



Pictured Rocks National Lakeshore Munising Falls to Spray Falls Visitor Use Management Plan Environmental Assessment

Munising, Michigan
November 2019



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ACRONYMS AND ABBREVIATIONS

CFR	Code of Federal Regulations
CUA	commercial use authorization
EA	environmental assessment
ft ²	square foot/feet
FONSI	finding of no significant impact
GMP	general management plan
IPAC	Information for Planning and Consultation
IVUMC	Interagency Visitor Use Management Council
Lakeshore	Pictured Rocks National Lakeshore
LF	linear foot/feet
NEPA	National Environmental Policy Act
NPS	National Park Service
USC	United States Code
USCG	US Coast Guard
USFWS	US Fish and Wildlife Service
VUM	Visitor Use Management

Chapter 1

Purpose and Need



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CHAPTER 1: PURPOSE AND NEED

INTRODUCTION

Lake Superior is the deepest, coldest, and most pristine of all the Great Lakes and the largest body of fresh water in North America. Pictured Rocks National Lakeshore (the Lakeshore), authorized by Congress as America's first national lakeshore in 1966, hugs the Lake Superior shoreline for more than 40 miles. Bordered on the west and east by the Michigan towns of Munising and Grand Marais, respectively, the park is renowned for its spectacular scenery, beaches, forests, dunes, abundant wildlife, and more than 100 miles of trails. The study area, which comprises approximately 17,939 acres of the Lakeshore's 73,623 total acres, provides visitors the ability to enjoy a breadth of summertime outdoor recreational activities, including day hiking, backpacking, camping, beachcombing, swimming, boating on Lake Superior, fishing, and scenic driving.

Visitation has significantly increased in recent years, up from 500,000 annual visitors in 2010 to more than 781,000 annual visitors in 2018. Key visitor attractions include the scenery (sandstone cliffs and Lake Superior), white sand beaches, waterfalls and inland lakes, boreal and eastern hardwood forests, abundant wildlife, and diverse outdoor recreation opportunities. More than 60% of visits occur during the summer months in the westernmost portion of the Lakeshore that extends from the Munising Falls Interpretive Center to Spray Falls (figure 1). Conditions in this area of the park continue to change with the added visitation and heightened interest in commercial use, including an increased amount of seasonal congestion and user conflict resulting in a perceived decline in the quality of visitor experience.

Pictured Rocks National Lakeshore's existing general management planning documents continue to provide relevant guidance, which may be supplemented through development of additional planning documents, such as this one. The Munising Falls to Spray Falls Visitor Use Management (VUM) Plan is a component of the park's planning portfolio and fulfills park planning for visitor use management between Sand Point and Chapel Beach. This plan is consistent with the general guidance of the 2004 general management plan (GMP) and helps the park to better meet the statutory requirements of 54 United States Code (USC) 100502, specifically the requirement to address measures for preservation of resources, indications of types and general intensities of development, and the identification of visitor carrying capacities.

PURPOSE AND NEED FOR THE PLAN

Purpose of the Plan

The purpose of the Munising Falls to Spray Falls VUM Plan is to identify strategies to help address increasing land-based visitation during the summer, changing visitation patterns, and heightened public and commercial use in the westernmost portion of the park located between Munising Falls and Spray Falls, while also ensuring protection of park natural and cultural resources, visitor safety, high-quality visitor experiences, and access to appropriate recreational opportunities.

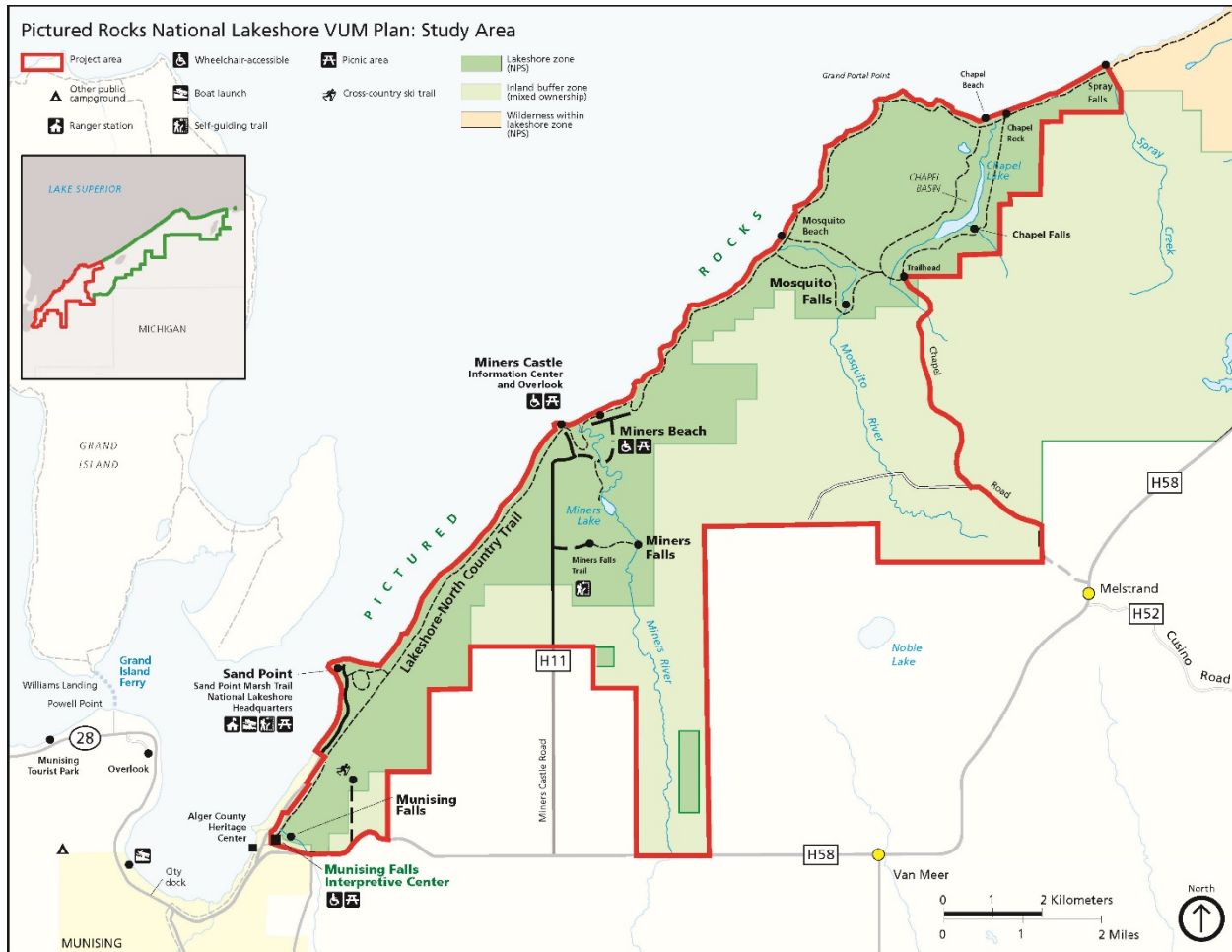


FIGURE 1. STUDY AREA

Need for Action

The Lakeshore has experienced a dramatic increase in visitation in recent years, particularly during the summer season, in the westernmost areas of the park that are more easily accessible (e.g., Sand Point, Miners Beach), and in more centrally located areas of the park (e.g., Mosquito and Chapel Beaches). Higher concentrations of visitors, changes in the types of use, heightened commercial kayak use, and changes in visitor use patterns have contributed to a wide range of issues, particularly during peak visitation periods. Visitor congestion has led to visitor conflicts; degraded visitor experience; safety concerns; resource damage along the shoreline, trails, and road sides; and inadequate facilities and infrastructure to accommodate visitor needs.

This growth in summer visitation in the study area requires new and creative strategies to more effectively connect visitors to the Lakeshore, continue to provide high-quality visitor services, help alleviate congestion associated with heightened summer use, and reduce associated visitor use impacts to natural and cultural resources. A long-term approach for managing commercial and visitor use is also needed to balance opportunities for commercial and private access to popular destinations. Finally, management actions for specific sites need to be developed and

incorporated into comprehensive actions that will enable the National Park Service to better connect with the next generation of Lakeshore visitors¹.

Additional Planning Objectives

In addition to outlining the purpose and need for the VUM plan, the National Park Service identified a number of objectives to help guide the planning process and provide a decision-making framework for management strategies carried forth in the VUM plan. Specific planning objectives included the following:

1. Build on prior planning and guidance to inform relevant elements of the plan.
2. Identify management strategies and appropriate use levels that promote the long-term stewardship of park resources and high-quality visitor experiences.
3. Provide an appropriate range of park facilities and infrastructure that are commensurate with appropriately defined use levels, reduce crowding, minimize adverse effects to park resources, and maximize park operational efficiency.
4. Provide visitors with the information necessary to help guide decisions regarding appropriate opportunities for shoreline access and responsible use, and also contribute to the Lakeshore's efforts to provide for a range of high-quality visitor opportunities and experiences.
5. Provide opportunities for visitors to learn about and understand key park resources as well as educational messages aimed at reducing visitor conflicts and resource impacts at beaches.
6. Engage local communities and key park stakeholders in the strategies to manage visitor use.

VISITOR USE MANAGEMENT

Visitor use management involves the proactive and adaptive process of planning for and managing characteristics of visitor use and its physical and social setting (using a variety of strategies and tools) to sustain desired resource conditions and visitor experiences. Proactively planning for visitor use maximizes the ability of the National Park Service to encourage access, improve experiences, and protect resources and values. Managing visitor use for visitor enjoyment and resource protection is inherently complex. It requires that officials analyze not only the number of visitors but also where they go, what they do, their impacts on resources and visitor experiences, and the underlying causes of those impacts. Lakeshore officials acknowledge the dynamic nature of visitor use, the vulnerabilities of natural and cultural resources, and the need to be responsive to changing conditions.

For the Lakeshore VUM planning effort, visitor use refers to human presence in an area for recreational purposes, including education, interpretation, inspiration, and physical and mental health. Visitor use goes beyond the types of activities that people engage in at parks. Visitor use also includes the amount, timing, and distribution of visitor activities and behaviors. The

1. Visitors are defined as the general public as well as specific user groups (commercial, special park use permittees, etc.).

Lakeshore planning process also integrates the VUM framework that has been previously established by the Interagency Visitor Use Management Council (IVUMC 2016). This VUM framework guides national park units and other federally protected areas to help develop long-term strategies for managing visitor use and fulfills the legal requirement to identify visitor capacity as specified in the National Parks and Recreation Act of 1978². Please visit <http://visitorusemanagement.nps.gov/> for a full description of the Interagency Visitor Use Management Council and framework guidance.

Desired Conditions

Desired conditions are defined as statements of aspiration that describe resource conditions, visitor experiences and opportunities, and facilities and services that an agency strives to achieve and maintain in a particular area. They help park managers answer the question “what are we trying to achieve?” Desired conditions tie back to the Lakeshore’s fundamental resources and values; the visitor experience opportunities associated with them; and the types and levels of management, development, and access that would be appropriate in a particular location. The goals and desired conditions for this plan were based on guidance from previous planning efforts at the Lakeshore and other established National Park Service (NPS) policy and guidance including, but not limited to, the GMP, and long range interpretive plan, and foundation document (NPS 2004, 2010, 2016). That previous planning and guidance identified three distinct management zones designated within the study area: casual recreation, primitive, and orientation/historic zones (figure 2). The desired conditions for these zones are provided below and articulate the kinds of experiences and opportunities that should be provided for, as well as some of the types of facilities. Additionally, within the study area there are lands that lie within the developed and mixed use zones. Management prescriptions within the developed zone focus primarily on administrative or private residential use and are outside the scope of this plan. Vehicle access to key sites within the study area via Miners Castle Road and Chapel Road also extend through portions of the mixed use zone, however, no new activities or management actions are proposed within this zone (other than continuing to work with partners and neighbors to maintain non-NPS roads).

2. The 1978 National Parks and Recreation Act requires units of the national park system to complete general management plans that include identification of and implementation commitments to visitor carrying capacities for all areas of the system unit (54 USC 100502). Under the planning framework currently adopted by the agency, if visitor capacity has not previously been addressed in a general management plan, it should be addressed during subsequent implementation plans that have a specific focus on visitor use (IVUMC 2016).

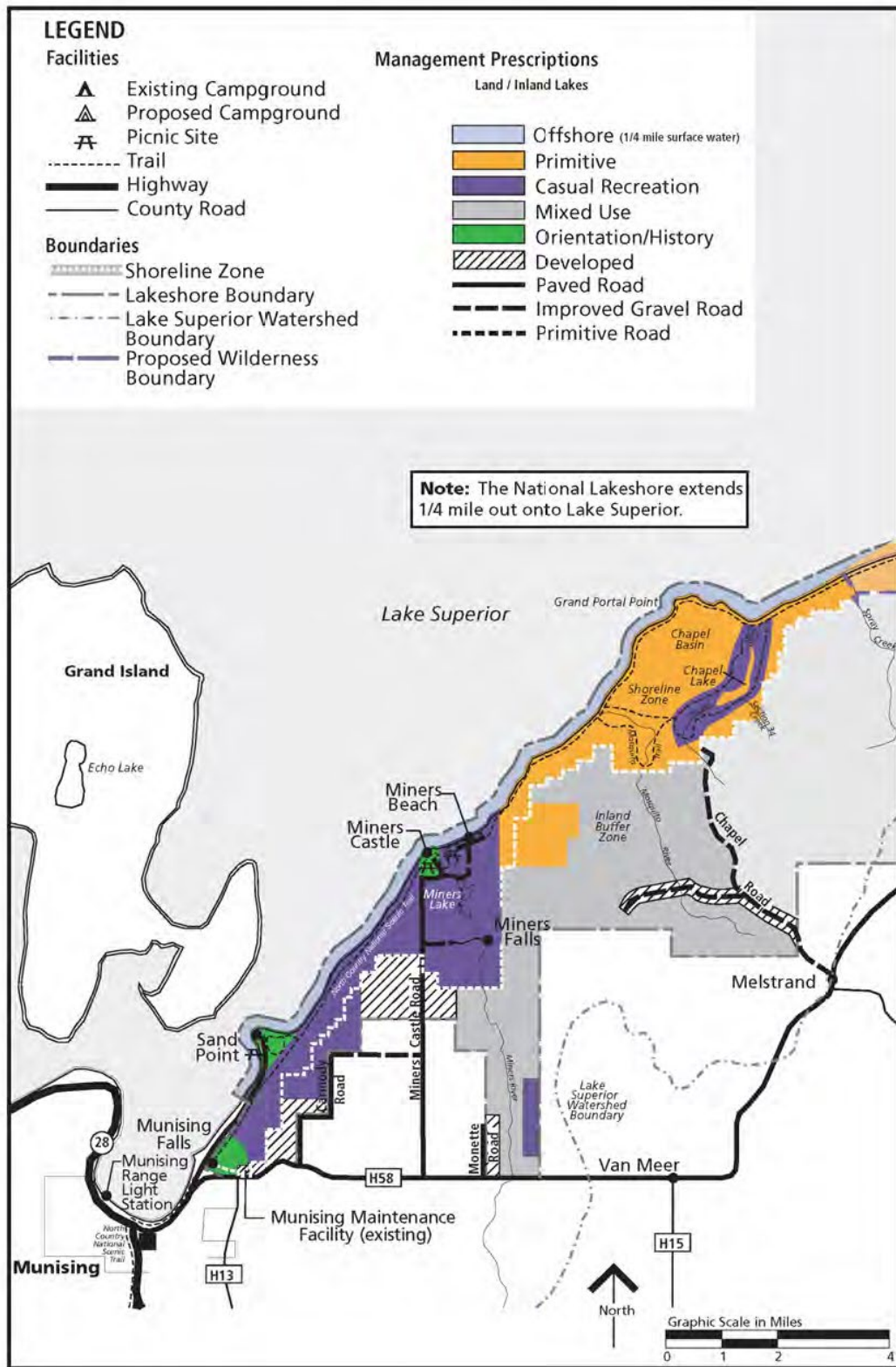


FIGURE 2. MANAGEMENT ZONES OCCURRING IN STUDY AREA

Casual Recreation Zone.

(Munising Falls to Miners Beach - east end of Miners Beach to the back end of the park)

Desired Conditions:

- Visitors have the opportunity to participate in
 - a diverse range of recreation opportunities, including a variety of exercise and healthy activities, enjoying scenery, short walks, fishing, nature study, beach strolling, casual driving, motorized and nonmotorized boating, and backcountry camping³;
 - nonmotorized-only recreation opportunities at Miners Lake;
 - social recreation experiences and encountering other visitors and National Park Service lakeshore staff; and
 - guided interpretive tours, hikes, and educational programming related to waterfalls, wildlife, and forests, and a robust schedule of interpretive programs related to the park's natural and cultural heritage.
- Visitors have the opportunity to learn about, interact with, and understand
 - the natural environment through observation and study;
 - natural sounds (e.g., lakes, wind, trees, rivers, waterfalls, birds, insects, mammals), the scent of different seasons and locations, and the touch of natural components (e.g., water, rocks, sand, trees);
 - the Lakeshore's universally designed facilities and services⁴;
 - the availability of shuttle services for backpackers and kayakers;
 - their own personal connections to the meanings and significance of Lakeshore resources and stories associated with those resources, have a feeling of achievement (both physical and mental), and have a sense of exploration and discovery;
 - rustic, convenient, and easily accessible attractions;
 - sights and serenity of this beautiful area from both the land and the lake, including opportunities for observing wildlife, experiencing solitude, appreciating dark night skies, hiking, camping, kayaking, hunting, and fishing; and
 - contact stations and interpretive media (waysides and bulletin boards).
- This area would be intentionally managed to
 - ensure the protection of natural and cultural resources and public safety, and reduce visitor conflicts (e.g., fences, law enforcement rangers/patrols);
 - limit modifications to natural and cultural resources as necessary to enhance the visitor experience and/or lakeshore needs (e.g., hardening trails, felling hazardous trees);
 - provide facilities to support visitor touring for day use, such as overlooks, short trails, picnic areas, parking areas, and restrooms;

3. Bicycle use would not be permitted on trails throughout the Lakeshore zone (figure 1). Hunting would be allowed except in areas where it is specifically prohibited.

4. Universally designed sites and facilities provide equal opportunity not only for persons with disabilities, but a variety of situations. Accessible and inaccessible constructed and programmatic components of a facility are indiscernible in Universal Design and can include considerations such as: site arrival, access paths, exhibits and media, functional spaces, etc.

- provide access to water-based recreation opportunities for the public and commercial visitors;
- provide access for visitors of all abilities, including some trails; and
- preserve scenic viewing opportunities as an essential visitor experience, including shoreline views of the largest body of fresh water in North America and the colorful and bold Pictured Rocks, and having the opportunity to see the northern lights throughout the year.

Primitive Zone.

(Miners Beach to Spray Creek, including most of Chapel Basin and Chapel Lake and east end of Miners Beach to Chapel Beach)

Desired Conditions:

- Visitors have the opportunity to participate in
 - a variety of exercise and healthy activities, including appropriate human-powered recreation; authentic backcountry recreation; adding to life lists; and collecting appropriate amounts of berries, fish, and game;
 - nonmotorized boating opportunities at Chapel Lake;
 - nonmotorized activities, including hiking, camping, hunting, fishing, kayaking, and canoeing⁵;
 - feeling a sense of solitude and being in an uncrowded place;
 - experiencing closeness to nature, tranquility, physical exertion, and the application of outdoor skills including limited contact with other visitors and lakeshore staff, except in campgrounds;
 - experiencing a sense of remoteness and immersion in nature; and
 - experiencing challenge and adventure.
- Visitors have the opportunity to learn about, interact with, and understand
 - natural sounds (e.g., lakes, wind, trees, rivers, waterfalls, birds, insects, mammals), the scent of different seasons and locations, and the touch of natural components (e.g., water, rocks, sand, trees);
 - the geologic resources that give the Lakeshore its name; and
 - the ability to experience a largely unmodified natural landscape in its natural state, including natural soundscapes and dark night skies.
- This area would be intentionally managed to
 - preserve natural quiet;
 - preserve scenic viewing opportunities as an essential visitor experience, including shoreline views of the largest body of fresh water in North America and the colorful and bold Pictured Rocks, and having the opportunity to see the northern lights throughout the year;
 - promote visitor use that avoids degradation to natural and cultural resources;
 - limit resource modifications in a way that harmonizes with the natural environment;

5. Bicycle use would not be permitted on trails throughout the Lakeshore zone (figure 1).

- limit facilities to primitive footpaths and backcountry (tent) campgrounds with minimal facilities, as well as only those facilities needed to avoid disturbing sensitive resources while still providing for visitor safety; and
- design structures that would be restricted to those necessary to protect resources (e.g., bear boxes, trail planking in wet areas).

