Fish and Wildlife Service during civic engagement, and the Service did not express concerns or raise issues. The park is expecting a determination that the plan may affect, but will not adversely affect, species listed or proposed for listing under the Endangered Species Act or designated critical habitat. Coordination and consultation with the US Fish and Wildlife Service for species listed under the Endangered Species Act is ongoing. Table G-1 lists the species that were analyzed.

Table G-1. List of Federally Threatened, Endangered, Proposed, and Candidate Species

Common Name	Scientific Name	Status
Canada Lynx	<i>Lynx canadensis</i>	Threatened
Gray Wolf	<i>Canis lupus</i>	Endangered
Wolverine	<i>Gulo Gulo</i>	Proposed Threatened
Mexican Spotted Owl	<i>Strix occidentalis lucida</i>	Threatened
Piping Plover	<i>Charadrius melodus</i>	Threatened
Whooping Crane	<i>Grus americana</i>	Endangered
Bonytail	<i>Gila elegans</i>	Endangered
Colorado Pikeminnow	<i>Ptychocheilus lucius</i>	Endangered
Greenback Cutthroat Trout	<i>Oncorhynchus clarkii stomias</i>	Threatened
Humpback Chub	<i>Gila cypha</i>	Threatened
Pallid Sturgeon	<i>Scaphirhynchus albus</i>	Endangered
Razorback Sucker	<i>Xyrauchen texanus</i>	Endangered
Monarch Butterfly	<i>Danaus plexippus</i>	Candidate

CLEAN WATER ACT

The Clean Water Act of 1972 was established to regulate discharges of pollutants into waters of the United States and regulate quality standards for surface waters. National Park Service *Management Policies 2006* requires the protection of surface waters and water quality consistent with the Clean Water Act. The proposed actions in this plan would not compete with or dominate hydrologic activity or discharge regulated pollutants into waters of the United States or other surface waters, and there are no ground-disturbing activities. Therefore, consultation with the US Army Corps of Engineers is not required for the proposed actions in this plan.

STAKEHOLDER OUTREACH

Park staff met with key stakeholders early in the planning process to discuss impacts and concerns of increasingly high levels of visitation. In addition to these informal conversations, park staff held virtual stakeholder meetings on May 20, 2021, and on December 14, 2022, as part of the pre-NEPA civic engagement process. For each pre-NEPA engagement period, a news release was distributed to various stakeholders, government agencies, and media groups. The National Park Service coordinated and consulted with the following stakeholders during the planning process:

Government Agencies and Representatives

- Town of Estes Park
- Town of Grand
- Boulder County
- Grand County
- Larimer County
- Colorado Tourism Office, State of Colorado
- Office of US Senator for Colorado Michael Bennet
- Office of US Senator for Colorado John Hickenlooper
- Office of US Representative Joe Neguse (2nd Congressional District of Colorado)
- Office for Governor of Colorado Jared Polis
- NOCO 2050 Partners (collaborative group of representatives from eight public land management agencies, in the Northern Colorado Front Range mountains, including the National Park Service):
 - Boulder County
 - Clear Creek County
 - Gilpin County
 - Jefferson County
 - Larimer County
 - Arapaho and Roosevelt National Forests and Pawnee National Grassland
 - Colorado Parks and Wildlife

Other Stakeholders

- Concessionaires and commercial use authorized permit holders at Rocky Mountain National Park (the National Park Service provided information during civic engagement)
- Estes Park Chamber of Commerce
- Estes Park Economic Development Corporation
- Estes Park League of Women Voters
- Grand Lake Chamber of Commerce
- National Parks Conservation Association
- Rocky Mountain Conservancy
- Rocky Mountain Transit staff
- Town of Lyons tourism planning workgroup, including employees and business owners
- Visit Estes Park Board of Directors and staff

This page intentionally blank.

APPENDIX H: REFERENCES

Akyildiz, Alyse, Bing Pan, Xu Guanhao, Vikash Gayah, Scott M. Esser, John Hannon, Derrick Taff, and Peter Newman

2023 “Microsimulations of Emergency Evacuation in Rocky Mountain National Park.” *Journal of Environmental Management*, manuscript submitted.

Alexander, Ruth M.

2010 “People and Nature on the Mountaintop: A Resource and Impact Study of Longs Peak in Rocky Mountain National Park.” Report for Rocky Mountain National Park. Colorado State University, Fort Collins, CO.