Orientation/Historic Zone.

(All of Munising Falls, Sand Point, and Miners Castle)

- Visitors have the opportunity to participate in
 - a variety of exercise and healthy activities, including *appropriate human-powered* recreation, adding to life lists, and collecting appropriate amounts of berries and fish;
 - large group social interaction environments, such as trails and access to water-based recreation where lakeshore staff presence is common;
 - limited opportunities for challenge or adventure where outdoor skills and physical exertion are not necessary; and
 - structured visitor opportunities (e.g., interpretive programs, tours, formal education programming) are provided, but self-guided opportunities are also available.
- Visitors have the opportunity to learn about, interact with, and understand
 - the lakeshore and associated resources;
 - sightseeing, taking walks, educational programs, visiting cultural resources, and other organized activities;
 - primary lakeshore features without comprising resource integrity; and
 - important park stories and resources during short orientations or moderate in-depth interpretation.
- This area would be intentionally managed to
 - recognize that buildings, facilities, and other signs of human activity are obvious, but natural elements are also present;
 - emphasize preservation or interpretation of cultural resources in some areas;
 - provide developed facilities and services that are universally designed (NPS 2010);
 - provide orientation and interpretation facilities, such as visitor centers, contact stations, kiosks, wayside exhibits, and other interpretive media;
 - provide facilities that are compatible with the setting, including access and support facilities such as parking areas, paved walkways, restrooms, picnic areas, and overlooks;
 - include facilities that might comprise groupings of historic structures and related landscapes;
 - ensure that most facilities are accessible to visitors with disabilities, and historic structures might be modified to accommodate these visitors; and
 - pave or harden some areas to protect resources or focus visitor use.

Impacts Associated with Increasing Visitor Use in the Study Area

Congestion and Crowding During the Summer Season. Congestion and crowding at Miners Beach, Miners Falls, and Miners Castle inhibits visitor access to these areas, diminishes visitor experience, and results in natural and cultural resource impacts in the immediate area. Additionally, visitor safety at the beach, at boat launches, and on the water has been a concern, as congestion along roads impedes emergency response. Recent efforts to relieve some of the congestion through implementation of a shuttle system for commercial users to access Miners Beach alleviated some of this issue, along with updates to commercial use authorization (CUA) permit conditions designed to improve the visitor experience and disperse the distribution of private and commercial uses. Other effects from congestion and crowding can be seen in increased vegetation impacts along road corridors that provide access to Miners Beach, Miners Castle, and Miners Falls. Visitors walking in undesignated areas along beaches, on the bluffs, and in other areas are widening existing trails and contributing to erosion.

Need for Facility and Infrastructure Improvements. During peak visitation, unauthorized parking of personal vehicles (and trailers) due to parking congestion and lengthy lines at park restrooms point to the potential need for limited facility and infrastructure improvements at Miners Beach and other key destination points in the study area to improve accessibility. Additionally, restrooms are currently used as changing facilities at Miners Beach and Sand Point, and sanitary facilities are inadequate for the level of visitation in developed and less-developed areas. At Sand Point, there is also a need to assess the appropriateness of continued boat access, which cannot be effectively maintained given changing lake levels and the repeated need to dredge the area of excess sand.

Natural and Cultural Resource Impacts from Visitor Use. Crowding and congestion result in a variety of resource impacts throughout the study area. Some of this crowding and congestion has contributed to unauthorized trail use, stream bank erosion, illegal climbing, improper human waste disposal, and vandalism throughout the study area. Unauthorized parking along roads and in other undesignated areas near trailheads is encroaching on roadside vegetation and creating a visual intrusion on the cultural landscape. In addition, congestion along trails has led to trampling of vegetation along popular trails and beaches, contributed to erosion along shoreline bluffs, and lead to the establishment of new visitor-created trails and resource damage. Although park rangers do their best to address improper visitor use that may be contributing to natural and cultural resource damage, many of these areas where damage occurs are difficult to get to, making it challenging for park law enforcement staff to respond in a timely manner. At Miners Beach, congestion results in displacement of wildlife, shoreline erosion, vegetation trampling, and disturbance of archeological sites due to visitor-created trails.

Link between Visitor Use and Commercial Use Operators. While the park has implemented new CUA permit conditions to ease land-based congestion, there is currently no management of group sizes or overall visitor capacity for the study area (the number of kayaks and paddleboards allowed at one time at the Sand Point Beach was limited to 12 each in 2017, but this visitor capacity does not address group sizes or overall capacity). While there are currently only two commercial operators generating most of the commercial visitation at the Miners Beach area, the park has witnessed a heightened interest in commercial opportunities. The park

also lacks criteria to evaluate new and emerging commercial uses and determine the compatibility with desired conditions tied to resource protection and visitor experience.

NEXT STEPS IN THE PLANNING PROCESS

Following public review of the draft VUM plan and assessment of public comments, the National Park Service will determine whether FONSI would be prepared. If a finding of no significant impact is prepared, it would document the NPS selection of an alternative for implementation; include any necessary errata or factual changes required in the document; and include NPS responses to substantive comments submitted by agencies, organizations, and the public.

Approval of this plan does not guarantee that funding and staffing needed to implement the plan will be forthcoming. Implementation of the approved plan would depend on future funding and could be affected by factors such as NPS staffing changes, visitor use patterns, and unanticipated environmental changes. Full implementation could be many years in the future. Once the plan has been approved, more detailed planning and environmental compliance may be needed before certain components of the selected alternative can be carried out. All actions will be reviewed prior to implementation to determine if further design and compliance is required.

Chapter 2

Alternatives



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CHAPTER 2: ALTERNATIVES

The Lakeshore VUM plan and environmental assessment (EA) evaluates a range of management strategies and analyzes the impacts that could result from their implementation to include a no-action alternative and an action alternative. A summary of each alternative carried forward is provided below, followed by an alternative comparison matrix (table 1) to delineate distinctions between the alternatives as well as site-specific details applicable to popular destinations throughout the Lakeshore. Conceptual site plans for the planned improvements at key sites in the study area are highlighted in appendix A.

Included in table 1 are a range of facility and infrastructure improvements that the park is planning to implement in the future as part of various alternatives. In some instances, management strategies and actions noted in table 1 and appendix A may require additional National Environmental Policy Act (NEPA) or National Historic Preservation Act (Section 106) compliance. Such determinations would occur during the design and engineering phase, prior to construction, should construction footprints vary from those shown in appendix A.

ALTERNATIVE A (NO-ACTION ALTERNATIVE)

Current management would continue in the study area. Management of visitor use would continue to largely focus on adjusting CUA conditions, implementing and enforcing parking restrictions, providing temporary facilities to alleviate strain on existing facilities, and applying existing management strategies that would relieve commingled (e.g., commercial and private) visitor use at Miners Beach. Overall, there would continue to be less reliance on changes to infrastructure and more reliance on indirect management strategies, such as education and interpretation, to change visitor behavior.

ALTERNATIVE B (PROPOSED ACTION AND PREFERRED ALTERNATIVE)

Alternative B employs a more proactive approach to managing visitors that includes a wider range of strategies that improve and expand infrastructure at key sites in the study area by enhancing access and providing diverse, high-quality experiences, while decreasing congestion and separating visitor uses to reduce conflicts between commercial and public visitors. Targeted redesign of parking areas and access roads (in select locations) would help reduce congestion, improve visitor experience, and help protect park resources. This alternative also emphasizes leveraging partners to assist with infrastructure needs as well as increased cooperation among partners to meet visitor needs.

Table 1. Alternatives Comparison Matrix

Area	Alternative A – No Action (Current Management)	Alternative B – Proposed Action
Area-wide (Munising Falls to Spray Falls)	<ul style="list-style-type: none"> Continue to use the Munising Falls Visitor Center as the primary visitor contact point for the westernmost portion of the park. Work with other state and federal public land management agencies to establish a shared visitor center on lands outside the park. Potential partners: State of Michigan, US Forest Service, and US Fish and Wildlife Service (currently evaluating where to site facility, appropriate size, staff, funding). Continue to provide additional messaging to the public to disperse use to lower-use times to alleviate crowding during high-use times. Reduce dune erosion through fencing and signage so people stay on trails and pathways. Continue to support shuttle transit to the study area in partnership with AlTran and the City of Munising to provide access to key sites such as Sand Point, Miners Beach/Miners Castle, Miners Falls, and Mosquito/Chapel Beach from Memorial Day to Labor Day. Increase enforcement related to unauthorized parking. Continue to improve accessibility in all planned improvements, where feasible, especially with regard to restrooms and park structures, 	<p>Same as alternative A and also the following:</p> <ul style="list-style-type: none"> Provide adequate space for shuttles to turn around at key visitor access sites, where appropriate (as depicted in appendix A). Add a roof over the entire Miners Castle Visitor Contact Station (within the existing footprint) to protect visitors against weather.
Miners Beach Area	<p>Commercial Services</p> <ul style="list-style-type: none"> Boating access for commercial use authorizations (CUAs) would continue to be allowed at the east and west ends of the beach. CUA conditions would be updated as noted in appendix D. CUA conditions may evolve or change over time, as appropriate. 	<p>Same as alternative A and also the following:</p> <p>Visitor Use Management</p> <ul style="list-style-type: none"> Designate the Miners Beach east area as a lower use, noncommercial use area (compared to the west end); primarily trailhead with some beach use (see appendix A). Develop a separate point of entry for all CUA permit holders. <p>Facilities – Parking</p> <ul style="list-style-type: none"> Pave with asphalt Miners Beach Road from Miners River to the east and west parking lots at Miners Beach (approximately 1.1 miles within the existing roadway footprint).

Area	Alternative A – No Action (Current Management)	Alternative B – Proposed Action
		<ul style="list-style-type: none"> • Redesign, expand, and pave with asphalt the parking lot at the east end of Miners Beach to better delineate the parking lot and provide a turnaround for large vehicles. The expanded parking lot would accommodate 15 parking spaces and 2 oversized parking spaces, resulting in approximately 0.27 acre of additional disturbance. • Redesign, expand, and pave with asphalt the parking lot at the west end of Miners Beach to more efficiently accommodate existing use levels. Establish a new public shuttle pickup/drop-off area on the north side of the parking lot. These actions would result in approximately 0.32 acre of additional disturbance. The expanded parking lot (approximately 0.78 acre total) would accommodate 82 parking spaces and 10 oversized vehicle parking spaces. • Included within the redesign of the Miners Beach West area would be a new paved drop-off area for commercial shuttles (approximately 0.28 acre) to separate public and commercial use. <p>Commercial Services</p> <ul style="list-style-type: none"> • Separate commercial use from public use to alleviate visitor conflict with a new drop-off area along the western branch of Miners Beach Road. <p>Other Infrastructure</p> <ul style="list-style-type: none"> • Construct a new 150-square-foot (ft²) vault toilet at the east end parking area. The facility would be located north of the existing parking lot at the trailhead. • Stabilize (using natural surface materials) and formally delineate the existing 2,400-linear-foot (LF) trail segment of the North Country National Scenic Trail that extends north from the east parking area. The trail would be 4 feet wide where possible. • Provide a changing station for beach visitors (approx. 250 ft²) on the adjacent east side of the existing vault toilet in the west parking lot. • Provide a separate changing station for beach visitors (approximately 250 ft²), a 150-ft² vault toilet, a new double-lane trail (approx. 6 feet wide and 450 feet long) connecting the commercial drop-off area to Miners Beach, and a temporary kayak staging area (700 ft²) for commercial use in the west parking lot. The trail would include a kayak slide and staircase providing access to the beach.

Area	Alternative A – No Action (Current Management)	Alternative B – Proposed Action
		<ul style="list-style-type: none"> • Install a well with a solar-operated pressurized water system to provide fresh drinking water at the west end of the parking area. • Widen and stabilize the existing Miners Beach Trail from single lane (4 feet wide) to double lane (6 feet wide) that extends along 500 feet of trail (approximately 0.02 acre of new disturbance). <p>[Note: Facility and infrastructure improvements identified above have undergone archeological survey and testing. Artifact recovery was sparse and the NPS did not recover any artifacts or identify any buried soils within the West Parking Lot area or the proposed beach access pathways; therefore, ground-disturbing activities in these locations would not adversely affect archeological resources (see Impact Topics Dismissed from Further Analysis later in this section).]</p>
Sand Point Beach	<p>Visitor Use Management</p> <ul style="list-style-type: none"> • Incidental visitor contact would continue to occur at the boathouse (Maritime Museum) and headquarters. <p>Commercial Services</p> <ul style="list-style-type: none"> • Commercial use authorizations would be evaluated per conditions noted in appendix D. <p>Facilities – Parking</p> <ul style="list-style-type: none"> • Continue to encourage overnight backcountry users to park in the employee lot away from the day use beach parking. <p>Other Infrastructure</p> <ul style="list-style-type: none"> • Continue to maintain the existing boat access point and associated break wall. 	<p>Same as alternative A and also the following:</p> <p>Commercial Services</p> <ul style="list-style-type: none"> • Manage special events and CUA use to specific times or days, limit size of events, and establish designated activity areas. <p>Other Infrastructure</p> <ul style="list-style-type: none"> • Provide a changing station for beach visitors (approximately 250 ft²) next to the existing vault toilet at Sand Point Beach. • Maintain the Sand Point boat access point for smaller craft only (kayaks and personal watercraft) but not larger trailered boats. The park would continue sand removal below the high-water mark.
Chapel / Mosquito Beach Area	<p>Visitor Use Management</p> <ul style="list-style-type: none"> • Continue to implement additional strategies to improve human waste management (e.g., education, signage, waste bags) <p>Facilities – Parking and Roads</p> <ul style="list-style-type: none"> • Work with park partners (timber company) and neighbors to establish possible additional overflow parking for private vehicles and possible shuttle drop off on non-park-owned lands. 	<p>Same as alternative A and also the following:</p> <p>Visitor Use Management</p> <ul style="list-style-type: none"> • Work with partners to enter into a memorandum of understanding to allow the following vehicle size restrictions during the peak visitor season (from June 15 to September 15) on Chapel Road: <ul style="list-style-type: none"> ○ Single unit vehicles in excess of 36 feet ○ Vehicle/trailer combined units in excess of 42 feet

Area	Alternative A – No Action (Current Management)	Alternative B – Proposed Action
	<ul style="list-style-type: none"> • Work with partners and neighbors to improve the condition of Chapel Road (<i>a non-NPS road—bring up to solid gravel base with proper drainage</i>) • Establish designated landing areas for commercial use authorizations. 	
Miners Falls Trailhead	<p>Facilities – Parking and Roads</p> <ul style="list-style-type: none"> • For Miners Falls Road and parking area, implement vehicle size restrictions during peak visitor season (e.g., trailers prohibited in the parking lot and single recreational vehicles longer than 32 feet from June 15 to September 15, provide better signage) <p>Facilities – Trails</p> <ul style="list-style-type: none"> • Replacement-in-kind of the existing lower viewing platform at Miners Falls to contain visitors and help prevent establishment of additional unauthorized, user-created trails in the area. 	<p>Facilities – Parking and Roads</p> <ul style="list-style-type: none"> • Improve Miners Falls Road (approximately 3,000 LF or 0.6 mile) by placing gravel overlay to correct drainage issues, help stabilize the road, and prevent potholes, while providing for a more permeable road surface. Note: Additional site-specific National Environmental Policy Act (NEPA) and Section 106 compliance would be conducted, as necessary, following site design for these improvements. • Redesign and expand the existing parking lot (within previously disturbed areas) to improve traffic flows and accommodate additional single-passenger vehicles. The expanded parking lot would be approximately 0.48 acre or 20% larger than the existing parking lot. Note: Additional site-specific NEPA and Section 106 compliance would be conducted, as necessary, following site design for these improvements. <p>Facilities – Trails</p> <ul style="list-style-type: none"> • Upgrade Miners Falls Trail to provide universal access. Approximately 440 feet of the existing trail would be rerouted to reduce cross slope. The upgraded gravel trail (3,500 LF) would be double lane (6 feet wide). Note: Additional site-specific NEPA and Section 106 compliance would be conducted, as necessary, for accessibility improvements along the length of the trail to the stairs that access Miners Falls.

Mitigation Measures and Best Management Practices

Congress has charged the National Park Service with managing the lands under its stewardship “in such manner and by such means as will leave them unimpaired for the enjoyment of future generations” (NPS Organic Act, 54 USC 100101(b) et seq.). As a result, the National Park Service routinely evaluates resources and implements mitigation measures whenever conditions are present that could adversely affect the sustainability of national park system resources.

Mitigation measures are designed to prevent or minimize adverse impacts or to contain impacts within acceptable limits during and after the implementation of a federal action. The National Park Service has generated a list of mitigation measures, as well as general best management practices, for key topic areas related to the VUM plan. Refer to Appendix C: Mitigation Measures and Best Management Practices for a complete list.

IMPACT TOPICS DISMISSED FROM FURTHER ANALYSIS

The following topics are dismissed from further analysis in this environmental assessment based upon the provided rationale.

Socioeconomics

Socioeconomics is the social science of how economic activity affects social processes. In the context of this plan, socioeconomics involves improvement and minor expansion of visitor amenities in the study area and changes to the management strategies associated with commercial use authorizations.

Neither alternative would substantially alter visitor use levels or visitor use patterns in a way that would have a measurable effect on local businesses or local residents. Under both alternatives, State Highway 58 would continue to function as it does today. Under the no-action alternative, visitors would continue to access diverse recreational opportunities between Sand Point and Chapel Beach. Under the action alternative, there would be limited facility and infrastructure improvements in the study area and adaptive strategies would be implemented to distribute commercial use over time and distance, which will likely result in less crowded and higher-quality visitor experience. Visitor access to the study area is addressed as part of visitor use and experience. As part of an adaptive strategy, the park will specify conditions that limit commercial use and impacts as provided in Public Law 105-391 § 418. Specifying conditions would not affect the number of commercial use authorizations operating in the park, although it would distribute use over time and space. Due to the small-scale changes in facilities and visitor use patterns and levels, no changes to park visitation, local employment opportunities, income, local tax base, or the general local economy are expected.

Neither alternative would have a measurable effect on local demographics, services, housing, employment, or the aesthetic quality of adjacent communities. Potential impacts associated with the action alternative include short-term, limited construction projects including small-scale improvements to existing visitor contact stations, expanded parking lots, additional changing stations for beach visitors, and toilets. These projects would result in a localized beneficial

impact. Under both alternatives, the park would continue to support nature-based tourism in the Munising area. Therefore, this impact topic was not retained for further analysis.

Water Resources (Including Hydrology)

The proposed developments in the alternatives would not adversely affect water quality of Lake Superior or drainages or flows of park drainages. Although there could be some short-term adverse impacts to water quality due to construction activities in localized areas (such as near the Miners Beach East and Miner Beach West parking areas), the application of best management practices and mitigation measures noted in appendix C and highlighted below would be expected to prevent degradation of water quality. The following would be implemented to ensure water quality is not affected:

- Continue to monitor water quality parameters to ensure water quality standards are maintained.
- Ensure that the cross slope of impervious surfaces to be established would be designed to limit rapid water runoff and would not cause gullying, trenching, or other accelerated erosive actions, or inadvertently block natural small drainage features.
- Use siltation control devices—such as silt fencing and mulch stabilization—to reduce erosion, capture eroding soils, and prevent sediments from entering wetland areas.
- Use erosion control matting that is appropriate for the climate and vegetative community.
- Revegetate to reconstruct the natural spacing, abundance, and diversity of native plant species as much as possible. All disturbed areas would be restored as much as possible to preconstruction conditions, including decompaction of soils, shortly after work is completed.

Therefore, this impact topic was dismissed from further analysis.

Cultural Landscape, Historic Sites, and Historic Structures

Cultural landscapes, historic sites, and historic structures in the study area are primarily concentrated in the Sand Point area, which includes the United States Coast Guard (USCG) Life Saving Station and associated historic buildings and structures. Other historic structures in the study area include the Munising Falls Visitor Center, which is situated just off of Sand Point Road. None of these historic structures are currently listed on the National Register of Historic Places.

Management strategies included in the alternatives would not adversely affect the Sand Point cultural landscape or any of the historic sites or structures noted above. New infrastructure at Sand Point is limited to a small changing station for beach visitors adjacent to existing parking and is consistent with the 2017 Cultural Resource Landscape Report for the Sand Point/Munising USCG Life Saving Station.

Archeology

Evidence of pre-contact human activity from the Late Archaic period (circa 5000 to 1800 Before Present [BP]) has been documented in the park's archeological record. Among the sites identified and extensively tested from this period is a large occupation site (circa 3000 BP), and a Late Archaic/Early Woodland campsite (circa 3500-2000 BP) along a section of shoreline in the middle of the park. Phase I archeological surveys using geo-archeological methods and geographic information system modeling of the paleo-shoreline identified several sites thought to be Late Archaic in age. Many of these sites are associated with former shoreline landforms and spits adjacent to paleo-lagoon and estuarine environments. A suspected Woodland Period campsite (circa 400 to 2000 BP) was identified, and another site yielded Woodland period ceramics and related materials including lithic cores, a small triangular projectile point, and faunal remains. Lacking conclusive diagnostic artifacts or dateable carbon, the sites are classified as pre-contact (prehistoric) without cultural affiliation. Historic period archeological sites are also well represented in the park, including numerous logging camps, small farmsteads, and early recreational camps that date from the late 1800s through the early 1900s.

In 2017, NPS archeologists from the Midwest Archeological Center surveyed and tested the Miners Beach area to address long-standing research and preservation questions, and to support Section 106 requirements for proposed infrastructure improvements. They tested four archeological sites and recommended future management actions. One of the reinvestigated sites did not yield any identifiable archeological features, while another site was identified as having the potential to meet the eligibility requirements for the National Register of Historic Places. The other two sites were determined unlikely to yield significant archeological information and no special attention for their management was recommended. Three areas of potential effect for infrastructure improvements were tested; based on the survey findings, it was recommended that ground-disturbing activities within the areas of potential effect for parking lot expansions or development of a new pathway to the beach would have no adverse effect on identified archeological resources (NPS 2018a).

As noted in Chapters 1 and 2 of this environmental assessment, some proposed projects are not yet fully designed (e.g., planned infrastructure improvements in the vicinity of the Miners Falls parking area). As project designs are developed and areas of project effects are better defined, these projects would be assessed and reviewed under Section 106 of the National Historic Preservation Act as required by Federal law and NPS policy. Additional archeological surveys, monitoring during construction and other measures would be carried out as necessary to mitigate any adverse impacts. In the event that presently unidentified resources are discovered, construction would cease in the project area and mitigation measures would be carried out in consultation with the state historic preservation officer and associated tribes. Measures would be undertaken to avoid or mitigate adverse impacts by means of project redesign, clearly marking site locations for avoidance, or other appropriate mitigation measures, and best management practices would be implemented prior to construction disturbance to protect or recover site information. For these reasons, the topic of archeological resources has been dismissed from analysis in this environmental assessment.

IMPACT TOPICS RETAINED FOR FURTHER ANALYSIS

The following topics have been carried forward for further analysis in the environmental assessment: *Visitor Use and Experience*, *Vegetation*, and *Species of Special Concern* (including federally listed species). As a VUM plan, visitor use and experience (including visitor access and accessibility to key sites in the study area) is a focal point of this plan and is directly linked to many of the actions included in the alternatives. In addition, evaluating how the alternatives consider congestion and crowding, given the increasing visitation to the study area, is critical for understanding the effects to visitor use and experience across the alternatives. Species of special concern and vegetation have been carried forward to help evaluate associated impacts with minor facility and infrastructure improvements that are included in the action alternative.

MONITORING: INDICATORS, THRESHOLDS, AND MANAGEMENT STRATEGIES

Monitoring is the process of routinely and systematically gathering information or making observations to assess the status of specific resource conditions and visitor experiences; it is a critical step in successfully implementing any VUM plan. A monitoring strategy is designed and implemented to generate usable data for periodically comparing existing and desired conditions, assessing the need for management actions, and evaluating the efficacy of management actions. A well-planned monitoring strategy provides for transparency, communication, and potential cost savings through efficiencies and possibly cost sharing. A monitoring strategy includes the selection of indicators, along with establishment of thresholds or objectives, and any needed triggers. It also includes routine, systematic observations or data collection of the indicators over time as well as associated documentation and analysis.

Indicators, thresholds, monitoring protocols, management strategies, and mitigation measures would be implemented as a result of this planning effort and are described below. Indicators would be applied to the action alternatives described within this plan. Indicators translate desired conditions of the Lakeshore VUM plan into measurable attributes (e.g., linear extent of visitor-created trails) that when tracked over time, evaluate change in resource or experiential conditions. These are critical components of monitoring the success of the plan and are considered common to all action alternatives. Thresholds represent the minimum acceptable condition for each indicator and were established by considering qualitative descriptions of the desired conditions, data on existing conditions, relevant research studies, professional judgement of staff from management experience, and scoping on public preferences. A trigger is defined as 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.

The interdisciplinary planning team considered the central issues driving the need for the Lakeshore VUM plan and developed related indicators that would help identify when the level of impact becomes cause for concern and management action may be needed. The indicators described below were considered the most critical, given the importance and vulnerability of the resource or visitor experience affected by types of visitor use. The planning team also reviewed the experiences of other park units with similar issues to help identify meaningful indicators. Not all of the strategies related to the indicators, thresholds, and visitor capacity would be

implemented immediately, rather as thresholds are approached or exceeded. Those strategies identified for use as needed are labeled as adaptive management strategies in each of the appendices. The impact analysis is included in chapter 3 so the Lakeshore can employ those as necessary to achieve desired conditions. The most-critical indicators are

- number of vehicles at one time
- number of encounters on trail segments in the Chapel Basin
- number of people per viewscape at Miners Beach

VISITOR CAPACITY

Visitor capacity is a component of visitor use management and defined as the maximum amount and types of visitor use that an area can accommodate while sustaining desired resource conditions and visitor experiences, consistent with the purpose for which the area was established (as well as goals and objectives for this plan)⁶. By establishing and implementing visitor capacities, the National Park Service can help ensure that resources are protected and that visitors have the opportunity for a range of high-quality experiences. Appendix B details visitor capacity considerations and the process used to identify visitor capacity for six distinct analysis areas in the study area including

1. Miners Castle
2. Miners Beach
3. Miners Falls
4. Sand Point
5. Munising Falls
6. Chapel Falls and Mosquito Beach

5. To fulfill the requirements of the 1978 National Parks and Recreation Act (54 USC 100502), visitor capacity identifications are legally required for all destinations and areas that this planning effort addresses (IVUMC 2016).

Chapter 3

Affected Environment and Environmental Consequences



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CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter analyzes the environmental impacts of implementing alternative A (current management) and alternative B (the preferred alternative) on visitor use and experience, vegetation, and species of special concern. This analysis is the basis for comparing the beneficial and adverse effects of implementing the alternatives.

Cumulative impacts result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of who undertakes such other actions. Cumulative impacts can result from individually minor, but collectively important, actions taking place over a period of time.

Cumulative impacts are considered for all alternatives. They were determined by combining the impacts of the alternatives proposed in this document with the impacts of other past, present, and reasonably foreseeable future actions. These identified actions make up the cumulative impact scenario.

The geographic scope of the analysis includes actions in the study area as well as other actions in the park or surrounding lands, including adjoining counties, where overlapping resource impacts are possible. The temporal scope for all impact topics includes projects and actions either completed within the past 5 years or planned within the next 10 years.

Table 2. National Park Service Actions and Projects

Action or Project	Brief Description	Past	Present or Ongoing	Reasonably Foreseeable Future Action
Sand Point Revetment EA	The preferred action includes removal of the revetment. The park is restoring natural features to a sand spit feature to restore natural beach dynamic processes. This would increase beach area for people as well as wildlife, particularly during lower lake levels.		X	
PWC EA	The selected action would permit PWC use (and beaching) from the west boundary of the park to the east end of Miners Beach during the summer. In the early 2000s, the Lakeshore was one of two parks given the opportunity to develop and implement park-specific regulations allowing PWC use in Lakeshore waters (permitting associated NEPA compliance). The EA formalizes an existing use, with levels of PWC use not expected to increase from current levels. Use levels will be monitored for increases over time.		X	
Drainage Improvements Along Sand Point Road	The Lakeshore is studying the need for possible modifications to drainage along Sand Point Road. Reasonably foreseeable actions could include new or expanded culverts. Types and amounts of visitor use are likely to remain similar to existing.			X
Human Waste Removal	The park is increasing efforts to remove waste from remote restroom facilities (existing pit toilets) in and around Chapel Beach and Mosquito Beach via boat.		X	
Miners Castle Septic System Improvements	The Lakeshore is carrying out compliance related to replacement of the entire Miners Castle septic system which will entail removal of all of septic tanks and adding newer tanks with expanded waste treatment capacity. The project would result in a new raised mound (due to shallow soils), and drainage area adjacent and just south of the Miners Castle area. The project is anticipated to occur in late summer 2020.		X	
Sand Point/Munising USCG Life Saving Station Facility Improvements	Facility improvements are being implemented as outlined in the 2017 Sand Point/Munising USCG Life Saving Station Cultural Landscape Report and EA (e.g., expanded visitor parking, new vault toilet, employee parking, rehabilitated boathouse). Such improvements focus on maintenance efforts to maintain conditions of historic buildings and structures, and are designed to more accurately represent the cultural landscape features characteristic between 1933 and 1958, when the historic structure was in use as a life-saving station. Enhancing the landscape could result in more people visiting the area to learn about the historic features.		X	
Fisherman's Trail near the Terminus of Miners Trail Overlook	At the terminus of Miners Falls Trail, a stair structure from existing lower viewing platform would be constructed to formalize access to a new viewing platform adjacent to the river. Additional compliance to be completed following implementation of the VUM plan.			X

Notes: EA=environmental assessment, NEPA=National Environmental Policy Act, NPS=National Park Service, PWC=personal watercraft, USCG=US Coast Guard, VUM=visitor use management.

Table 3. Non-National Park Service Actions and Projects

Action or Project	Brief Description	Past	Present or Ongoing	Reasonably Foreseeable Future Action
Regional Airstrip Improvement	A potential land swap between the USFS and the County to extend the landing space at the regional airstrip (for small craft) just south of the study area (approximately 5 miles from the park boundary). Improvement are being done in response to increasing visitation throughout the area. This could result in an increase in airplane traffic over the park and potentially more people traveling to and from the region.			X
Increased Commercial Kayak Use Launching from on Water	Pictured Rocks Kayaking (a CUA) is planning to increase commercial use related to kayak launching from boats on Lake Superior (versus on land). This could potentially result in the transportation of more than 52 kayaks (104 people) in multiple groups, versus the existing levels of 16 kayaks. Clients would be launching from the boat and staying on the water.		X	
Road Resurfacing of Sand Point Road	Munising will be resurfacing Sand Point Road which will cause driving delays affecting Sand Point visitation for approximately 3 months. The project is currently scheduled for the summer of 2019.	X		
Expanded Opportunities for Boat Launching on Lake Superior	The Munising marina has been improved and the number of boat slips has been expanded. Pictured Rocks Cruises replaced their dock (adjacent to the city dock) to accommodate increased commercial use and functionality associated with existing use. Private boat launches have been added elsewhere along the Lake Superior shoreline. Actions will result in slight increases in boating traffic and congestion on the water, along with additional opportunities for visitors to the area to view the Lakeshore shoreline from the water.	X		

Notes: CUA=commercial use authorization, USFW=US Forest Service.

VISITOR USE AND EXPERIENCE

Affected Environment

With its scenic and diverse landscape, the Lakeshore offers visitors abundant recreational and educational opportunities. Colorful sandstone cliffs towering up to 200 feet above Lake Superior are accompanied by white sand beaches, dunes, lakes, streams, waterfalls, and hardwood forests, providing not only dramatic scenery, but also a unique opportunity for visitors to enjoy a variety of recreational activities. The Lakeshore offers visitors a complete sensory experience from the sights and sounds of crashing waves, the ability to view wildlife, the opportunity to eat fish just caught from a river, and the chance to feel the spray from a waterfall. The fee-free Lakeshore is open 24 hours a day, 365 days a year.

Visitation Trends. The Lakeshore has experienced a large increase in visitation over the last decade. Recreational visitation to the Lakeshore in 2010 totaled 499,000, a number that increased 63% to 815,000 in 2018 (figure 3). The increase has been especially pronounced in recent years, with the lakeshore receiving record numbers of visits in each of the past 4 years (2015-2018) (NPS 2018b).

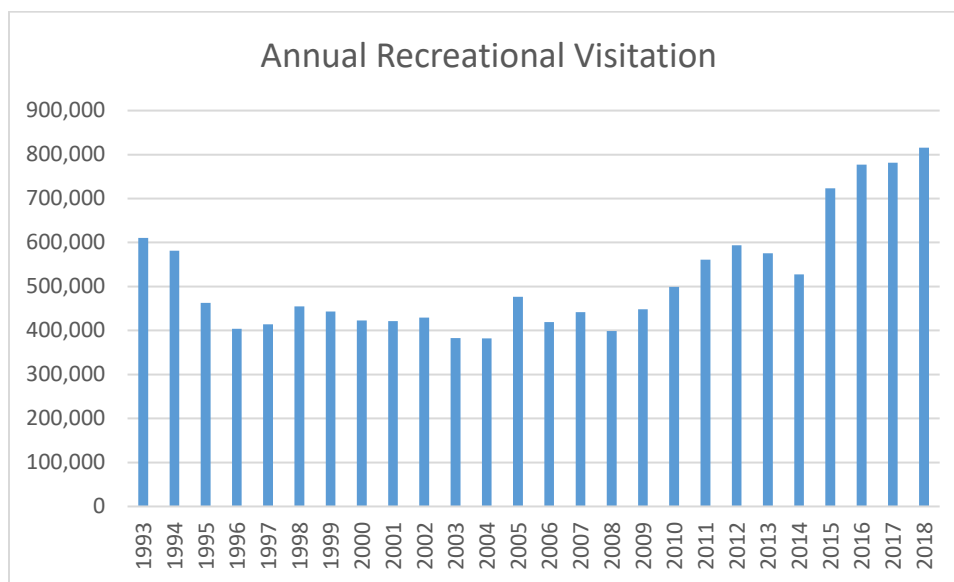


FIGURE 3. ANNUAL RECREATIONAL VISITATION TO PICTURED ROCKS NATIONAL LAKESHORE

The visitation increase at Pictured Rocks has been more pronounced over the last decade than increases experienced at National Park Service sites nationwide and at other national lakeshores in the region. While visitation at Pictured Rocks increased 82%, system-wide visitation only increased 11% over that same period. The two other national lakeshores managed by the National Park Service, Apostle Islands in Wisconsin and Sleeping Bear Dunes in Michigan's lower peninsula, saw respective increases of 48% and 41% over the same period.

Visitation to Pictured Rocks is highly seasonal in nature, with around three-quarters of annual visitation occurring from June through September and a peak in July and August (NPS 2018b)

(figure 4). Most of this visitation occurs in the study area. Visitors are drawn to the area because of the Lakeshore’s most popular beaches—Chapel, Miners, and Sand Point Beaches—as well as the most well-known of the pictured rocks, Miners Castle.

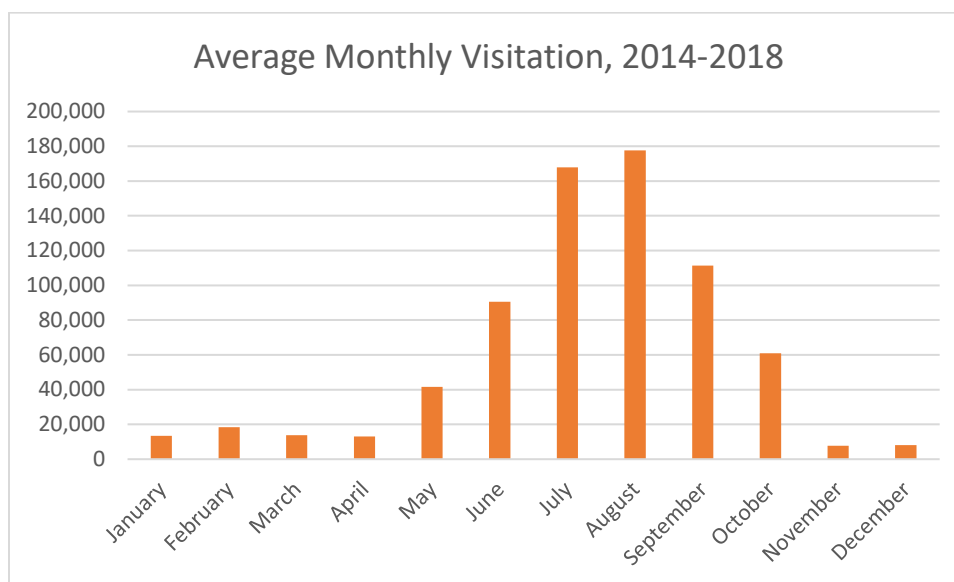


FIGURE 4. AVERAGE MONTHLY VISITATION TO PICTURED ROCKS NATIONAL LAKESHORE, 2014-2018

Visitor Types. Researchers from the Department of Forest Resources of the University of Minnesota conducted observational research to evaluate visitor use and behavior at Miners Beach in the summer of 2016. The following year, they evaluated visitor perceptions of crowding at both Miners and Sand Point Beaches. These two studies are referred to throughout this chapter as Schneider and Pflughoeft 2016 and Schneider, Pflughoeft, and Choi 2018, respectively.

According to the 2018 study of visitor perceptions and preferences at Miners and Sand Point Beaches (Schneider, Pflughoeft, and Choi 2018), around half of all visitors to the study area were between 30 and 49 years old (average 41.8), with only 11% over the age of 60 and 22% between the ages of 18 and 29. The vast majority (84%) self-identified as white. Visitors identifying as Asian (7%) made up the next largest group, followed by Hispanic or Latino (4%) American Indian/Alaskan Native (3%), African American (1%) and Native Hawaiian or other Pacific Islander (<1%).

Commercial visitors (as opposed to noncommercial visitors) were most frequently between the ages of 18 to 29 years. Interestingly, this youngest age group was the only group with a disproportionately high number of commercial visitors. This age group was comprised of 34% of commercial visitors and only 22% of overall visitors. For all other age groups, the proportion of overall visitors was higher than or equal to the proportion of commercial visitors. This indicates that the youngest visitors are much more likely to visit the Lakeshore with a commercial guide than older visitors. The average commercial user percentage throughout the summer is around 20% of the total visitors. During the week, however, commercial use peaked at Miners West Beach on Saturdays (43%) and Wednesday at Miners East Beach (38%).

Throughout the day, the average percent of commercial users at one time was highest between sunrise and noon.