Baron, Jill S., Tim Weinmann, Varun Kirk Acharya, Caitlin Charlton, Koren R. Nydick, and Scott Esser

2023 “Marmots do not drink coffee: Human urine contributions to the nitrogen budget of a popular national park destination.” *Ecosphere* 14 (4): e4504.

Bates, Matthew, George Wallace, and Jerry Vaske

2006 “Visitor Use in Wilderness Phase II: Estimating Visitor Use in Rocky Mountain National Park.” Report for the National Park Service. Colorado State University, Fort Collins, CO.

Battaglin, William A., Paul M. Bradley, Luke Iwanowicz, Celeste A. Journey, Heather L. Walsh, and Vicki S. Blazer

2018 “Pharmaceuticals, hormones, pesticides, and other bioactive contaminants in water, sediment, and tissue from Rocky Mountain National Park, 2012–2013.” *Science of the Total Environment*, Vol. 643:651–673.

Biedleman, Carol Aileen

1988 “Visitor Attitudes and Perceptions of Use Management in Rocky Mountain National Park.” University of Arizona: Tucson, AZ.

Bioeconomics and RRC Associates

2023 “NPS Report: Rocky Mountain NP Economic Regional Data and Analysis.” Prepared for the National Park Service. August 25, 2023.

Braun, C. E., D. R. Stevens, K. M. Giesen, and C. P. Melcher

1991 “Elk, white-tailed ptarmigan and willow relationships: a management dilemma in Rocky mountain National Park.” *Transactions of the North American Wildlife Conference* 56:74–85.

Brickler, Stanley Keith

1969 “Park Visitor Classification Matrix.” Colorado State University, Fort Collins, CO.

Bzdek, M., and J. Ore

2010 The Mission 66 Program at Rocky Mountain National Park. Accessed September 18, 2023. <http://npshistory.com/publications/romo/mission-66-pgm.pdf>.

Cole, David N.

- 2019 “The Relationship between Amount of Visitor Use and Environmental Impacts.” Contributing paper prepared for the Interagency Visitor Use Management Council. March 2019, Edition One.
- 2021 “Reflections on the early history of recreation ecology.” *Parks Stewardship Forum* 37(2):379–400.

Cook, Philip S.

- 2012 “Impacts of Visitor Spending on the Local Economy: Rocky Mountain National Park, 2010.” University of Idaho: Mosco, ID and Natural Resource Stewardship and Science, National Park Service, US Department of the Interior.

Creany, Noah, and Christopher A. Monz

- 2023 “Understanding Visitor Attitudes Towards the Timed Entry Reservation System in Rocky Mountain National Park: Contemporary Managed Access as a Social-Ecological System.” Manuscript submitted. Utah State University, Logan, UT.

Cullinane, Thomas, C., M. Flyr, and L. Koontz

- 2022 *2021 National park visitor spending effects: Economic contributions to local communities, states, and the nation.* Natural Resource Report NPS/NRSS/EQD/NRR—2022/2395. National Park Service, Fort Collins, Colorado. <https://doi.org/10.36967/nrr-2293346>.

D’Antonio, Ashley, Christopher Monz, Peter Newman, Steve Lawson, and Derrick Taff

- 2013 “Enhancing the utility of visitor impact assessment in parks and protected areas: A combined social-ecological approach.” *Journal of Environmental Management* 124:72–81.

Dean Runyan Associates

- 2022 “The Economics Impact of Travel in the Estes Park Local Marketing District.” Prepared for Visit Estes Park. September 6, 2022.

Dietze, Alison, Bridger Tomlin, Kirsta Tortorice, and Stephanie Reifenberg

- 2019 “Visitor Use Management Strategies in the Bear Lake Road Corridor.” University of Colorado, Boulder, CO, and National Park Service, US Department of the Interior.

Esser, Scott, and Paige Lambert

- 2021 Visitor Use Patterns and Trends – TEPS 2.0. Continental Divide Research Learning Center.

Estes Park Economic Development Corporation (EDC)

- 2023 Estes Park Economic Development Corporation. Accessed July 2023. <https://www.estesparkedc.com/>.

Fazio, James R.

- 1974 “A Mandatory Permit System and Interpretation for Backcountry User Control in RMNP: An Evaluation Study.” Colorado State University, Fort Collins, CO.

Fehr & Peers

- 2020 “Regional Transportation System Usage Analysis for National Parks in Colorado.” Final Plan, September 2020. Regional Office serving Interior Regions 6, 7, & 8. National Park Service, US Department of the Interior.