According to the 2018 study, the majority of United States visitors to the Lakeshore are from Michigan (64%), with Wisconsin next at 11%. This pattern was consistent for both commercial and noncommercial visitors, though noncommercial visitors represented nine more states than commercial visitors (34 versus 25). International visitors came from 12 different countries, most frequently Canada (Schneider, Pflughoeft, and Choi 2018).

Chapel, Miners, and Sand Point Beaches are among the most-visited sites in the Lakeshore (although Chapel Beach was not included as an intercept site in the visitor studies), and the 2018 study found that 63% of those who recreated there were first-time visitors. Of the returning visitors, commercial users had visited more often over the prior 12 months than noncommercial users (averaging 9 visits versus 2 visits). This indicates that there is a significant subset of visitors that visit frequently (more than 9 times per year on average) and visit the Lakeshore with a commercial guide. The overall average length of stay for non-commercial visitors at the Lakeshore was 4.65 hours, with visitors spending approximately half of their visit at either Miners or Sand Point Beach (2.32 and 2.43 hours, respectively). The length of stay includes time spent both on water and on land.

Visitor Access and Circulation. There are ample opportunities to access the Lakeshore via main and secondary destinations. Since the Lakeshore has multiple entrances that are geographically spread out, the Lakeshore staff have challenges orienting and informing visitors who seek a variety of different experiences. In January 2018, the National Park Service relocated its central visitor contact station to the Munising Falls Interpretive Center, which became the main contact point for visitors to the western end of the Lakeshore. However, not all visitors stop at the visitor center when they arrive.

County Highway H-58 provides the primary access to the Lakeshore and is used to travel along its length, while smaller roads lead to trailheads and parking areas. County Highway H-58 was fully paved in 2010, but some of the side roads need upgrades to improve drainage, address potholes, and provide adequate turnaround space for larger vehicles. These smaller roads are also subject to congestion due to heavy use and illegal roadside parking. Traffic counts are typically the highest at Miners Castle, with Munising Falls the second highest (NPS 2018b).

Quality of Visitor Experience. Congestion and crowding—particularly during the summer—have been observed in the study area, specifically around the Chapel, Miners, and Sand Point Beaches, and to a lesser extent, at Mosquito Beach. Crowding on the beaches can overwhelm existing facilities, negatively impact visitor access and experience, and damage cultural and natural resources, while roadway congestion can increase the risk of accidents and interfere with emergency response. Large vehicles, such as RVs, reduce the number of available parking spaces for a diverse range of visitors. Inadequate parking facilities compel visitors to park illegally along the roadside. In 2017, about 51% of Sand Point visitors identified finding parking as a problem, as did 43% of those who visited Miners Beach (Schneider, Pflughoeft, and Choi 2018). It should be noted that the 2016 observational study found that some unauthorized parking at Miners Beach was due to visitors' desire for shaded parking spots, rather than a lack of available spaces.

Visitors to the Lakeshore have consistently identified enjoying scenic beauty, nature, and peacefulness as desirable experiences. A visitor use study conducted in the fall of 2000 reported that more than 90% of respondents indicated they enjoyed the natural quiet of the area, and nearly all recent studies have reported that scenery was the most important motivation for their visit. Visitors are not yet reporting that the quality of their visits is declining due to the increase in visitation and related impacts to peace, quiet, and scenery (Warzecha et al. 2000 and 2001; Schneider, Pflughoeft, and Choi 2018).

To alleviate concerns about limited parking, Lakeshore staff has been encouraging overnight users to park in an employee lot, rather than in day-use lots, and in 2016, a shuttle system was implemented for commercial users to mitigate crowding. Lakeshore staff report that the strategy appears to have been reasonably effective, but there is a need for a formal evaluation of its efficacy (Schneider and Pflughoeft 2016; Schneider, Pflughoeft, and Choi 2018).

In light of observed crowds and visitor complaints about congestion, as well as the results of the 2016 observational study, the visitor use study was conducted in 2017 to examine visitor perceptions of crowding at Miners and Sand Point Beaches. The study found between 71% and 78% of visitors identified the number of people on the beach as a problem. Almost half felt they were crowded, but most indicated it was not necessary to plan their trip to specifically avoid crowded conditions.

Visitors who participated in the study preferred that no other people or boats be present but indicated up to 24 people and 20 boats on average would be acceptable. Data from the 2016 observational report showed that the number of people on the beach at one time typically fell within these ranges and these levels of use were only exceeded occasionally. Rather than manage the number of people or boats allowed on the beach at one time, most of those surveyed felt that Lakeshore staff should share information about commercial use and crowded times to encourage voluntary adjustment of visitor arrival days and times (Schneider and Pflughoeft 2016; Schneider, Pflughoeft, and Choi 2018).

Along with increased visitation has come increased strain on facilities, as well as more frequent incidences of inappropriate visitor behaviors. Park management has expressed concern about increased littering, increased human waste, and decreased water quality/water supply. Lines of people waiting are often reported at the Miners and Sand Point restrooms, though the 2016 observational study found lines during 10% or less of observations. Twenty-nine percent of visitors surveyed during the 2018 study reported bathroom lines to be a problem, more frequently at Miners Beach than at Sand Point (31% versus 23%). Further investigation found that lines were most likely caused by visitors using the restrooms for changing, indicating the potential need for a separate changing facility.

Conflicts between commercial and noncommercial kayakers launching at the same access point results from crowding and competition for limited boat launch space. The Lakeshore also has user conflicts that result from a high volume of visitors, crowding, and incompatible uses in the same area, such as conflicts between anglers and swimmers. Conflicts also occur between visitors who are seeking a quieter experience (e.g., birdwatching, photography, hiking for scenery) and those who wish to enjoy time at the beach with friends and family and have a more social experience.

Visitor Activities. Visitors to the study area have an opportunity to enjoy a variety of activities including hiking, swimming, beach-going, bicycling, fishing, birdwatching, sightseeing, and boating. As visitation has increased, so have recreational uses such as sea kayaking and personal watercraft use. However, sightseeing, beach-related activities, and hiking have remained the most sought-after experiences at the Lakeshore.

Hiking: The Lakeshore offers 100 miles of hiking trails that provide access to rivers, lakes, beaches, campsites, and stunning views of the Pictured Rocks. The Lakeshore also contains a 42-mile segment of the North Country National Scenic Trail, a footpath that stretches approximately 4,600 miles from New York to North Dakota.

Information about hikes in the study area, which range in length from 800 feet up to 10 miles (one way), is available on the website and in the Lakeshore's "Walks & Hikes" site bulletin. Nature trails, such as the Miners Falls Nature Trail, are self-guided via interpretive waysides and brochures.

Lakeshore employees have observed the development of unauthorized user-created trails, as well as impacts occurring along existing trails, including erosion and vegetation trampling. Safety is a concern, especially where user-created trails may lead visitors onto unstable rock formations. Crowding, especially around the Miners Falls trailhead, is leading to congestion and insufficient parking.

Some of the more popular trails in the study area include the following:

- **Miners Castle Overlook** – This short (up to 1,300 feet, one way) trail accesses three overlooks that provide views of Miners Castle, Lake Superior, and Grand Island. A picnic area with grills is available. The upper overlook is a short walk from the Miners Castle parking lot. Although the trail is paved and Architectural Barriers Act (ABA) accessible, the portion leading to the lower overlook, one of the Lakeshore's most-scenic views, includes stairs and a steep slope. An additional, 1-mile unpaved section of the North Country National Scenic Trail leads from the overlook to Miners Beach.
- **Munising Falls** – This trail leads to the lower Munising Falls viewing platform, allowing visitors to view the 50-foot-high waterfall. The 800-foot (one way) trail and viewing platform are paved and ABA accessible. This trail is one of the only trails in the study area where pets are permitted, but they must be on a 6-foot leash.
- **Miners Falls Trail** – This easy, 1.2-mile round trip trail takes you through the forest to view the park's most powerful waterfall. Seventy-seven steps lead to a lower viewing platform, and the trail leading to the upper overlook is not ABA accessible.

Miners Beach: Miners Beach occupies nearly a mile of the Lakeshore approximately 9 miles northeast of the Munising Township and is the most popular beach area at the Lakeshore. It can be accessed via a portion of the North Country National Scenic Trail or by County Highway H-58 via Miners Beach Road. Two short trails, approximately a half mile apart, lead from separate parking areas at the west and east ends of Miners Road, and the beach is typically described in terms of these west and east ends. The west end access point is larger and includes more parking spaces and turnaround space than the east end. The University of Minnesota studies indicated

that the west end is used more often and more heavily than the east end (Schneider and Pflughoeft 2016; Schneider, Pflughoeft, and Choi 2018). In addition to engaging in beach-related activities including sunbathing, spending time with friends and family, kayaking, stand-up paddleboarding, and fishing in the Miners River, visitors to this site can view the distant Bridal Veil Falls from the west end of the beach. A mile-long trail leads up to the Miners Castle overlook. Miners River is a popular fishing spot in the spring and fall. Facilities include a vault toilet at the west end and a portable toilet at the east end. The beach is not wheelchair accessible.

Miners Beach is a popular location for commercial-use kayak and paddleboard groups, who access the beach from both the west and east ends and mingle with noncommercial visitors. The park does not currently manage commercial use authorizations by number of participants on each trip or number of trips in a day or season. To avoid conflicts with noncommercial users, commercial operators are required per their CUA conditions to use designated areas of the beach for equipment staging and safety briefings. As of 2016, they are required to pick up their clients at a location away from the Lakeshore and shuttle them to their launch site from Memorial Day through Labor Day to alleviate crowding of parking areas and roadways. Lakeshore staff reported that after the first year of implementation, both informal roadside parking and road congestion had decreased as a result of this change. Despite these influential changes, roadside parking and parking lot congestion still occur during launching times.

Sand Point Beach: Sand Point Beach is located approximately 6 miles southwest of Miners Beach and offers distant views of the Pictured Rocks cliffs. In 2007, The Weather Channel named it one of the “Top Five Summer Beaches in America.” It is a popular place for walking and watching sunsets, and is considered to be especially well-suited to swimming, as the water tends to be warmer here than at other beaches. Sand Point is also noted for its birdwatching opportunities, particularly for warblers. Facilities include picnic tables, grills, and vault toilets. One picnic table is fully accessible and contains a pedestal fire grate. The beach is accessed via two adjacent paved parking lots near the end of Sand Point Road, one of which also offers access to the Sand Point Marsh Trail. There is a vehicle turnaround space at the end of Sand Point Road, but illegal parking sometimes renders this space inadequate for use by larger vehicles. Sidewalks are paved, but a boardwalk does not lead visitors all of the way to the shoreline.

Like Miners Beach, Sand Point Beach is also used by commercial groups, often as an alternative when weather conditions at the former location are unfavorable. In 2017, the number of kayaks and paddleboards allowed at the beach at one time was 12 for each commercial use authorization. Launching boats at Sand Point can be challenging given changing lake levels and the recurring need to remove excess sand.

Sand Point Beach faces many of the same challenges as Miners Beach, including crowding and congestion, but to a slightly lesser extent. Challenges include the potential that crowding will continue to increase as more visitors are displaced from Miners Beach. Higher numbers of visitors can result in increased incidences of destructive behaviors. The visitor survey found more respondents were concerned about dogs off leash at this location than at Miners Beach, and that the number of visitors who identified alcohol-consumption as a problem in the area was trending upwards (Schneider, Pflughoeft, and Choi 2018).

Visitor Orientation, Interpretation, and Education. The conversion in January 2018 of the interagency visitor center in Munising to solely US Forest Service space has left the busy west end of the Lakeshore without a reliable, centralized point of contact for visitors entering through town. With the loss of the interagency visitor center, the Munising Falls Interpretive Center became the primary visitor contact station located in the west end of the Lakeshore. The interpretive center is open throughout the year, Wednesday through Sunday from 9 a.m. to 4 p.m. (during the winter), and daily from 9 a.m. to 5 p.m. (Memorial Day through mid-September). Operating hours are subject to staff availability. The interpretive center contains a small Eastern National gift store and exhibits about local ecology and a nonextant blast furnace.

Interpretation and orientation at Miners Castle, one of the more visited areas of the Lakeshore, are provided at a visitor contact station during the summer. Informal 10-minute presentations with variable content (but often focusing on lakeshore geology) are offered to visitors during July and August. The interpretive exhibits at the contact station were installed in 2006 but were identified for replacement in the 2010 Long Range Interpretive Plan.

Environmental Consequences of Alternative A

The VUM strategies articulated in the no-action alternative would have mostly beneficial impacts to visitor use and experience in the Lakeshore, however, visitor management would continue to be more reactive than proactive in response to increasing visitation and this reactive management would have adverse impacts. Management strategies that would impact visitors include minor alterations to the current visitor center configuration; additional minor facility improvements such as restrooms, changing stations, trails, and boardwalks; minimizing congestion in parking areas and improving the arrival experience; and limited measures to reduce conflicts between commercial and noncommercial users.

Under the no-action alternative, Lakeshore managers would continue to work with other state and federal public land management agencies to establish a shared visitor center on lands outside the park. This interagency visitor center would enhance the Lakeshore staff's ability to provide information and orientation to the many visitors who enter the park through the town of Munising in a reliable and centralized location. The busy west end of the Lakeshore would also be served by continued use of the Munising Falls Visitor Center. Incidental visitor contact would continue to take place at the rehabilitated Sand Point boathouse and headquarters, and summer visitors would also be served by the visitor contact station at Miners Castle. With these four stations, visitors would have opportunity throughout the study area to obtain information about trip planning, recreational opportunities, and the resources and values of the Lakeshore.

A key VUM element of the no-action alternative is to provide additional messaging to the public to disperse use to lower-use times and alleviate crowding during high-use times. Providing this information would allow visitors to choose a time to visit that best suits their desired experience. The effects of this action may be somewhat limited, however, by other factors that influence visitors' decisions about arrival time, including temperature and weather (Verbos, Altschuler, and Brownlee 2017), challenges associated with motivating family members to get there early, and the time needed to arrive at a particular destination. With that said, providing information to visitors about crowded times and times that are not as busy would set more accurate

expectations for all visitors and allow some visitors to attain a less-crowded experience if they so desire. This would slightly decrease crowding at peak visitation times, better match expectations with actual experiences, and improve the overall experience for all visitors.

The no-action alternative includes a couple of minor ongoing improvements to the restroom and human waste management infrastructure that would benefit visitors. A new vault toilet in the northern parking lot at Sand Point would provide visitors with a convenient and modern restroom facility and help alleviate some of the lines and wait times that sometimes occur at the vault toilet at the southern parking area. These actions would result in beneficial impacts to the visitor experience. However, since the lines were most likely caused by visitors using the restrooms for changing, and the no-action alternative would not address this issue directly, the beneficial impact may only be slight. The no-action alternative would also implement strategies to improve human waste management and mitigate current impacts at Chapel/Mosquito Beach, which would reduce the sewage odor and allow visitors to enjoy scents associated with nature. This would also result in beneficial impacts to the quality of the visitor experience.

Visitors that arrive by land-based motor vehicle would have an improved arrival and parking experience under the no-action alternative, resulting in beneficial impacts to visitor access and circulation. The Lakeshore's managers would continue to work with park partners and neighbors to improve the condition of Chapel Road and establish possible overflow parking on non-park-owned lands near the Chapel/Mosquito Beach Trailhead. This would make for smoother driving on the way to the trailhead and reduce stress, frustration, and possible conflict experienced by visitors struggling to find a parking spot during high-use times, also resulting in beneficial impacts to visitor access and circulation. The no-action alternative also includes implementation of a vehicle size restriction during peak season at Miners Falls Trailhead. This action would slightly increase parking efficiency and availability so more visitors could find a legal parking space; however, it would also have the adverse effect of preventing visitors who are traveling to the area in larger vehicles from visiting the area. The overall result of this would be more visitors finding parking, but few large vehicle groups visiting. At Sand Point, visitors would more easily find parking spots in the expanded visitor parking area, and they would experience less parking conflict with employees and overnight backcountry users who would have a new separate designated parking area. This action would result in beneficial impacts to visitor access and circulation.

Under the no-action alternative, Lakeshore managers would explore options with partners to establish a shuttle route to connect downtown Munising with key visitor destinations in the study area during the summer visitation season. This shuttle route would substantially replace the current on-call shuttle system, which has sporadic pick-up times and locations and requires an appreciable amount of research to use. The shuttle route would be more consistent and user-friendly and use of transit would presumably increase accordingly. Beneficial impacts would result for visitor access and circulation as the shuttle route would provide visitors with an alternative means of reaching their destination and potentially avoid the challenge of finding an available parking space, thus making the Lakeshore more readily accessible to some visitors and decreasing the challenge of parking for others. Introducing this shuttle route could also have the adverse impact of further focusing visitation in areas that already experience high visitation levels and crowding, such as Miners Beach, Miners Falls, and Chapel/Mosquito Beach. Adverse

impacts would also result as visitor use challenges could be exacerbated by the pulsing effect that transit systems have when large numbers of visitors arrive at the same time. These actions would be combined with implementation of mitigation measures to minimize the adverse impacts of pulsing visitation to the area. For example, monitoring of visitation through various methods including transportation data could inform the implementation of potential adaptive management strategies.

Under the no-action alternative, both adverse and beneficial impacts would stem from the efforts to separate commercial and noncommercial users. Both user types would continue to share the parking lots on the east and west ends of the road at Miners Beach, resulting in reduced efficiency in visitor circulation and flow. This concentration of visitor use types in the same area would continue to result in adverse impacts to the visitor experience as conflicts arise from competition for resources and access to key experiences. Incremental increases in congestion and crowding at the shared commercial and private boater staging area could frustrate visitors, resulting in adverse impacts to the visitor experience.

While the two conflicting user groups might not be separated spatially, they would be separated temporally as commercial operators would be required to use these areas at the beginning and end of the day. This could result in slight beneficial impacts to the quality of the visitor experience. Visitors arriving in the middle of the day, when visitation tends to be greatest, would encounter less commotion from commercial operators loading and unloading kayaks. In addition, these visitors would not need to compete with the commercial operators for parking. Also, the ongoing establishment of designated commercial kayak landing areas at Chapel/Mosquito Beach would prevent user conflicts on this section of shoreline.

Finally, visitors would benefit from ongoing actions under the no-action alternative that would improve the trails, walkways, and boardwalks in some locations. The existing lower viewing platform at Miners Falls would be replaced in kind, thus affording visitors a clearly defined place to view the falls without development of unsightly user-created trails. Likewise, the walk, boathouse, and boardwalk at Sand Point would be repaired or rehabilitated, which would improve the walking surface and potentially enhance accessibility of the Sand Point beach area for visitors.

Conclusion. Overall, under the no-action alternative, visitor use management at the Lakeshore would continue to be reactive rather than proactive. This reactive visitor management would result in adverse impacts to the visitor experience—specifically visitor access and circulation—as well as the overall quality of the visitor experience, as actions may address immediate challenges but not provide longer-term solutions.

Environmental Consequences of Alternative B

Alternative B adds additional components to the existing management actions analyzed in alternative A. These additional impacts are analyzed below. Alternative B incorporates the continuation of the management strategies included under alternative A, and those impacts analyzed above are hereby incorporated into the analysis of alternative B. The strategies included in alternative B would have greater beneficial impacts to visitor use and experience.

These strategies represent the proactive, direct management of visitors that characterizes alternative B.

One management element that is unique to alternative B is the inclusion of adequate space for shuttles to turn around at key visitor access sites throughout the study area. While this strategy would not directly impact visitors on its own, it would improve the efficiency and ease of use of the transit system and thus encourage more visitors to use it. More visitors using the shuttle bus system would increase the beneficial and adverse impacts of the transit system analyzed under alternative A.

Some of the primary beneficial impacts of alternative B from a VUM perspective stem from the strategies to separate commercial use from noncommercial use. Separating these user types both spatially and temporally would help reduce conflicts between the two groups, provide a more relaxed and enjoyable atmosphere for private visitors, and streamline the operations of commercial operators. At Miners Beach, private visitors seeking to hike the North Country Trail or have a quieter beach-going experience would be able to use the east parking area without competing with commercial kayak use. Likewise, private visitors to the west area of Miners Beach would not encounter the commotion of loading and unloading kayaks in the already-busy middle part of the day, thereby increasing their ability to find parking and access to the beach and picnic area.

Visitors to the Lakeshore who choose to come with a commercial guide would also benefit from this separation as their guides would stage their equipment in advance of their trip, thus reducing their wait times. The commercial guides and private kayak users would receive beneficial impacts from inclusion of the kayak staging area with a staircase and kayak “slide.” This dedicated infrastructure would make getting boats from the parking area to the water a much easier, smoother, and less-congested task.

The improvement and expansion of parking lots and access roads, specifically in the Miners Beach and Miners Falls areas, would beneficially impact visitors. At Miners Beach, the currently unpaved road would be paved from Miners River to parking lots at both the east and west ends. These parking lots would also be paved and expanded to more efficiently accommodate existing use levels at the west end, and better delineate parking spaces and provide a turnaround for large vehicles at the east end. These improvements would create a smoother and simpler arrival experience for visitors as they drive into one of the most visited areas of the Lakeshore. These visitors would have a better chance of finding a parking space due to the improved efficiency; they would also be able to quickly identify if there are no legal parking spaces, indicating they need to visit at a different time. This is especially true for visitors with oversized vehicles. These beneficial impacts contribute to an overall improved visitor experience.

At Miners Falls Trailhead, the access road would be improved. This would improve the availability and ease of finding parking at Miners Falls, meaning visitors would have an improved arrival experience free from the traffic jams, conflicts with other visitors, and safety risks from backing into the lane of travel that currently characterize the arrival experience.

The road and parking lot improvements would also have some minor and intangible adverse impacts to visitors’ perceptions of their experience. As visitors arrive at the more developed

Miners Beach and Miners Falls Trailhead areas during less-busy times, they may feel that the areas are less natural than they currently are. This impact, however, would likely be less noticeable than the feeling that currently accompanies a parking lot full of haphazard parking and congestion.

Visitor comfort and convenience would be improved by new restrooms and changing stations at the Miners Beach and Sand Point areas. Two new vault toilets and two new changing stations at Miners Beach would provide adequate facilities for visitors preparing to visit the beach, hike, or get on the water. More facilities would generally decrease wait times for visitors; the addition of changing stations that are distinct from restrooms would further decrease the lines that were sometimes observed during the University of Minnesota's 2016 study (Schneider and Pflughoeft 2016). Likewise, the new changing station proposed for the southern parking area at Sand Point would provide visitors a convenient facility in which to change clothes without having to wait in lines at the restroom or walk along Sand Point Road to the other restroom. The Sand Point changing station would increase visitor safety, convenience, and overall enjoyment of the beach-going experience.

Under the preferred alternative, the Miners Beach and Miners Falls areas would experience some trail work, which would result in beneficial impacts by improving access for individuals of varying abilities and better accommodate existing use levels. At Miners Beach, the trail improvements would be focused in two areas. The section of the North Country National Scenic Trail that extends north from the east parking area would be stabilized and formalized while the trail that accesses the beach from the west parking area would be widened. These wider and more stable trails would limit visitor conflicts between and among hikers, beachgoers, and kayakers and allow them to more easily pass on the trail.

The preferred alternative also includes other infrastructure improvements that would beneficially impact visitors. A solar-operated well at the west end of Miners Beach would provide visitors a safe and convenient water source allowing visitors to stay hydrated during their visit, resulting in a beneficial impact to the visitor experience. Maintenance of the boat access for smaller craft would continue to provide an alternative lake access point for kayakers and other personal watercraft users. Users of larger trailered boats, however, would not be able to use this access point. A roof over the Miners Castle Information Center would protect visitors against inclement weather and provide them with a consistently dry, shaded, and calm area to get trip planning information and resource interpretation. This would result in a beneficial impact to visitors as they would have a more tranquil experience early in their visit with time to gather all relevant information for a well-planned experience during their stay in the Lakeshore.

Under the preferred alternative, park staff would work with partners to allow vehicle size restrictions on Chapel Road during the peak summer visitor season. While this action would improve parking availability for visitors in passenger vehicles, it would also mean that visitors traveling to the park in larger vehicles during the peak summer season would not be able to visit Chapel Falls in personal vehicles. They would instead have to park elsewhere and use transit or some other form of alternative transportation. This could result in adverse impacts to the visitor experience for those visitors in oversized vehicles.

Environmental Consequences Associated with Indicator and Threshold Management Strategies. In addition to the strategies outlined in Chapter 2: Alternatives, there are additional management strategies described in the “Indicators and Thresholds” section of Appendix B: Visitor Use Management Monitoring Strategy that would impact visitor use and experience of the Lakeshore. These strategies would be pursued if the action alternative is selected, they are analyzed here under the no-action alternative.

The Visitor Use Management Monitoring Strategy (appendix B) includes a number of management actions that would be triggered as needed by monitoring information to improve visitors’ access to trip planning information before and during their visit. These strategies include using the park website and social media accounts to communicate areas that accommodate higher use, providing information on sites and times that are likely to be more or less busy, issuing media releases in advance of historically busy weekends, and others.

By informing the public of expected crowding on busy weekends and providing possible alternative locations and times to visit, visitors would be less likely to have to navigate through congested areas and would be able to spend more time enjoying the water or other areas of the Lakeshore. The added communication would also allow visitors who are flexible in terms of selecting a time and place to choose an appropriate destination for their desired experience. Visitors who seek a more social experience and are comfortable with large crowds can choose areas that accommodate higher use and visit at peak times, while visitors who seek more solitude and opportunities to connect with nature can select quieter locations or times. Visitors’ perceived experiences would be improved as their expectations more closely align with their actual experience. This would result in beneficial impacts to the overall quality of the visitor experience as well as visitor access and circulation.

In addition to providing basic trip planning information regarding times and places to visit, the management strategies also include efforts to provide real-time trip planning information. These real-time communication actions would have beneficial and some slightly adverse effects to the visitor experience. Having the information about a given area’s current status would allow visitors to avoid congested areas if they so desire, effectively spending less time searching for an available parking space and more time enjoying the Lakeshore. These actions would also help reduce parking lot congestion. Real-time communication about areas currently full would distribute use to other areas inside and outside the Lakeshore, which would be largely beneficial but could also be an adverse impact if those areas are not able to accommodate the increase in use or do not meet visitor needs or desired experiences.

The management strategies include increased enforcement of parking outside of designated areas by visitor use assistants, volunteers, and law enforcement personnel. While an increase in law enforcement would reduce inappropriate behaviors and increase visitor safety and the comfort of some visitors, others may find the increased presence uncomfortable and distracting as they try to experience and enjoy the park. The use of visitor use assistants or volunteers to enforce parking restrictions creates an opportunity to suggest alternative locations or times to visitors, which enhances the visitor experience by providing useful information and decreases the likelihood of illegally parking in another location.

Designation of some short-term parking spaces at key locations would mean more visitors have the chance to experience multiple areas of the park as parking space turnover rates increase. Longer-term congestion of specific sites would decrease as more visitors would come and go in shorter intervals. The adverse impact of the proposed short-term parking spaces would be that fewer unrestricted parking stalls would be available for visitors who prefer to stay and experience one area for the day.

Environmental Consequences Associated with Indicator and Threshold Adaptive Management Strategies. The “Indicators and Thresholds” section of Appendix B: Visitor Use Management Monitoring Strategy identifies a number of adaptive management strategies that would impact visitor use and experience of the Lakeshore. As these strategies are adaptive, they would only be implemented if and when conditions dictate they are necessary. Since these strategies could be pursued if the action alternative is selected, they are analyzed here under the action alternative.

One of these adaptive management strategies would implement a temporary queuing system when parking lots are at capacity. While this action may relieve congestion in crowded areas, visitors who are turned away would be denied the experience altogether, resulting in adverse impacts. This adverse impact could be mitigated to some extent by providing real-time information about areas that are at capacity and providing information about alternative destinations before arriving at a full parking lot.

Using parking permits to alleviate congestion would improve the ability to manage congestion and prevent visitor frustration over finding an available site. Similarly, a permit or reservation system for backcountry day use would allow visitors to ensure they are able to experience a particular trail or area of the Lakeshore. If a permit system were implemented, the quality of the visitor experience would be enhanced by reducing crowding and congestion. However, that same permit or reservation system could also result in adverse impacts to visitors who prefer to arrive unscheduled to their destination. Visitors may also be inconvenienced by having to obtain a permit; this would be an adverse impact as it would reduce spontaneity and flexibility in visiting key sites. It would also require planning and knowledge to access the experience, which may prevent those who are less-experienced visitors to the Lakeshore from experiencing some areas altogether.

If determined feasible, adding off-site parking and using a transit system to shuttle visitors to key destinations along the lakeshore would allow some visitors to bypass the challenge of finding an available parking space at congested locations. The quality of the visitor experience would thereby be enhanced by reducing congestion. However, the transit system may have the adverse effect of increasing crowding at key destinations as the size of the parking lot at the destination would no longer constrain visitation levels. The transit system may in fact deliver higher volumes of visitors to areas that are unable to accommodate the increase in use. Further analysis of this action would be needed before implementation.

Managing group size at appropriate locations would provide a much better experience for visitors who are seeking less-social experiences and for visitors participating in smaller tours. However, the limited group size of tours may eliminate the opportunity for visitors that are present when no tours are provided or when tour capacities have already been reached.

Environmental Consequences Associated with Implementation Strategies in Visitor Capacity Identification. In addition to the strategies outlined in Chapter 2: Alternatives, further implementation strategies are described in the “Visitor Capacity Identification” section of Appendix B: Visitor Use Management Monitoring Strategy that would impact visitor use and experience of the Lakeshore. As the identification and implementation of the visitor capacity are elements of the preferred alternative, associated effects have been analyzed in this section. The beneficial and adverse impacts of enforcing designated parking, delineating parking, redistributing visitor use to less-busy times, and establishing a permit or reservation system are analyzed in the “Environmental Consequences Associated with Indicator and Threshold Adaptive Management Strategies” and the “Environmental Consequences Associated with Indicator and Threshold Management Strategies” sections above.

Munising Falls: Stationing interpretation rangers outside of the visitor center to help with visitor circulation and information would have a beneficial effect on visitor use and experience. Visitors would have the opportunity to speak face-to-face with a park representative and receive accurate and up-to-date information to plan their trip.

Sand Point: Actions related to effectively managing commercial use to coexist with noncommercial use would result in beneficial impacts to the visitor experience. The separation of use type and reduction of the potential for visitor conflicts would provide a higher-quality visitor experience. By designating commercial use to one location, private users would have the opportunity to appreciate the scenery and recreational opportunities on the beach without being disturbed by the commotion of staging and prepping kayaks by commercial operators.

Miners Castle: Designation of Miners Castle as an expanded amenity fee area and considering a permit or reservation parking system for the area in the future would have beneficial and adverse impacts. The expanded amenity fee would likely be effective in deterring some visitors whose desired experiences could be met equally well at other locations within and outside of the Lakeshore from visiting Miners Castle simply because it is the most familiar or easiest destination to reach. This would have the beneficial effect of reducing crowding and congestion, but it would also have adverse effects. The expanded amenity fee would create an incentive to visit other sites instead of Miners Castle, which could present an issue if visitors’ desired experiences or activities would best be accommodated at Miners Castle and other locations are not suitable for those experiences or activities. The amenity fee could also have the adverse effect of preventing visitors with limited financial means from accessing or experiencing Miners Castle.

Miners Falls: Enforcing vehicle length requirements would mean more parking availability and less crowding and congestion, thereby improving the visitor experience. However, the length restriction would also be an adverse impact to visitors traveling to the park in oversized vehicles who would then need to use public transit or some other form of transportation to visit the falls. The adaptive strategy of adding overflow parking with safe shoulder sidewalk access to the trailhead would be beneficial as it would reduce crowding and congestion at the trailhead.

Miners Beach: See the beneficial and adverse impacts analyzed in the “Environmental Consequences Associated with Indicator and Threshold Adaptive Management Strategies” and

the “Environmental Consequences Associated with Indicator and Threshold Management Strategies” sections above.

Chapel Falls and Mosquito Beach: See the beneficial and adverse impacts analyzed in the “Environmental Consequences Associated with Indicator and Threshold Adaptive Management Strategies” and “Environmental Consequences Associated with Indicator and Threshold Management Strategies” sections above.

Cumulative Impacts. Past, present, and reasonably foreseeable projects within the park and surrounding areas have the potential to affect visitor use and experience. Planned improvements at Sand Point would increase beach area for visitors, which may have the effect of reducing some crowding in the Sand Point area, though the actual amount of shoreline would not change. The park staff’s efforts to remove human waste from existing remote pit toilets in and around Chapel Beach and Mosquito Beach would also have a beneficial impact as visitors would have the opportunity to enjoy scents associated with nature, rather than a sewage odor.

At Miners Falls, the trail would be upgraded to provide beneficial impacts to improved access for visitors with varying ability levels. This would be a noteworthy benefit for visitors with disabilities that currently do not have the opportunity to experience the falls but would be able to see the falls after traveling on an accessible 1/8-mile trail to the first viewing platform.

Continued use of two-stroke personal watercraft would continue to adversely impact visitors’ enjoyment of the Lakeshore, especially as it relates to the opportunity to experience natural soundscapes. However, the timing or amount of personal watercraft use is not expected to change. Since the actions related to this plan would not alter the natural soundscape in any appreciable way, the cumulative impact of the actions analyzed in this document along with the personal watercraft action would not be any greater than the impacts of the personal watercraft action alone.

The reasonably foreseeable drainage improvements along Sand Point Road is not expected to affect visitor use and experience nor would the replacement of the Miners Castle septic system.

It is reasonably foreseeable that the regional landing strip could be extended. This airstrip serves only small aircraft, therefore the impact of this change on overall visitation levels to the region (whether adverse or beneficial) would be relatively minor as only a very small proportion of visitors arrive by plane. There could also be an adverse impact associated with the increase in noise from plane traffic over the park.

One of the guided kayaking commercial use authorization holders is intending to increase on-water launching of commercial kayak tours of the Lakeshore. This could lower the overall use level on the land of the Lakeshore as more commercial kayakers launch from water rather than land. This would be a slight beneficial impact in the study area; however, the increase in noise and visual interruptions created by additional motorboats would have a slight adverse impact. Other adverse impacts to visitor use are likely (e.g., impacts related to on-water visitor experience); however, these exist outside of the study area and should be analyzed in forthcoming planning.

The City of Munising is expected to resurface Sand Point Road during the summer of 2020. Driving delays for visitors trying to reach Sand Point would constitute a minor short-term adverse effect. Other visitors may avoid the Sand Point area, thereby increasing visitation to other Lakeshore areas, increasing crowding and congestion at those locations and having an adverse effect.

Overall, the effects of past, present, and reasonably foreseeable projects would be relatively minor adverse impacts, short-term impacts, or beneficial impacts. The action alternative would not contribute any meaningful incremental impact as most of the impacts stemming from the past, present, and reasonably foreseeable projects do not overlap with the action alternative's impacts.

Conclusion. The impacts to visitor use and experience from the no-action alternative are, for the most part, slightly beneficial to adverse, while the impacts of the action alternative are beneficial to slightly adverse. This indicates that the action alternative is more beneficial than the no-action alternative. Neither alternative would have a significant adverse effect.

VEGETATION

Affected Environment

The vegetation communities associated with sand dune systems, including those along lakeshores, are transitional and complex in terms of biodiversity value, provision of wildlife habitat, and ecological services if left unrestrained by human activity (Schlacher et al. 2007). There are two major types of dune vegetation systems: the foredunes, which parallel conspicuous coastal shoreline features, and larger, more widespread transgressive dunes, that reach much further inland and are mostly stabilized by vegetation, including forests (Kesler 2019).

Because of the interplay between shoreline, dune, sandstone cliffs, and interior forested upland, the vegetation communities across the parklands are transitional and diverse, and are influenced by cyclical weather patterns as well as by past and present management actions, including logging, agricultural, and fire management activity. Due to the intrinsic qualities of sandy soils (poor horizon development, low percentage of organic material and fertility, coarse texture, loose structure, and low water retention), they are prone to erosive actions—both those that emanate naturally from weather and climate events, and those that are human-caused, such as from driving, trampling, establishment of infrastructure (Schlacher et al. 2007). Though plants established on sandy soils possess physiological characteristics allowing them to establish and persist (e.g., elongated horizontal root systems, thick cuticles, root qualities to support nitrogen fixation, morphological responses and rapid growth to sand accretion) and are resilient to naturally occurring and intermittent erosive actions, they are especially prone to alteration of the substrate by actions that accelerate erosion, such as persistent foot or tire traffic. Because these types of erosion activities are persistent, they have the effect of continually drying the sandy soils, thereby reducing stability and undermining the ability of sand-adapted vegetation to retain access to adequate moisture, nutrition, and structure, and resulting in reduced vigor and growth over time. This has the connected effect of deteriorating associated values of the

vegetation, such as the provision of wildlife habitat. With time, the vegetation communities fail to thrive and recede from the landscape; this has the overall effect of destabilizing dune features and slopes, and positioning the soils and landscape to the increased, exacerbated erosion actions from both natural and persistent human elements and increasing the effects of human-caused habitat fragmentation.

The beaches support grass and forb vegetation communities that are highly adapted to the dynamics and poor soils of dune environments. Above the wave line, the vegetative cover typically consists of slender wheatgrass (*Agropyron trachycaulum*), Canada wildrye (*Elymus canadensis*), American beachgrass (*Ammophila breviligulata*), beach wormwood (*Artemisia campestris*), horsetails (*Equisetum* spp.), and sand cherry (*Prunus pumila*) (Hop et al. 2010).

The primary forest community in the study area is deciduous northern hardwood–hemlock–white pine forest; in general, second-growth forest comprises most of the study area, which was historically logged. On stable coarse outwash and coastal sands, red pine (*Pinus resinosa*), eastern white pine (*Pinus strobus*), and jack pine (*Pinus banksiana*) are dominant. Considerable amounts of paper birch (*Betula papyrifera*) and trembling aspen (*Populus tremuloides*), as well as sugar maple (*Acer saccharum*) and yellow birch (*Betula alleghaniensis*), characterize much of the study area’s upland forest landscape, with American beech (*Fagus grandifolia*) integrating at various sites.

Of the approximately 750 vascular plant species reported as present in the park, about 120 nonnative plant species are known to occur (NPS 2018c), including about a dozen highly invasive species. Among these, garlic mustard (*Alliaria petiolata*) is an aggressive species and is most conspicuous in the Miners Castle area. Garden forget-me-not (*Myosotis scorpioides*) is another highly invasive species common in the Miners Castle area and in wet ditch areas along Sand Point Road. Sand Point and the Miners Beach area also have substantial populations of spotted knapweed (*Centaurea maculosa*). Invasive insect species also have the potential to affect the Lakeshore’s forests, including beech bark disease (an insect-fungus complex) and gypsy moth (*Lymantria dispar dispar*).