Fisher, David M., Spencer A. Wood, Eric M. White, Dale J. Blahna, Sarah Lange, Alex Weinberg, Michael Tomco, and Emilia Lia

- 2018 Recreational use in dispersed public lands measured using social media data and on-site counts. *Journal of Environmental Management* Vol. 222.
<https://doi.org/10.1016/j.jenvman.2018.05.045>.

Fisichelli, N. A., G. W. Schuurman, W. B. Monahan, and P. S. Ziesler

- 2015 “Protected area tourism in a changing climate: will visitation at US national parks warm up or overheat?” *PLoS ONE* 10 (6):e0128226.
<https://doi.org/10.1371/journal.pone.0128226>.

Flick, Sarah, and Jonathan Taylor

- 1998 “Attitudes of Backpackers and Casual Day Visitors in Rocky Mountain National Park.” *Park Science*, 18:18–20.

Graham, Robin, and Christopher Monz

- 2019 “An Assessment of Informal Trails and Sites in Riparian Areas in Rocky Mountain National Park, CO.” Unpublished. Utah State University, Logan, UT.

HDR, Inc.

- 2015 “Develop Solutions to Reduce Crowding and Resource Impacts in the Bear Lake Road Corridor: Rocky Mountain National Park,” Draft report. June. National Park Service, Rocky Mountain National Park.

Headwaters Economics

- 2023 A Demographic Profile: Estes Park, CO and Grand Lake, CO. Produced by Headwaters Economics’ Economic Profile System. Last accessed October 2023.
<https://headwaterseconomics.org/tools/economic-profile-system/about-eps/>.

Henderson, Susan

- 1983 “Decision Making Information for a Carrying Capacity Based Management System: A Case Study of Day-Users on Longs Peak, Rocky Mountain National Park.” Colorado State University, Fort Collins, CO.

Interagency Visitor Use Management Council (IVUMC)

- 2016 “Visitor Use Management Framework: A Guide to Providing Sustainable Outdoor Recreation.”
- 2019 “Visitor Capacity Guidebook Managing the Amounts and Types of Visitor Use to Achieve Desired Conditions.”

International Institute of Tourism Studies and Confluence Sustainability

- 2022 Situation Analysis Report: Sustainable Destination Management Plan Development. Prepared for Jackson Hole Travel and Tourism Board.
<https://industry.visitjacksonhole.com/sdmp>.

The Institute for Tourism and Recreation Research, RRC Associates, and Otak, Inc.

- 2022 “Comprehensive Survey of the American Public 3rd Iteration – Secondary Analysis.”

Jackson, Dan

- 2021 Rocky Mountain National Park. October 21–24, 2020, East Troublesome Fire Event: Impacted Buildings Inventory. On file at SWCA Environmental Consultants, Salt Lake City, UT.

Keller Barbara J., and Louis C. Bender

- 2010 “Bighorn Sheep Response to Road-Related Disturbances in Rocky Mountain National Park, Colorado.” *The Journal of Wildlife Management* 71(7):2329–2337.

Kidd, A., Robin Graham, and Christopher Monz

- 2016 “Visitor Use on Longs Peak: A Preliminary Assessment in Rocky Mountain National Park, Colorado. Report of Findings.” Department of Environment and Society, Utah State University, Logan, UT. <http://npshistory.com/publications/romo/longs-peak-vis-use.pdf>.

Landres, Peter, Chris Barns, Steve Butcher, Tim Devine, Peter Dratch, Adrienne Lindholm, Linda Merigliano, Nancy Roeper, Emily Simpson

- 2015 “Keeping it Wild 2: an updated interagency strategy to monitor trends in wilderness character across the National Wilderness Preservation System.” Gen. Tech. Rep. RMRS-GTR-340. Fort Collins, CO: US Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Lawhon, Lydia

- 2022 “Parking Lot Turnover in Rocky Mountain National Park.” Draft. University of Colorado: Boulder, CO, and the National Park Service, US Department of the Interior.

Lawson, Steve, Peter Newman, and Chris Monz

- 2016 “A systems-based approach to address unintended consequences of demand-driven transportation planning in national parks and public lands.” *International Journal of Sustainable Transportation*.

Lawson, Steve, Robert Chamberlin, Janet Choi, Ben Swanson, Brett Kiser, Peter Newman, Chris Monz, David Pettebone, and Larry Gamble

- 2011 “Modeling the Effects of Shuttle Service on Transportation System Performance and Quality of Visitor Experience in Rocky Mountain National Park.” *Transportation Research Record: Journal of the Transportation Research Board*, No. 2244, Transportation Research Board of the National Academies, Washington, DC.