While several research efforts have reported on the impacts of both formal (established) and informal (social) trails, most research efforts have been targeted at a local level, usually within protected areas (Jordan 2000; Ballantyne and Pickering 2015). Jordan (2000) and Ballantyne and Pickering (2015) completed reviews of the current literature (English language) on this topic, and classified the prevailing impacts of visitor trail networks (informal or formal) on vegetation and soils. The effects classified in these reviews are relevant to the visitor-related impacts reported in this planning effort. Many of the impacts are related to distribution and dispersion of visitors at and from crowded or overflow areas. From the visitor behaviors reported earlier in this document (e.g., parking encroachment, facility and trailhead crowding), the most familiar and interrelated stresses of social trailing include trampling of vegetation, and habitat disturbance and modification (e.g., erosion, soil destabilization, compaction of soils with an organic component, tree root exposure). For example, trail width, especially for social trails, is shown to increase linearly with a logarithmic increase in the number of users (i.e., the trail width doubles with ten-fold increase in use) with correlated vegetation changes beyond the linear edges of the trails, though the extent of these impacts is not well understood. Continued habitat

fragmentation from newly established trails and social trails establishes a subtle and unintended land use change that affects vegetation communities through microclimatic changes, such as increased exposure to sunlight, changes in precipitation or humidity levels due to reduced canopy interception, increased wind or air circulation, and altered hydrological and temperature regimes. Nutrient-loading changes from dispersion of people away from crowded comfort station facilities into the surrounding natural area and improperly handled food waste, may alter vegetation composition by favoring conditions for some nonnative plant species to establish and persist, resulting in lowered native grass and forb diversity. Other influences, such as modification to soil nutrient cycling (bacteria, insects, mycorrhizal), persistence of early seral species assemblages, and generating conditions favoring introduced exotic plants and generalist scavenger species that negatively impact some wildlife species, are also recognized as impacts. The accumulative affect from concentrated networks of social trailing to native vegetation communities is a gradual decrease in overall plant community vigor and their related ecological services, making them prone to stochastic weather events, plant disease outbreaks, and rapid encroachment of invasive nonnative plant species.

Following are brief descriptions of the vegetation communities' representative of the specific areas of affected environment (Hop et al. 2010). For a full description of the vegetation communities inventoried at the park, please refer to Hop et al. (2010).

Munising Falls. This area contains a variety of vegetation communities that are heavily modified by past and current land use changes, both inside and outside park boundaries. The vegetation here reflects a system that is decidedly fragmented with moderate levels of development. While some natural woodlands exist, the areas adjacent to the most heavily visited, developed areas consist of patches of persistent ruderal vegetation in both the hardwood forest and associated understories and grasslands. Other associated forest community types include small areas of wetland conifer. These forested types are dominated by red pine forest and may intergrade with white pine forest types containing oak (*Quercus* spp.), bigtooth aspen (*Populus grandidentata*), paper birch, and red maple (*Acer rubrum*). These forest types are commonly observed with ericaceous (blueberry) shrubbery (*Vaccinium* spp.) in the understory.

Sand Point. Sand Point contains a mostly undeveloped shoreline of sand cobble beach and is situated on a gently to moderately sloping dune habitat. The vegetation types contained here are strongly influenced by rapidly draining soils, as well as the site's moderate protection from erosive actions, such as wind and water, given its proximity to Grand Island. Closest to the shoreline where dunes are stabilized, but still too disturbed by wind for trees to establish, beachgrass dune communities dominate and are characterized by stretches of American beachgrass and little bluestem (*Schizachyrium scoparium*), and small stands of woolly beach-heather (*Hudsonia tomentosa*), common juniper (*Juniperus communis*), and sand cherry may persist throughout. Moving inland where forested areas are established, mixed conifer forests of red pine, jack pine, and eastern white pine dominate, with a blueberry shrub later thriving in the understory. A dogwood-willow swamp occurs here, characterized by a dense, shrubby, diverse stand of red-osier dogwood (*Cornus sericea*) and associated willow species (*Salix* spp.).

Miners Castle. This area contains vegetation communities that are found perched atop the gently sloping bluff that characterizes this landscape feature. These communities are

predominately white pine–hardwood forest or white pine–aspen–birch forest and include mixed hardwoods representative of vegetation communities that are widespread throughout the Great Lakes region. These forest stands are associated with a variety of slope positions in deep, dry-mesic to mesic, rapidly drained soils of fine sandy to loamy soil textures. In the subcanopy and understory, maples (*Acer* spp.) occur, and shrubby woody species such as beaked hazelnut (*Corylus cornuta*) and northern bush honeysuckle (*Diervilla lonicera*) is present throughout. In Michigan, this forest type can originate as a result of past forestry management, though natural examples exist and have slightly more variation in associated plant species.

Miners Falls. The Miners Falls area contains transitioning forest communities (mesic conifer–hardwood to drier mixed northern hardwood) that are influenced by slope and the mesic conditions of the associated soils found here. Moist forest types are typified by white cedar–boreal conifer mesic forest (conifer–hardwood), a mesic to wet forest type that is typically located on slopes. This forest type is characterized by stands of northern white cedar (*Thuja occidentalis*), balsam fir (*Abies balsamea*), yellow birch, paper birch, and red maple, with a rich understory of spinulose woodfern (*Dryopteris carthusiana*), dwarf red blackberry (*Rubus pubescens*), and twinflower (*Linnaea borealis*). The richness of this community is primarily due to its association with the saturated conditions of the soils found here. Shifting to slightly drier soil conditions, maple–yellow birch northern hardwood forest is encountered, which is broadly represented throughout the parklands. Closer to the falls, the overstory is represented by balsam fir–paper birch forest/northern bush honeysuckle (*Abies balsamea*–*Betula papyrifera*/*Diervilla lonicera*) forest—a vegetation association that is typically affiliated with transition ecotones between sand dunes and mesic forest, lake and pond margins, and high-energy streams and waterfalls.

Miners Beach. Also containing a sand cobble shoreline feature, this area contains sand dune vegetation communities that are found along shorelines featuring dunes. Situated on the slopes and ridges of the dunes, and dominating much of the site here is the Great Lakes Coast pine barrens forest community, a globally rare vegetation type. This community is described as a coniferous savanna of scattered trees, including jack pine and eastern white pine, with an evergreen shrub layer of kinnikinnick (*Arctostaphylos uva-ursi*) and common juniper (*Juniperus communis*), which transitions to maple–yellow birch northern hardwoods forest type. Further inland, a forest mosaic of jack pine/blueberry/feather moss and white pine/blueberry dry mesic forests dominate, their vegetation composition strongly influenced by the mesic conditions found in the associated loamy soils. Associated vegetation communities include swamp-dune mosaic forest community types found between the beach ridges and wetland swales, distinguished by a canopy of white pine and red maple. Beach-heather dune dwarf shrubland is found here as well, dominated by woolly beach-heather (*Hudsonia tomentosa*) and grasses such as American beachgrass and wavy hairgrass (*Deschampsia flexuosa*). An occurrence of dogwood–willow swamp (described earlier) is also found here.

Chapel Falls. The Chapel Falls area contains one of the most extensively represented hardwood forest stands found throughout the park that can span a wide spectrum of environments, the maple–yellow birch northern hardwood forest. It is usually associated with mesic environments containing rich soils and can be represented in both wet-mesic and dry-mesic settings. Sugar maple is usually the dominant tree and is mixed with other hardwoods,

including red maple, paper birch, American beech, and bigtooth aspen. Depending on past land uses, Canada yew (*Taxus canadensis*) might be found at high densities in the shrub layer.

Mosquito Beach. Above sandstone bedrock shoreline found here, this area features sandstone bedrock ledges characterized by two vegetation classifications: the Great Lakes sandstone bedrock shore at the steeply sloped lower sections and the balsam fir–paper birch forest on the more gently sloped upper sections. The sandstone bedrock shore is a sparsely vegetated feature with vegetation adapted to poor soil development. This vegetation community is limited to herbaceous plants and dwarf shrubs, such as common yarrow (*Achilleum millefolium*), fireweed (*Chamerion angustifolium*), and dwarf red blackberry that can take hold in the crevices that are characteristic of the sandstone bedrock ledges, while mosses and liverworts are found in seepages that flow across the bedrock. Balsam fir–paper birch forest distinguishes the more gently sloped reaches of the benches and contains a moderately dense tree canopy dominated by paper birch, with balsam fir represented at lesser amounts. Red maple, quaking aspen (*Populus tremuloides*), and white spruce (*Picea glauca*) may be scattered throughout, and the understory may contain a shrubby and herbaceous layer of Canada yew and northern bush honeysuckle. A third forest type, Great Lakes hemlock–beech (*Tsuga canadensis*–*Fagus grandifolia*) hardwood forest is located above the ledges on flatter aspects characterized by sandy or loamy soils, or loamy silt soils, and may have an associated herbaceous understory containing bunchberry dogwood (*Cornus canadensis*), starflower (*Trientalis borealis*), and snow trillium (*Trillium grandiflorum*).

Environmental Consequences of Alternative A

Under alternative A, no management changes would be expected for vegetation; however, efforts to manage visitor impacts on vegetation would continue through adjustments to reduce visitor encroachment or trailing into natural areas when facilities are crowded. Efforts to manage impacts would stem from separating visitor types (commercial, private) both in place and in timing, improving visitor circulation by identifying overflow parking areas outside of parklands, applying strategic parking limits (size of vehicles, circulation), and establishing a second vault toilet at Sand Point to alleviate visitor wait times. This alternative would rely more on indirect management strategies (education, interpretation, administrative corrective actions, separation of visitor uses) to change visitor behavior. Though mitigation measures would be implemented for alternative A, disturbances to vegetation communities would continue to occur under these management practices and projected visitor use.

Visitors disperse from designated trails and visitation sites along the most accessible routes (visual, slope) to reach sites of interest, scenic viewpoints, or other inherent diversions; over time these areas may appear to be authorized for visitor use. This continued activity creates additional stress to vegetation, as previously described. Additionally, temporary vegetation rehabilitation techniques (e.g., erosion control matting) may create the unintended consequence of providing unimpeded, groomed pathways for visitors to trail through or congregate, which suppresses efforts to recover and establish native vegetation.

While it would be somewhat imprecise to apply quantifiable figures for a given area of informal or unauthorized visitor disturbance, the following approximations are made. Footprints for

facility installations and trail lengths are estimated from computer analyses of area expansion or routes drawn from scaled topographic maps. Linear feet or mileages, and square feet and acreages of disturbance have been rounded to the nearest 0.01. Due to rounding, numbers presented here may not calculate precisely to the totals provided. Installation of a comfort facility at the perimeter of an established parking area is calculated to occupy 150 ft² for a vault toilet or 250 ft² for a changing station. For off-road parking encroachment, the area impacted would include the average width of the vehicle plus an additional 10 feet from the passenger side of the vehicle for offloading, multiplied by the length of road where vehicles are aligned. For dispersion from points of visitor concentration, the area impacted would be dependent on the density of visitors at a given time, the topography of the site, and the available vegetative cover and type at a site. For example, given these factors, should dispersion from a high-use visitor area occur because of lack of comfort facilities, the cone of disturbance of social trailing and refuse deposition would be from 30 to 500 feet away from the node of dispersal. Trail improvements are predicted by multiplying the estimated length of the trail by the width of the corridor that would be affected by construction. It is assumed that existing trails would be improved to the maximum width of the designated trail class.

Cumulative Impacts. Past and present actions in the park have resulted in or are resulting in varying levels of vegetation disturbance or restoration within the study area. These projects have occurred or are occurring in or within proximity of established disturbance areas, facilities, or infrastructure. If implemented, projected drainage improvements along Sand Point Road would stabilize the road structure and eliminate undesirable driving conditions. Replacement of the septic system at Miners Castle would take place in zones that are developed or contain persistent ruderal vegetation types and would not be expected to have additional impacts to vegetation. Construction of a stair structure at Miners Falls Trail from an existing lower platform to a new platform would have temporary impacts from installation of the stairs and new platform but would be offset by mostly eliminating the current social trailing that occurs as visitors move to a viewing area closer to the river. Removal of the revetment at Sand Point would restore the natural sand spit and natural beach dynamic process, restoring about 0.5 acre of beach area.

As previously described, the direct and indirect impacts of alternative A to vegetation would result in continued adverse impacts on vegetation at key points of visitor congestion. When these effects are combined with other past, present, and reasonably foreseeable impacts, the total cumulative impact on vegetation would continue to be adverse. While there would be some improvement in localized areas, the incremental impacts of alternative A would contribute slightly to the impacts that are already occurring.

Conclusion. Overall, the area affected by alternative A is estimated to be about 0.20 acre of impacted vegetation *per* individual zone of impact. Each of the six sites previously described may have more than one zone of impact. This figure also does not account for roadside vehicle encroachment into natural areas. These impact zones mostly occur along existing parking lots and roads when parking lots are full. Under alternative A, both adverse and beneficial impacts to vegetation would stem from efforts to provide options for alleviating crowding and improving visitor flow at key visitation sites. Use of the existing infrastructure by park visitors would continue to result in small adverse impacts on vegetation across key points of visitor congestion.

These impacts are not likely to be limited, as they occur within margins of existing disturbed zones (trails, roads, parking areas) and most of the affected vegetation types, with the exception of Sand Point, are not rare. Ongoing impacts would not diminish the overall natural vegetation cover in the study area. The incremental impacts of the no-action alternative would contribute slightly to the impacts that are already occurring. By providing options for visitor circulation and accommodation, visitors would more likely use designated facilities, trails, and parking areas to reach their intended destinations. Beneficial impacts also occur from strategies that aim to provide messaging to visitors about recognizing resource benefit when using established facilities to reach their destination. These options may alleviate the more chronic impacts to vegetation but are unlikely to measurably decrease the current impacts and are not expected provide long-term solutions.

Environmental Consequences of Alternative B

Under this alternative, improvement to park facilities would have some localized and adverse direct impacts to vegetation; however, they would occur in areas that are currently impacted by informal visitor use and dispersal. The actions described for alternative B would disturb or remove about 2.1 acres of vegetation.

For vegetation in sandy environments, the benefits of implementing alternative B would likely improve and stabilize the habitat for sand dune-restricted plants and rare vegetation types and reduce impacts to sandy loams and soils having rapid permeability or that are prone to moderate or severe soil-blowing hazard and related erosive processes where vegetation is reduced or eliminated. At Miners Beach, the proposal to require boats to be carried, rather than dragged, would effectively stabilize or reduce the current levels of accelerated erosion by managing for unintentional removal of or damage to vegetation in this area, as well as reducing disturbance to sandy soils that have poorly developed soil horizons.

For vegetation and associated soils in forested areas, the reduction of social trailing by improved trailing and directional signing would reduce the fragmentary nature of this impact, stabilize or improve the presence of early seral pioneer plant species, and encourage recruitment and establishment of mid-seral plant communities. Managing for social trailing would also maintain or improve the condition of boggy/wetland areas containing poorly drained soils and/or associated sensitive vegetation. Additionally, alleviating crowding of bathroom facilities to improve solid and human waste collection and disposal would effectively manage the current undesired impacts of trampling and trailing in vegetated areas (where visitors disperse to seek the privacy of cover), especially in areas where sensitive plants species may be present or where soils are poorly drained. This reduction in social trailing would also provide an opportunity for resource managers to improve conditions for establishment of native vegetation and reduce the impacts associated with soil compaction from visitor use. At Miners Falls, reduction of social trailing by replacing the lower viewing platform and creating an appropriate stair structure between the two platforms would improve conditions for soil stability, exposed tree roots and slopes, and associated sensitive plant species that may be located in the falls area, though there may be short-term impacts to vegetation during construction of the stair structure and platform.

Finally, road improvements along Miners Beach Road and Miners Falls Road would help delineate the route of vehicle travel and appropriate parking areas. This would limit the related impacts of unintended road-width expansion due to off-shoulder parking and the associated encroachment into natural areas from interim grading of the current road and trailing into natural vegetation communities from visitors exiting and entering vehicles. However, road design that does not consider its broader impacts to land topography and surface hydrology, or to the connected ecologies of vegetation, wetland habitat, and wildlife that is not highly mobile, would result in persistent degradation to the biotic community that is already impacted by human-caused fragmentation.

Alternative B would contribute slightly to vegetation impacts that are already occurring along the perimeter of defined visitor use areas but would be expected to have beneficial impacts to natural vegetation communities beyond the areas of visitor congestion as visitors are provided with appropriate parking, traffic and pedestrian flow, and comfort facilities and other structures. Overall, cumulative impacts on vegetation would be largely beneficial when analyzed beyond the period of initial construction.

Cumulative Impacts. Past and present actions in the park have caused or are resulting in varying levels of vegetation disturbance or restoration in or within proximity to the study area. These projects have occurred or are occurring in or adjacent to previous areas of disturbance, or the existing footprint of where concentrated disturbance, facilities, or infrastructure are already established. Improvements to parking facilities (realignment, limited expansion) would remove vegetation in areas that are currently impacted by unauthorized parking, social trailing, and foot traffic along parking lot perimeters. Limited forb, shrub, and tree clearing may result and there would be a slight net increase in the percentage of park lands that would have impervious cover. This would be offset by reducing the impacts to vegetation from unauthorized parking in zones contiguous to current parking areas. If implemented, potential drainage improvements along Sand Point Road would help stabilize the road, as would similar improvements to Miners Falls Road. At Miners Beach, a rare vegetation community (Great Lakes Coast pine barrens forest) may be slightly affected if the improved facilities are established where this community is currently delineated. Also at Miners Beach, a CUA dropoff, a CUA trail, and associated facilities (vault toilet, changing station, and possible kayak staging area) would be established within the area of a previously existing roadbed. Replacement of the septic system at Miners Castle would take place in zones that are developed or contain persistent ruderal vegetation types and would not be expected to have additional impacts to vegetation. Construction of a stair structure at Miners Falls Trail from an existing lower platform to a new platform would have temporary impacts from installation of the stairs and new platform; impacts would be offset by mostly eliminating the current social trailing that occurs as visitors move to a viewing area closer to the river. However, some visitors may be motivated to move off trail and closer to the river, which would impact riparian vegetation and related soil structure there. Removal of the revetment at Sand Point would restore the natural sand spit and natural beach dynamic process, restoring about 0.5 acre of beach area.

As previously described, the direct and indirect impacts of alternative B would result in both beneficial and localized adverse impacts on vegetation at key points of visitor congestion. When these effects are combined with other past, present, and reasonably foreseeable impacts, the

total cumulative impact on vegetation would also be both beneficial and adverse. The incremental impacts of alternative B would contribute slightly to, but would not substantially change, the impacts that are currently occurring. Overall, cumulative impacts on vegetation would be beneficial when analyzed beyond the period of initial construction.

Conclusion. Under alternative B, the realignment of parking areas, improvements to roads and trails, establishment of comfort stations, and establishment of commercial-use-only facilities to separate types of visitor use and improve visitor flow, would result in both beneficial and adverse impacts on vegetation. These impacts would not likely be significant as they would be limited to margins of existing disturbed zones (trails, roads, parking areas), would not directly impact rare vegetation types, and would not cause any meaningful change to composition or ecology of the presently existing vegetation communities. There would be a net benefit to vegetation that is currently disturbed by unintended visitor access from an absence of appropriate facilities and planning to accommodate visitor use; this would alleviate chronic adverse impacts to vegetation in these areas overall.

SPECIES OF SPECIAL CONCERN

Affected Environment

The US Fish and Wildlife Service (USFWS) has implemented a consultation process and tool titled “Information for Planning and Consultation” (IPaC). This is a regulatory review process designed to help agencies evaluate any potential effects to listed or proposed species or to proposed critical habitat that may be in the action area under Section 7 of the Endangered Species Act (50 Code of Federal Regulations [CFR] § 401.12).

Using the results from the Information for Planning and Consultation, the National Park Service initially entered into informal consultation with the US Fish and Wildlife Service (Lansing, Michigan Field Office) in June 2018 regarding the evaluation of effects to these species with respect to the preferred alternative and updated the report on September 11, 2019 (USFWS 2019a). The record received from the US Fish and Wildlife Service indicated that there are potentially seven threatened or endangered species in the study area. No designated critical habitat for any listed species is identified in the action area. Table 4 presents a list of the species potentially occurring at the Lakeshore.