- Llanos-Paez, O, and V. Acuña
 2022 Analysis of the socio-ecological drivers of the recreational use of temporary streams and rivers. *Science of The Total Environment* 807(1).
<https://doi.org/10.1016/j.scitotenv.2021.150805>.
- Malcolm, C. J. and H. Heinrich
 2017 “Preventive success! Grand Canyon’s response to search-and-rescue overload.” *Park Science* 33(1):99–107. Accessed July 2023.
https://www.nps.gov/articles/parkscience33-1_99-107_malcolm_heinrich_3864.htm.
- Marion, J. L., J. Wimpey, and C. Carr
 2013 “Long-term Monitoring Methods for Assessing Visitor Impacts to Mountain Summits.” Final Research Report. US Geological Survey, Distributed by the Virginia Tech College of Natural Resources, Blacksburg, VA.
- Manning, R., W. Valliere, L. Anderson, R. McCown, P. Pettengill, S. Lawson, P. Newman, M. Budruk, D. Laven, J. Hallo, L. Park, J. Bacon, D. Abbe, C. van Riper, and K. Goonan
 2011 “Defining, Measuring, Monitoring, and Managing the Sustainability of Parks for Outdoor Recreation.” *Journal of Park and Recreation Administration* 29(3):24–37.
- Matthews, S., P. Gandhi, S. Lee, and P. Wilcox
 2023 “2022 Community Assessment on the Impacts of Increased Tourism in Sitka.” Pardee RAND Graduate School.
- Morris, K., A. Mast, G. Wetherbee, J. Baron, C. Taipale, T. Blett, D. Gay, and J. Heath
 2014 “2012 monitoring and tracking wet nitrogen deposition at Rocky Mountain National Park: January 2014.” Natural Resource Report. NPS/NRSS/ARD/NRR—2014/757. Fort Collins, Colorado.
- National Park Service (NPS)
 1975 “Backcountry Management Plan.” February. Rocky Mountain National Park.
 1976 “Final Master Plan.” January. Denver Service Center, National Park Service, US Department of Interior. Rocky Mountain National Park.
 1982 “Development Concept Plan – Bear Lake.” January. Rocky Mountain National Park.
 1992 “Visitor Use Survey.” December. Rocky Mountain Regional Office and Denver Service Center, National Park Service, US Department of the Interior.
 1996 “Management and Development Concept Plan: Longs Peak/Wild Basin/Lily Lake.” January. Rocky Mountain National Park.
 2001 “Backcountry/Wilderness Management Plan.” July. Rocky Mountain National Park.
 2002 “Finding of No Significant Impact: Bear Lake Road Improvement Project.” May. Rocky Mountain National Park.
 2003 “Finding of No Significant Impact: Moraine Route Shuttle Bus Stops and Sprague Lake Road Improvements for Rocky Mountain National Park.” Rocky Mountain National Park.

- 2005 “The Skyline of the World: The Design of Trail Ridge Road.” Rocky Mountain National Park: Continental Divide Research Learning Center.
- 2009 “Finding of No Significant Impact: Bear Lake Road, Phase 2 Improvement Project.” Rocky Mountain National Park.
- 2012 Elk and Vegetation Management Plan. Rocky Mountain National Park.
- 2013 “Foundation Document.” Rocky Mountain National Park.
- 2020a “Alpine Tundra Ecosystem.” Website.
https://www.nps.gov/romo/learn/nature/alpine_tundra_ecosystem.htm.
- 2020b “Categorical Exclusion: Public Use Limitation: Maintenance of Public Health and Safety.” July. Rocky Mountain National Park.
- 2020c “Year of the Tundra.” Continental Divide Research Learning Center, Rocky Mountain National Park. Accessed September 12, 2023. On file at park.
- 2021a “Visitor Spending Effects – Economic Contributions of National Park Visitor Spending.” <https://www.nps.gov/subjects/socialscience/vse.htm>.
- 2021b Rocky Mountain National Park Day Use Visitor Access Strategy (Pre-NEPA) Public Comment Summary Report. Rocky Mountain National Park. August 2021.
- 2023a IRMA Portal (Integrated Resource Management Applications). Accessed in 2023.
<https://irma.nps.gov>.
- 2023b Rocky Mountain National Park Day Use Visitor Access Plan. Public Comment Summary Report. Rocky Mountain National Park. August 2023.
- 2023c Personal communication (pers. comm.) from Scott Esser, ecologist, to Kelly Horvath, NPS visitor use management specialist, regarding visitation data at key destinations throughout Rocky Mountain National Park.
- 2023d Reference Manual 41 – Wilderness.
<https://www.nps.gov/subjects/wilderness/rm41.htm>.