The Lakeshore preserves more than 40 miles of shoreline and much of the shoreline, especially where sandy beaches are prominent, is used by shorebirds and other shoreline-adapted wildlife for habitat, migration stopover, and foraging activity. Depending on the species, shorebirds are shown to have particular preferences for using beaches based on extent and type of vegetation structure, and other physical characteristics that provide shelter and access to food resources (Meager et al. 2012). There is a growing body of scientific evidence indicating that human activity and recreation will modify habitat selection by birds. For species that are sensitive to human disturbance, the intensity and duration of human activity will negatively influence shoreline use by these birds (Meager et al. 2012). Depending on the proportion of human activity, shorebirds will exhibit an increasing avoidance of habitats they would normally select in areas lacking human presence or with low human densities. Contingent on how widespread

human activity is in a given area, the avoidance of habitat will affect sensitive species' access to those conditions that influence their fitness and capacity to thrive.

More detailed information on individual species follows.

Table 4. Federally Listed Species Present or Potentially Present at Pictured Rocks National Lakeshore

Taxa	Common Name	Scientific Name	Federal Status
Plant	Pitcher's thistle	<i>Cirsium pitcheri</i>	Threatened
Bird	Rufa red knot	<i>Calidris canutus rufa</i>	Threatened
Bird	Piping plover	<i>Charadrius melodus</i>	Endangered
Bird	Kirtland's warbler	<i>Dendroica kirtlandii</i>	Endangered
Mammal	Canada lynx	<i>Lynx canadensis</i>	Threatened
Mammal	Gray wolf	<i>Canis lupus</i>	Endangered
Mammal	Northern long-eared bat	<i>Myotis septentrionalis</i>	Threatened

Sources: National Park Service 2018c, US Fish and Wildlife Service 2019a.

Pitcher's Thistle. This plant is in the composite family (Asteraceae) and is listed as threatened wherever it is found (USFWS 2019a, USFWS 2002). It is a perennial, herbaceous plant that generally flowers after a 5- to 8-year juvenile stage, setting flowers and seeds only once during its existence (USFWS 2002). Often referred to as the “dune thistle,” it is a distinctive plant with woolly white vegetative parts, deeply pinnatifid leaves revealing minute spines along the leaf margins, and branched stems displaying flower heads consisting solely of disk flowers in a cream or pinkish color. It is endemic to the sandy beaches and grassland dunes of Lakes Michigan, Superior, and Huron (USFWS 2002), with the majority of the sites occurring along the shores of Lake Michigan. This plant is associated with the open dune and sand cobble shore habitat, identified as an important habitat type in Michigan's natural heritage assessments (Derosier et al. 2015). Pitcher's thistle is reported from the park (Hop et al. 2010, NPS 2018c).

Rufa Red Knot. This bird is a federally threatened species wherever it is found (USFWS 2014a). It is a medium-sized shorebird with a short thick bill and legs, soft chestnut-colored upper feathers, and paler underneath (Baker et al. 2013). The rufa red knot migrates between breeding grounds in the central Canadian Arctic and several wintering regions, which include the southeastern United States (USFWS 2014b). During the spring and fall migrations, rufa red knots may use key staging and stopover areas to rest and feed on a variety of small invertebrates. Migratory habitats generally include large coastal zones and open sandy beaches (USFWS 2019a). The rufa red knot is reported to be a low-density migrant and most records are of pairs or small flocks of up to 10 birds. In Michigan, this species is more frequently recorded during the autumn on Lakes Erie and Michigan (USFWS 2014a). This species appears to be opportunistic and may occur almost anywhere along the shores of the Great Lakes, inland on mudflats of falling reservoirs in late summer and autumn, or on flooded fields in the spring (USFWS 2014b, Vincent Cavalieri pers. comm. November 8, 2018).

Piping Plover. The piping plover is a small shorebird with pale sandy-hued upperparts, orange legs, a short stout bill, and a distinctive two-noted “peep-lo” melodius whistle—characteristics that are important for identification (Hyde 1999, Elliott-Smith and Haig 2004). In the Great

Lakes region, this species is listed as federally endangered; along the Atlantic coast and in the Great Plains it is listed as federally threatened (USFWS 2018a). Piping plovers are rare shorebirds with a global breeding population of just 8,400 individuals (Partners in Flight 2019). In the Great Lakes region, they are currently reported to breed on shorelines of all five Great Lakes (Great Lakes Piping Plover Conservation Team 2018) and 57 nesting pairs were reported in Michigan in 2015 (Derosier et al. 2015). Critical habitat for the Great Lakes region was identified in 2001 (USFWS 2001); while the park's eastern reach bounds with critical habitat, the action area lies outside of identified critical habitat and potential critical habitat. This species is known for migratory activity within the project area, notably Sand Point (Bruce Leutscher, PIRO Resources Chief, pers. comm. November 6, 2018).

Historically, piping plovers bred across three geographic regions in the United States and Canada: northern Great Plains, Great Lakes region, and the Atlantic coastal region from Newfoundland to North Carolina (USFWS 2018a). Piping plovers currently live in the area that is similar to their historical range; however, their numbers have significantly decreased since the 1930s. Population declines are attributed to land use conversion in nesting and migratory habitat; direct and unintentional harassment and mortality rates by people, pets, and vehicles; and changes in water levels affecting availability of nesting habitat (USFWS 2018a).

Nesting, brooding, and foraging occur on wide sand and cobble beaches containing little vegetative cover and human disturbance (USFWS 2003). In Michigan, piping plovers may be observed from late April into September (Hyde 1999). Nests are usually initiated by May and brooding occurs from late May through late July, with fledging occurring approximately 21 to 30 days after hatching. Breeding adults will disperse by mid-August, and most juvenile plovers leave nesting sites by the end of August (USFWS 2003). Although there are no records of breeding pairs from within the park boundaries, there are records of piping plover observations inside park boundaries during the late season migratory window at Twelvemile Beach Campground (September 10, 1974, northeast of the study area near Grand Marais), and at Sand Point on August 29, 2017 (inside the study area) (eBird Basic Dataset 2019). Staff with the USFWS Ecological Services Field Office in Lansing, Michigan describe Sand Point as the most likely area in the park to observe piping plovers, which marginally meets the specifications outlined in the critical habitat for this species (Vince Cavalieri pers. comm. November 8, 2018).

Kirtland's Warbler. This is a federally endangered species of songbird known to nest in stands of young jack pine forest on well-drained sandy soils in northern Michigan, Wisconsin, and Ontario, Canada (USFWS 2019b; Bocetti et al. 2014). This bird has fairly specific habitat requirements, only nesting in large stands of young jack pine (of at least 80 acres) but preferring 300- to 400-acre stands that were recently disturbed by fire. Features associated with its preferred nesting habitat contain savanna, forest openings, and large contiguous areas of natural landscapes (Derosier et al. 2015). Between 1967 and 1995, this species was known to nest only in the northern part of Michigan's Lower Peninsula (USFWS 2019b; Bruce Leutscher, Pictured Rocks National Lakeshore Staff, pers. comm. March 14, 2019). At present, they are also known to nest in Michigan's Upper Peninsula, as well as in Wisconsin and Canada, and are listed as state endangered in Michigan (Derosier et al. 2015). Additionally, the park reports a sighting of this warbler during 2019 within the legislated boundary, but not in the action area (Cindy Heyd,

Pictured Rocks National Lakeshore, August 9, 2019). Currently, this species' population is proposed for delisting (USFWS 2018b).

Canada Lynx. This federally threatened species is a medium-sized cat with long legs, 19 to 22 pounds, 23 to 34 inches long, large paws, tufted ears, and a short blacked-tipped tail. Its long legs and large feet make it highly adapted for hunting in deep snow. The lynx's distribution in North America is closely associated with the distribution of North American boreal forest and specifically with boreal/hardwood forest ecotone in the Great Lakes region. Within this general forest type, lynx are likely to persist in areas receiving deep snow and that have high densities of snowshoe hare populations (their principal prey). Their home range contains a variety of early-, mid-, and late-seral forest types that provide adequate opportunities for hunting, cover, and denning (Murray et al. 1994). The preferred denning habitat is reported as large expanses of dense, mature forests containing woody debris (fallen trees, stumps).

This species is reported as apparently extirpated from Michigan; although individuals of this species are reported in Michigan, there are no reports of breeding populations (Derosier et al. 2015). The state of Michigan, therefore, does not list this species as a Species of Greatest Conservation Need. There is no identified critical habitat for this species in Michigan (USFWS 2019a). Records of observation exist for the park in 2003 and 2004 (NPS 2018c). Canada lynx may use the park as a travel corridor between suitable patches of habitat, though they are unlikely to linger or den, given the area's lack of favorable habitat conditions, both for denning and for their preferred prey.

Gray Wolf. This species is federally endangered throughout most of its range in the contiguous United States, with the exception of Minnesota (where it is federally threatened) and Idaho and Montana (where it is delisted due to recovery). All gray wolf populations are currently proposed for delisting (USFWS 2019a). Michigan's gray wolf population has exceeded both state and federal recovery goals and has therefore been removed from Michigan's list of Species of Greatest Conservation Need (Derosier et al. 2015). No critical habitat exists in or near the Lakeshore. Throughout North America, wolves are adapted to a wide variety of habitats where there is sufficient prey (USFWS 2019a).

Northern Long-Eared Bat. This federally threatened species is found across much of the eastern and northcentral United States (37 states) and in all Canadian provinces from the Atlantic coast west to the southern Northwest Territories and eastern British Columbia (USFWS 2019a). It is a medium to dark brown bat with long ears and a symmetrical spear-like anatomical projection at the front of the external opening to the ear, which is important for identification (USFWS 2015, Derosier et al. 2015). Northern long-eared bats hibernating in caves in the eastern United States are reported to have undergone a 98% decline between 2010 and 2015 following exposure to the disease white-nose syndrome (Derosier et al. 2015). In the major hibernacula of Michigan, it is projected that declines of this species will range from 40% to 98% with the emergence of this disease.

From recent acoustical surveys at the park, the northern long-eared bat is known to occur in the park (Cindy Heyd, Pictured Rocks National Lakeshore, pers. comm. November 9, 2018). Though it was thought to likely occur in the park, it was first detected through acoustical surveys in 2003 (Kruger and Peterson 2008). During mist-netting efforts for bats in 2016, Eastern

Michigan University biologists identified five maternity roosts at locations in the park (Kurta and Slider 2016). There is also the potential for bats to opportunistically roost in individual trees during the active season (April 1 to November 15) and to forage in forested corridors, emergent wetlands, open grassland edges, fencerows, and riparian areas in the action area.

Migratory Birds, Including Shorebirds. Because of the wide variation in habitat types and topography in the Lakeshore, the diversity of bird species is high, especially for migratory species and others using shoreline habitats. The US Fish and Wildlife Service identified a list of 12 migratory bird species to be considered in the action area that are of particular concern because they occur on the USFWS Birds of Conservation Concern list or warrant special attention in the project location (USFWS 2019a). Eleven of the 12 species are presented in table 5. The 12th species, dunlin (*Calidris alpina articola*), is not listed here as this is a Bird of Conservation Concern only in certain Bird Conservation Areas in the continental United States. The park and project area are not included in any of the Bird Conservation Areas where this species may occur (USFWS 2019a). Table 5 contains notes on when the 11 species might occur or breed in the area; this is helpful when determining appropriate timing for implementation of the best management practices described in Appendix C.

Table 5. Birds of Conservation Concern or Protected by the Bald and Golden Eagle Protection Act That Occur in Pictured Rocks National Lakeshore

Common Name	Scientific Name	Presence Notes / Breeding Season
American bittern	<i>Botaurus lentiginosus</i>	April 1 – August 31
Bald eagle	<i>Haliaeetus leucocephalus</i>	December 1 – August 31
Bobolink	<i>Dolichonyx oryzivorus</i>	May 20 – July 31
Canada warbler	<i>Cardellina canadensis</i>	May 20 – August 10
Cape May warbler	<i>Setophaga tigrina</i>	June 1 – July 31
Evening grosbeak	<i>Coccothraustes vespertinus</i>	May 15 – August 10
Lesser yellowlegs	<i>Tringa flavipes</i>	Migratory; breeds elsewhere
Olive-sided flycatcher	<i>Contopus cooperi</i>	Reported as migratory in the park. May breed May 20 – August 31.
Rusty blackbird	<i>Euphagus carolinus</i>	Unconfirmed presence in the park. May breed May 10 – July 20.
Semipalmated sandpiper	<i>Calidris pusilla</i>	Reported as “probably present” in the park. Migratory; breeds elsewhere.
Wood thrush	<i>Hylocichla mustelina</i>	May 10 – August 31

Sources: National Park Service 2018, US Fish and Wildlife Service 2019a.

Species identified as migratory species include shorebirds, such as the semipalmated sandpiper (*Calidris pusilla*) and lesser yellowlegs (*Tringa flavipes*). The bald eagle (*Haliaeetus leucocephalus*) is known for migratory passage through the Great Lakes region, as well as breeding in or near the action area (Cindy Heyd, Pictured Rocks National Lakeshore, pers. comm. August 9, 2019). Bald eagles will roost in trees along shorelines during migratory intervals. During the breeding season, they will nest and/or roost along shoreline and upland

areas, constructing large nests in the canopies of tall trees, and are routinely observed hunting along shorelines.

Species known or suspected to breed in or near the action area include upland or inland species, such as the olive-sided flycatcher (*Contopus cooperi*); shoreline/marsh species, such as the American bittern (*Botaurus lentiginosus*); wet meadow species, such as the bobolink (*Dolichonyx oryzivorus*); and upland forest species, such as the Canada warbler (*Cardellina canadensis*), Cape May warbler (*Setophaga tigrina*), evening grosbeak (*Coccothraustes vespertinus*), and wood thrush (*Hylocichla mustelina*).

Sensitive Species and State Species of Special Concern. In addition to considering federally listed threatened and endangered species and migratory birds, the Michigan State Wildlife Action Plan (Derosier et al. 2015) and the Michigan Natural Features Inventory (Michigan State University Extension 2019) collectively identify several species of state management concern; taxa on this list include mammals, birds, plants, and invertebrates. This list includes state endangered or threatened species, and those with ecologies that would be considered during management planning, project implementation, and post-project monitoring.

This list of species was cross-referenced with certified park biological inventories (NPS 2018c), as well as using information provided by park staff over various dates (Bruce Leutscher, Cindy Heyd, Pictured Rocks National Lakeshore, pers. comm.) to provide a list of 12 species that are known or likely to occur in the action area. A more detailed table that includes management status, park management priority, park abundance, and management recommendations related to periods of activity for these species is located in Appendix C.

Please note that if a species presented through other compliance pathways is already described in this section (federal or migratory), it is not presented in table C-1.

Environmental Consequences of Alternative A

Under alternative A, the general footprint, visitor use, and types of recreation within existing visitor use zones would remain the same, including road and trail placement, parking facilities, locations of comfort stations; there would also be the lack of established comfort stations in key areas. Continued adverse impacts to natural areas along the perimeters of concentrated visitor use would result from continued increases in visitation. This would be most evident as unauthorized parking continues to occur, resulting in continued expansion of unintended habitat disturbance. Similar impacts would be evident in areas where social trailing networks are concentrated, especially as visitors seek to disperse from congested areas, such as trailheads and parking lots. This social trailing would likely result in widening dispersed influence on habitat and vegetation, and continue to affect the quality of the natural cover and habitat type in these impact zones.

Federally Listed Species. Evaluation for each of the federally listed species potentially occurring in the Lakeshore finds that the species are either not present in the action area, the species do not occupy the habitat type identified in the action area, the action area is not used for breeding activities, or the action area is outside the known range of the species in the park or surrounding area. Migratory activity may be observed for the piping plover, however. The park

will continue ongoing consultation with the US Fish and Wildlife Service to obtain concurrence on the section 7 determination.

Analyses for each of the federally listed species identified for the action area are presented below.

Pitcher's Thistle. None of the locations identified in alternative A overlap with the known localities of this species in the park (Bruce Leutscher Pictured Rocks National Lakeshore, pers. comm. November 6, 2018); however, all proposed areas of activity would be surveyed by NPS botanists prior to ground disturbance. If any Pitcher's thistles are located in trail alignments, the plants would be marked so individual plants can be avoided by routing the trail away from the plants. Given the restricted distribution and stationary nature of this species, alternative A would not alter this species' distribution or population or affect the known presence of this species in the action area. *Therefore, alternative A may affect, but is not likely to adversely affect, the Pitcher's thistle.*

Rufa Red Knot. Although this species may use suitable areas in the park during migration, no records of observations for this species in the park have been located; however, there is one record of observation of the nominate species (*Calidris canutus*) at Grand Marais, outside of the park near its northeastern boundary (eBird Basic Dataset 2018). Given the transitory nature of this species in this region and the few individuals that may use this area, alternative A would not alter this species' distribution or population or affect the presence of this species in the study area. Per USFWS guidance, this species only needs to be considered if actions occur along coastal areas during its migratory window of May 1 to September 30. This guidance will be further addressed through implementation of best management practices noted in appendix C. *Therefore, alternative A may affect, but is not likely to adversely affect, the rufa red knot.*

Piping Plover. Because there are no records of breeding piping plovers in the action area, and because the action area lies outside of identified critical habitat areas, alternative A would not affect the unlikely presence of breeding activity in the action area. The USFWS Ecological Services Office (Lansing, Michigan) recommends that agency management actions be sensitive to habitat disturbance, primarily for foraging, during the spring migration and breeding period (Vincent Cavalieri pers. comm. November 8, 2018). This recommendation will be further addressed in the best management practices of this document. *Therefore, alternative A may affect, but is not likely to adversely affect, the piping plover.*

Kirtland's Warbler. While there is potential breeding habitat (jack pine vegetation communities) in the park (Hop et al. 2010), there are no known records for this species from the action area. There are recorded observations, however, from locations south of the park in the Hiawatha National Forest (eBird Basic Dataset 2014). Additionally, the park reports a sighting of this warbler during 2019 within the legislated boundary, but not in the action area (Cindy Heyd, Pictured Rocks National Lakeshore, pers. comm. August 9, 2019). Alternative A would not alter this species' distribution or population or affect the presence of this species in the study area. *Therefore, alternative A may affect, but is not likely to adversely affect, the Kirtland's warbler.*

Canada Lynx. While the presence of people may slightly impede the movement of individual lynx within a travel corridor, alternative A would not alter this species' distribution or population and would not change the behavior or affect the presence of this species in the action area. *Therefore, alternative A may affect, but is not likely to adversely affect, the Canada lynx.*

Gray Wolf. There are observations of gray wolves at the park recorded in the park's Wildlife Observation Database (NPSpecies 2018), and individuals are known to use the action area (Bruce Leutscher, Cindy Heyd, Pictured Rocks National Lakeshore, pers. comm. August 9, 2019). No critical habitat is known from the park or action area. While the presence of people may impede the movement of individual wolves within a travel corridor, alternative B would not alter this species' distribution or population or affect the presence of this species in the action area. *Therefore, alternative A may affect, but is not likely to adversely affect, the gray wolf.*

Northern Long-Eared Bat. Under alternative A, there likely would be limited clearing of trees associated with parking lot improvements, new trails, or improvements to existing trails; these activities would be flexible in timing and approach. Specific details on proposed tree-clearing locations and times are not identified in the alternative and would not be made available until specific actions are carried out. NPS staff will follow the framework laid out in the USFWS's 2016 guidance (USFWS 2016). Under the section 4(d) rule for the northern long-eared bat, the actions being proposed in this plan would likely be exempted from incidental take prohibitions because they would not likely occur within 0.25 mile of a known hibernaculum or within 150 feet of a known occupied maternity roost tree during the pup season. Although the bats may have long-term site fidelity to roosts, changing environmental conditions (e.g., natural tree fall, wind throw, tree disease) would likely result in habitation of previously unoccupied sites. Due to the potential for this outcome, consultation with the US Fish and Wildlife Service would need to continue when specific information is available for the proposed tree removal. Depending on the outcome of the consultation, additional compliance steps may need to be undertaken before tree removal would be permitted to occur. *Therefore, alternative A may affect, but is not likely to adversely affect, the northern long-eared bat.*

Migratory Birds, Including Shorebirds. To best meet its agency obligations to protect these species under these acts, the National Park Service will incorporate guidance from the USFWS's Nationwide Standard Conservation Measures to reduce impacts to birds and their habitats during project implementation (USFWS 2019c). This especially applies to shorelines, muddy flats, and beaches associated with the Lakeshore, as these habitats are especially important as stopover sites for migrating birds. Under alternative A, it is unlikely that any actions would impact these species' distribution or population or would affect the presence of any of these species in the study area.