Newman, Peter, Steve Lawson, and Chris Monz

- 2010 “Integrated Approach to Transportation and Visitor Use Management at Rocky Mountain National Park.” Colorado State University, Resource Systems Group, and Utah State University. Submitted to National Park Service, US Department of the Interior.

Otak, Inc.

- 2023 *2022 Socioeconomic research of Rocky Mountain National Park: Report on 2022 data collection.* Natural Resource Report NPS/ROMO/NRR—2023/2545. National Park Service, Fort Collins, Colorado.

Parsons Brinckerhoff Quade & Douglas, Inc. (Parsons et al.)

- 2000 “Rocky Mountain National Park Transportation Study: Summary Report.” August. National Park Service, US Department of the Interior.

- Pettebone, David, Ashley D'Antonio, Abigail M. Sisneros-Kidd, and Christopher Monz
 2019 "Modeling Visitor Use on High Elevation Mountain Trails: An Example from Longs Peak in Rocky Mountain National Park, USA." *Journal of Mountain Science* 16(12):2882–93. <https://doi.org/10.1007/s11629-019-5663-9>.
- Pettebone, David, Peter Newman, and David Theobald
 2006 "Quantifying Recreation Impacts Along the Glacier Gorge Trail." Final project report for the National Park Service. Colorado State University, Fort Collins, CO.
- Pettengill, Peter, Robert Manning, Laura Anderson, William Valliere, and Nathan Reigner
 2012 "Measuring and Managing the Quality of Transportation at Acadia National Park." *Journal of Park and Recreation Administration* 30:68–84.
- Richardson, R., and J. Loomis
 2004 "Adaptive recreation planning and climate change: A contingent visitation approach." *Ecological Economics* 50:83–99.
- RSG
 2017 "Needs Assessment to Support Day Use Plan for Rocky Mountain National Park." January. Prepared for Rocky Mountain National Park, White River Junction, VT.
- Sarmento, Wesley, and Joel Berger
 2017 "Human visitation limits the utility of protected areas as ecological baselines." *Biological Conservation* 212:316–326.
- Schultz, Jeremy, and Juraj Svajda
 2016 "Examining crowding among winter recreationists in Rocky Mountain National Park." *Tourism Recreation Research*.
- Schuster, Elke, S. Shea Johnson, and Jonathan G. Taylor
 2004 "Wilderness Experience in Rocky Mountain National Park: 2002. Fort Collins Science Center, Policy Analysis & Science Assistance Program, Fort Collins, CO.
- Scott, Laura C., Alexandra Aubee, Mark J. Wilson, Scott Esser, Denisse Descamps, Nicholas Lee, Emiko Distler, and Tiong Gim Aw
 2023 "Leave No Trace? Ecological and anthropogenic determinants of antibiotic resistant bacteria in a recreational alpine environment." *Environmental Research*: 216.
- Scott, Laura C., Mark J. Wilson, Scott Esser, Nicholas Lee, Michael E. Wheeler, Alexandra Aubee, Emiko Distler, and Tiong Gim Aw
 2021 "Assessing visitor use impact on antibiotic resistant bacteria and antibiotic resistance genes in soil and water environments of Rocky Mountain National Park." *Science of the Total Environment*: 785.
- Scott, Laura C., Scott Esser, Alexandra Aubree, Nicholas Lee, Matthew Flood, Tiong Gim Aw
 2022 "Use of microbial fecal indicator monitoring and fecal source tracking as a park management tool in Rocky Mountain National Park." *Environmental Challenges* Volume 8.

- Svadja, J., S. Korony, I. Brighton, S. Esser, and S. Ciapala
2016 “Trail impact monitoring in Rocky Mountain National Park, USA.” *Solid Earth*: 7:115–128.
- Taylor, Patricia A., and Burke D. Grandjean
2009 “Visitor Satisfaction Along the Highway 7 Corridor to Rocky Mountain National Park.” Wyoming Survey & Analysis Center, University of Wyoming, Laramie, WY.
- Town of Estes Park, Colorado
2023a “Community Survey.” Accessed June 2023.
<https://estespark.colorado.gov/communitysurvey>.
2023b “Town of Estes Park: Sales Tax.” Accessed June 2023.
<https://estespark.colorado.gov/salestax>.
- Town of Grand Lake, Colorado
2023 Town of Grand Lake: Finance. Accessed July 2023.
<https://www.townofgrandlake.com/finance>.
- Trahan, Richard G.
1978 “Social Science Research, Rocky Mountain National Park, Summer 1978.” Prepared for the US Department of the Interior, National Park Service. University of Northern Colorado, Greeley, CO.
- US Census Bureau
2023 Accessed February 2023. <https://data.census.gov/>.
- Uysal, Muzaffer, M. J. Sirgy, E. Woo, and H. Kim
2016 “Quality of life (QOL) and well-being research in tourism.” *Tourism Management* 53:244–261. <https://doi.org/10.1016/j.tourman.2015.07.013>.
- Valdez, Sandy D.
1996 “Rocky Mountain National Park Visitor Use Study: 1994-1995.” National Park Service, Rocky Mountain National Park.
- Vaske, Jerry, M. Donnelly, and X. Lehto
2002 “Visitor Crowding and Normative Tolerances at Congested Areas of Rocky Mountain National Park.” Colorado State University, Fort Collins, CO.
- Vermeer, Danielle
2021 “Creating Welcoming Spaces at National Parks for All Visitors.” University of Michigan School for Environment and Sustainability, Ann Arbor MI. Accessed July 2023. <https://seas.umich.edu/news/creating-welcoming-spaces-national-parks-all-visitors>.
- Visit Estes Park
2023 Accessed April 2023. <https://www.estesparkedc.com/>.

- Wallace, George, Jeffrey J. Brooks, and Matthew Bates
 2004 “Visitor Use in Wilderness Study Phase II: A Survey of Day and Overnight Backcountry/Wilderness Visitors in Rocky Mountain National Park.” Colorado State University, Fort Collins, CO.
- 2006 Visitor Use in Wilderness Study Phase II: A Survey of Day and Overnight Backcountry/Wilderness Visitors in Rocky Mountain National Park. Colorado State University: Fort Collins, CO.
- Wartmann, F. M. , M. F. Baer, K. T. Hegetschweiler, C. Fischer, M. Hunziker, and R. S. Purves
 2021 Assessing the potential of social media for estimating recreational use of urban and peri-urban forests. *Urban Forestry & Urban Greening* Volume 64.
<https://doi.org/10.1016/j.ufug.2021.127261>.
- Wetherbee, Gregory
 2016 “Evaluation of National Atmospheric Deposition Program Measurements for Colocated Sites CO89 and CO98 at Rocky Mountain National Park, Water Years 2010–14.” US Geological Survey.
- Wesstrom, Shannon T., Noah Creany, Christopher Monz, Anna B. Miller, and Ashley D’Antonio
 2021 “The Effect of Vehicle Diversion Traffic Management Strategy on Spatio-Temporal Park Use: A Study in Rocky Mountain National Park, Colorado, USA.” *Journal of Park and Recreation Administration*.
- Whittaker, D. B., R. Shelby, D. Cole, and G. Haas
 2011 “Capacity Reconsidered Finding Consensus and Clarifying Differences.” National Association of Recreation Resource Planners, Marienville, PA. <http://www.narrp.org>.
- Wilderness Connect
 2023 Rocky Mountain National Park Wilderness. Accessed 2023.
<https://wilderness.net/visit-wilderness/?ID=745>.
- Willard, Beatrice E., and John W. Marr
 1963 “Effects of Visitors on National Ecosystems in Rocky Mountain National Park.” Institute of Arctic and Alpine Research, University of Colorado, Boulder, CO.
- 1970 “Effects of Human Trampling on Alpine Tundra Ecosystems in RMNP, Colorado.” *Biological Conservation* 2:257–265.
- 1971 “Recovery of Alpine Tundra Under Protection After Damage by Human Activities in Rocky Mountains of Colorado.” *Biological Conservation* 3:181–190.
- Willard, BE, Cooper DJ, Forbes BC
 2007 “Natural Regeneration of Alpine Tundra Vegetation after Human Trampling: a 42-year Data Set from Rocky Mountain National Park, Colorado, U.S.A.” *Arctic, Antarctic, and Alpine Research* 39(1):177–183.

World Population Review

2023 “Grand Lake, Colorado Population 2023.” Accessed July 2023.

<https://worldpopulationreview.com/us-cities/grand-lake-co-population>.



As the nation’s principal conservation agency, the Department of the Interior has 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 national 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.

ROMO 121/190350
October 2023



**Rocky Mountain National Park | Colorado
Day Use Visitor Access Plan and Environmental Assessment | October 2023**