Sensitive Species and State Species of Special Concern. While it is unlikely any action under alternative A would alter these species' distribution or population or affect the presence of any of these species in the study area, to best meet its agency obligations to protect these species of special concern, the National Park Service will apply the guidance from resources providing the best available data, including NPS research, technical assistance, inventory and monitoring, the Michigan State Wildlife Action Plan, the Michigan Natural Features Inventory (Michigan State

University Extension 2019), and the USFWS's Nationwide Standard Conservation Measures (USFWS 2019c), to reduce impacts to these species and their habitats during project implementation.

Cumulative Impacts. Past and present actions in the park have caused or are resulting in varying levels of habitat disturbance in or within proximity to the study area. These projects have occurred or are occurring in or adjacent to the existing footprint of where concentrated disturbance, facilities, or infrastructure is currently established. If implemented, potential drainage improvements along Sand Point Road would stabilize the road structure. Replacement of the septic system at Miners Castle would take place in zones that are developed or contain ruderal vegetation types and would not be expected to have additional impacts to habitat. Construction of a stair structure at Miners Falls Trail from an existing lower platform to a new platform would have temporary impacts from installation of the stairs and new platform; impacts would be offset by mostly eliminating the current social trailing that occurs as visitors move to a viewing area closer to the river. However, some visitors may be motivated to move off trail and closer to the river, which would impact riparian vegetation and related soil structure there. Removal of the revetment at Sand Point would restore the natural sand spit and natural beach dynamic process, restoring 0.5 acre of beach area.

As previously described, the direct and indirect impacts of alternative A would result in continued adverse localized impacts on wildlife habitat at key points of visitor congestion. When these effects are combined with other past, present, and reasonably foreseeable impacts, the total cumulative impact on habitat would continue to be limited and adverse. The incremental impacts of alternative A would contribute slightly to, but would not substantially change, the impacts that are currently occurring. Cumulative impacts on species of special concern, including the effects of alternative A, would be long-term and minimal, and would not affect any one species at the population level. The increment of impact contributed by alternative A to this cumulative effect would be small.

Conclusion. Under alternative A, both adverse and beneficial impacts to habitat would stem from efforts to provide options for alleviating crowding and improving visitor flow at key visitation sites. Use of the existing infrastructure by park visitors would continue to result in small adverse impacts on habitat across key points of visitor congestion. These impacts are not likely to be significant as they are limited to margins of existing disturbed zones (trails, roads, parking areas). Ongoing impacts would not diminish the overall habitat quality in the action area. The incremental impacts of alternative A would contribute slightly to, but would not substantially change, the impacts that are currently occurring. By providing options for visitor circulation and accommodation, visitors would more likely use designated facilities, trails, and parking areas to reach their intended destinations. Beneficial impacts also occur from strategies that aim to provide messaging to visitors about recognizing resource benefit when using established facilities to reach their destination. These options may alleviate the more chronic impacts to habitat, but do not provide long-term solutions for habitat encroachment by unintended visitor use.

Environmental Consequences of Alternative B

Under alternative B, the general footprint, visitor use areas and access zones, and types of recreation within existing visitor use zones would be similar to those that currently exist. Additionally, under this alternative, improvement of park facilities would have some adverse direct impacts to habitat and habitat use in areas that are currently impacted by informal visitor use and dispersal. Implementation of alternative B would disturb or remove 2.1 acres of habitat. The disturbance would be limited to the prism and perimeters of existing roads, perimeters of existing parking areas (as they are redesigned), area of improvement to an existing trail to Miners Beach, establishment of a new commercial use off-loading zone and a new spatially related commercial-use trail to Miners Beach on a preexisting roadbed, re-alignment of a preexisting trail to Miners Fall for accessible use, and installation of four comfort stations (changing stations, vault toilets).

The commercial-use trail would be established on a pre-existing roadbed; however, after a period of low use, the area has likely recovered somewhat from past use. While use of the pre-existing roadbed avoids the need to establish a new path over undisturbed soils and vegetation, the updated use would potentially have negative impacts, such as removing reestablished native vegetation, providing a conduit for invasive plant establishment, or accelerating erosion susceptible soil types along this feature.

Related to the separation of commercial visitor and public visitors, the duration and intensity of shoreline use, especially for commercial use visitors, is expected to slightly increase, given the proposed 10% increase in commercial visitor use (public visitation would be maintained at current levels), augmented by the proposed updated CUA conditions (loading/unloading before 10 a.m. and after 4 p.m.) to spatially and temporally separate visitor use to manage crowding and traffic flow. The expected increase in duration and intensity of use would potentially negatively affect both upland and shoreline habitat use by wildlife (especially shorebirds) that are sensitive to human disturbance (presence, proximity, activity, noise).

Federally Listed Species. Evaluation for each of the federally listed species potentially occurring in the Lakeshore finds that the species are either not present in the action area, do not occupy the habitat type identified in the action area, the action area is not used for breeding activities, or the action area is outside the known range of the species in the park or surrounding area. Migratory activity may be observed for the piping plover, however. The park will continue ongoing consultation with the US Fish and Wildlife Service to obtain concurrence on the section 7 determination.

Analyses for each of the federally listed species identified for the action area are presented below.

Pitcher's Thistle. None of the locations identified in alternative B overlap with the known localities of this species in the park (Bruce Leutscher, Pictured Rocks National Lakeshore, pers. comm. November 6, 2019); however, all proposed areas of activity would be surveyed by NPS botanists prior to ground disturbance. If any Pitcher's thistles are located in trail alignments, the plants would be marked so individual plants can be avoided by routing the trail away from the plants. Given the restricted distribution and stationary nature of this species, alternative B would

not alter this species' distribution or population or affect the known presence of this species in the action area. *Therefore, alternative B may affect, but is not likely to adversely affect, the Pitcher's thistle.*

Rufa Red Knot. Although this species may use suitable areas in the park during migration, no records of observations for this species in the park have been located; however, there is one record of observation of the nominate species (*Calidris canutus*) at Grand Marais, outside of the park near its northeastern boundary (eBird Basic Dataset 2018). Given the transitory nature of this species in this region and the few individuals that may use this area, alternative B would not alter this species' distribution or population or affect the presence of this species in the study area. Per USFWS guidance, this species only needs to be considered if actions occur along coastal areas during its migratory window of May 1 to September 30. This guidance will be further addressed through implementation of best management practices noted in appendix C. *Therefore, alternative B may affect, but is not likely to adversely affect, the rufa red knot.*

Piping Plover. Because there are no records of breeding piping plovers in the action area, and because the action area lies outside of identified critical habitat areas, alternative B would not affect the unlikely presence of breeding activity in the action area. The USFWS Ecological Services Office (Lansing, Michigan) recommends that agency management actions be sensitive to habitat disturbance, primarily for foraging, during the spring migration and breeding period (Vincent Cavalieri pers. comm. November 8, 2018). This recommendation will be further addressed in the best management practices of this document. *Therefore, alternative B may affect, but is not likely to adversely affect, the piping plover.*

Kirtland's Warbler. While there is potential breeding habitat (jack pine vegetation communities) in the park (Hop et al. 2010), there are no known records for this species from the action area. There are recorded observations, however, from locations south of the park in the Hiawatha National Forest (eBird Basic Dataset 2014). Additionally, the park reports a sighting of this warbler during 2019 within the legislated boundary, but not in the action area (Cindy Heyd, pers. comm. August 9, 2019). Alternative B would not alter this species' distribution or population or affect the presence of this species in the study area. *Therefore, alternative B may affect, but is not likely to adversely affect, the Kirtland's warbler.*

Canada Lynx. While the presence of people may impede the movement of individual lynx within a travel corridor, alternative B would not alter this species' distribution or population or affect the presence of this species in the action area. *Therefore, alternative B may affect, but is not likely to adversely affect, the Canada lynx.*

Gray Wolf. There are observations of gray wolves at the park recorded in the park's Wildlife Observation Database (NPSpecies 2018), and individuals are known to use the action area (Bruce Leutscher, Cindy Heyd, Pictured Rocks National Lakeshore, pers. comm., August 9, 2019). No critical habitat is known from the park or action area. While the presence of people may impede the movement of individual wolves within a travel corridor, alternative B would not alter this species' distribution or population or affect the presence of this species in the action area. *Therefore, alternative B may affect, but is not likely to adversely affect, the gray wolf.*

Northern Long-eared Bat. Under alternative B, there likely would be limited clearing of trees associated with parking lot or trail realignment; these activities would be flexible in timing and approach. Specific details on proposed tree-clearing locations and times are not identified in the alternative and would not be made available until specific actions are carried out. NPS staff will follow the framework laid out in the USFWS's 2016 guidance (USFWS 2016). Under the section 4(d) rule for the northern long-eared bat (USFWS 2016), the actions being proposed in this plan would likely be exempted from incidental take prohibitions because they would not likely occur within 0.25 mile of a known hibernaculum or within 150 feet of a known occupied maternity roost tree during the pup season. Although the bats may have long-term site fidelity to roosts, changing environmental conditions (e.g., natural tree fall, wind throw, tree disease) would likely result in habitation of previously unoccupied sites. Due to the potential for this outcome, consultation with the US Fish and Wildlife Service would need to continue when specific information is available for the proposed tree removal. Depending on the outcome of the consultation, additional compliance steps may need to be undertaken before tree removal would be permitted to occur. *Therefore, alternative B may affect, but is not likely to adversely affect, the northern long-eared bat.*

Migratory Birds, Including Shorebirds. To best meet its agency obligations to protect these species under these acts, the National Park Service will incorporate guidance from the USFWS's Nationwide Standard Conservation Measures to reduce impacts to birds and their habitats during project implementation (USFWS 2019c). This especially applies to shorelines, muddy flats, and beaches associated with the Lakeshore, as these habitats are especially important as stopover sites for migrating birds. Under alternative B, it is unlikely that any actions would impact these species' distribution or population or would affect the presence of any of these species in the study area.

Sensitive Species and State Species of Special Concern. While it is unlikely any action under alternative B would alter these species' distribution or population or affect the presence of any of these species in the study area, to best meet its agency obligations to protect these species of special concern, the National Park Service will apply the guidance from resources providing the best available data, including NPS research, technical assistance, inventory and monitoring, the Michigan State Wildlife Action Plan, the Michigan Natural Features Inventory (Michigan State University Extension 2019), and the USFWS's Nationwide Standard Conservation Measures (USFWS 2019c), to reduce impacts to these species and their habitats during project implementation.

Cumulative Impacts. Past and present actions in the park have caused or are resulting in varying levels of habitat disturbance or restoration in or within proximity to the study area. These projects have occurred or are occurring in or adjacent to the existing footprint of where concentrated disturbance, facilities, or infrastructure is currently established. If implemented, potential drainage improvements along Sand Point Road would stabilize the road structure. Reestablishing systematic use of the pre-existing roadbed at Miners Fall (for CUA use) would potentially negatively impact native vegetation communities and wildlife by introducing invasive plant species and expanding human presence into an area where activity is currently low. Replacement of the septic system at Miners Castle would take place in zones that are developed or contain ruderal vegetation types and would not be expected to have additional impacts to

habitat. Construction of a stair structure at Miners Falls Trail from an existing lower platform to a new platform would have temporary impacts from installation of the stairs and new platform but would be offset by mostly eliminating the current social trailing that occurs as visitors move along current social trailing to a viewing area closer to the river. Removal of the revetment at Sand Point would restore the natural sand spit and natural beach dynamic process, restoring about 0.5 acre of beach area.

As previously described, the direct and indirect impacts of alternative B would result in both beneficial and adverse impacts on habitat at key points of visitor congestion as facilities are improved or established and visitor congestion is alleviated. When these effects are combined with other past, present, and reasonably foreseeable impacts, the total cumulative impact on habitat would also be both beneficial and adverse. The incremental impacts of alternative B would contribute slightly to, but would not appreciably change, the impacts that are currently occurring. Overall, cumulative impacts on wildlife habitat would be beneficial when considered beyond the period of initial construction.

Conclusion. Overall, the area affected by alternative B would result in 2.1 acres of habitat loss, which would be limited to the perimeters of currently existing footprints (parking areas, trails, roads). However, establishment of key facilities, improved parking areas, and improved messaging to visitors would likely allow habitat conditions for both plant and animal species to recover over time, and reduce conditions favoring introduced exotic plants and generalist scavenger species that negatively impact some wildlife species. These habitat improvements would be especially evident in areas where the habitat is currently disturbed by visitor dispersion away from congested sites, resulting in an overall improvement of habitat in the cone of disturbance from the point of visitor dispersal. These actions, combined with implementation of mitigation measures, would minimize adverse impacts from the project such that impacts would not affect species of concern at the population level.

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Chapter 4

Consultation and Coordination



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CHAPTER 4: CONSULTATION AND COORDINATION

The National Park Service consulted with various agencies, tribes, and interested persons in preparing this document. The public had numerous avenues for participation during the development of the plan through participating in public meetings and providing feedback by submitting comments via regular mail and electronically using the NPS Planning, Environment, and Public Comment (PEPC) system website.

PUBLIC INVOLVEMENT

In spring 2018, Pictured Rocks National Lakeshore invited the public to share initial thoughts, concerns, and ideas to improve and manage visitor use within the study area. The public provided input to park staff and NPS specialists considered these comments when developing the possible management actions for the Pictured Rocks National Lakeshore VUM Plan. The park released a newsletter in the spring of 2018 outlining the primary VUM challenges faced by the park and possible management actions that may be used to address those challenges. Additionally, the park hosted two open house meetings, one in Munising (May 8, 2018) and one in Marquette (May 9, 2018), to update the public and gather feedback on the park's VUM project. During the meeting, NPS staff briefed the public about the status of the VUM project, its purpose, overall goals, and implications for future park management decisions. NPS staff also answered questions and solicited input from the public on visitor use-related concerns they would like to see addressed. The public was asked to share their thoughts on the challenges and proposed actions outlined in the 2018 newsletter between May 8, 2018, and June 5, 2018, as well as at the open house meetings.

During public review, approximately 42 correspondences were received through the PEPC website or were sent directly to the park. Comments were received from 4 states: 38 from Michigan, and 1 each from Indiana, Minnesota, North Carolina, and Wisconsin.

The comments ranged from support or opposition of possible management actions to detailed recommendations for implementation of other possible actions. According to respondents, the primary visitor use-related issues were a lack of parking, restrooms, and a primary point of contact for visitors within the park (i.e., a comprehensive visitor center), as well as high and/or concentrated use resulting in impacts to resources. Specific comments on the issues and actions evaluated were based on the following topic areas:

- Congestion and crowding (including parking, public transit/shuttles, managed entry, managed access (within the park))
- Management of commercial use authorizations
- Facilities/infrastructure (including restrooms, changing stations, drinking water, and road improvements)
- Need for a park visitor center
- Enforcement
- Other feedback

CONSULTATION AND COORDINATION TO DATE WITH OTHER AGENCIES, OFFICES, AND INDIAN TRIBES

Section 7 Consultation

The National Park Service initiated informal consultation with the US Fish and Wildlife Service (Michigan Ecological Services Field Office) in an April 2018 letter. The letter notified the US Fish and Wildlife Service that the National Park Service was developing a VUM plan for the area extending from Munising Falls to Spray Falls and included an accompanying newsletter that was sent to the general public that included preliminary management options. The letter also specified that the National Park Service was initiating informal consultation on the project. The National Park Service referenced the electronic list of federally listed plant and animal species, as generated by the USFWS IPaC system (<https://ecos.fws.gov/ipac>). On June 21, 2019, the Lakeshore Chief of Sciences and Resources Stewardship and USFWS Field Supervisor shared some of the project elements and discussed the need to carry federally listed species through impact analysis.

The US Fish and Wildlife Service will be provided a draft of the plan/environmental assessment and accompanying biological assessment. The National Park Service will continue ongoing informal consultation and reinitiate consultation in the future, as appropriate, with the US Fish and Wildlife Service for their concurrence on elements of the plan that may require further compliance in the future.

Section 106 Consultation

In April 2018, the National Park Service distributed a newsletter to the Michigan State Historic Preservation Office noting the intent to prepare a VUM plan for the study area. In June 2019, the Lakeshore Chief of Sciences and Resources Stewardship provided the state historic preservation office's cultural resource management specialist some of the draft project elements via email and future opportunities to comment on the draft environmental assessment/plan. As of the date of completion of the draft EA, no follow-up correspondence on these project elements had been received from the Michigan State Historic Preservation Office.

The Michigan State Historic Preservation Office will be provided a review copy of the plan/environmental assessment to assess the potential effects of the proposed alternatives on cultural resources. In accordance with Section 106 of the National Historic Preservation Act, the National Park Service will continue to consult with the Michigan State Historic Preservation Office, and other stakeholders as actions identified in the plan advance to more detailed design development and implementation stages.

Consultation with Native American Indian Tribes

In April 2018, the National Park Service distributed a newsletter to nine affiliated tribes associated with the park noting the intent to prepare a VUM plan for the study area. On September 5, 2019, the National Park Service shared relevant sections of the draft plan/environmental assessment with Tribal leaders and the Tribal Historic Preservation Office and solicited feedback prior to releasing the draft for public review. In addition to seeking

general feedback on the VUM plan, the Lakeshore inquired whether there are areas within the Lakeshore that the Tribes would like to see recognized or honored, and whether there are certain times during the year or places within the Lakeshore that should be cordoned off for gathering or rituals. Based on a follow-up request from the Bad River Band of Lake Superior and Lac du Flambeau Band of Lake Superior Chippewa Indians, the park planned an in-person consultation meeting for October 23, 2019. Due to scheduling issues, these meetings were postponed. At the time of completing this environmental assessment and preparing for public review, no tribal issues or concerns had been shared with the National Park Service. The National Park Service remains committed to government-to-government consultation with the tribes in the future, as appropriate.

US FISH AND WILDLIFE SERVICE

Scott Hicks, Field Supervisor, US Fish and Wildlife Service

STATE OF MICHIGAN HISTORIC PRESERVATION OFFICE

Brian D. Conway, State Historic Preservation Officer, Michigan Department of Labor and Economic Opportunity
Brian Grennell, Cultural Resource Management Specialist

TRIBES

Mike Wiggins Jr, Chairman, Bad River Band of Lake Superior Tribe of Chippewa
Bryan Newland, Chairman, Bay Mills Indian Community of Michigan
Kevin DuPuis, Chairman, Fond du Lac Band of Lake Superior Chippewa
Beth Droust, Chair, Grand Portage Band of Lake Superior Chippewa Indians
Warren C. Swartz, Jr, President, Keweenaw Bay Indian Community
Louis Taylor, Chair, Lac Courte Oreilles Band of Lake Superior Chippewa Indians
Joseph Wildcat, Sr., President, Lac du Flambeau Band of Lake Superior Chippewa
James Williams, Jr. Chair, Lac Vieux Desert Band of Lake Superior Chippewa Indians
Richard Peterson, Chair, Red Cliff Band of Lake Superior Chippewa Indians

PICTURED ROCKS NATIONAL LAKESHORE

Cindy Heyd, Wildlife Biologist
David Horne, Superintendent
Stephen Howard, Facility Manager
Joseph Hughes, Chief Ranger
Bruce Leutscher, Chief of Sciences and Resources Stewardship
Callie New, Environmental Protection Specialist
John Patmore, Chief Ranger (retired)
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Chapter 5

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Chapter 6

Appendixes



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APPENDIX A: ALTERNATIVE SITE PLANS

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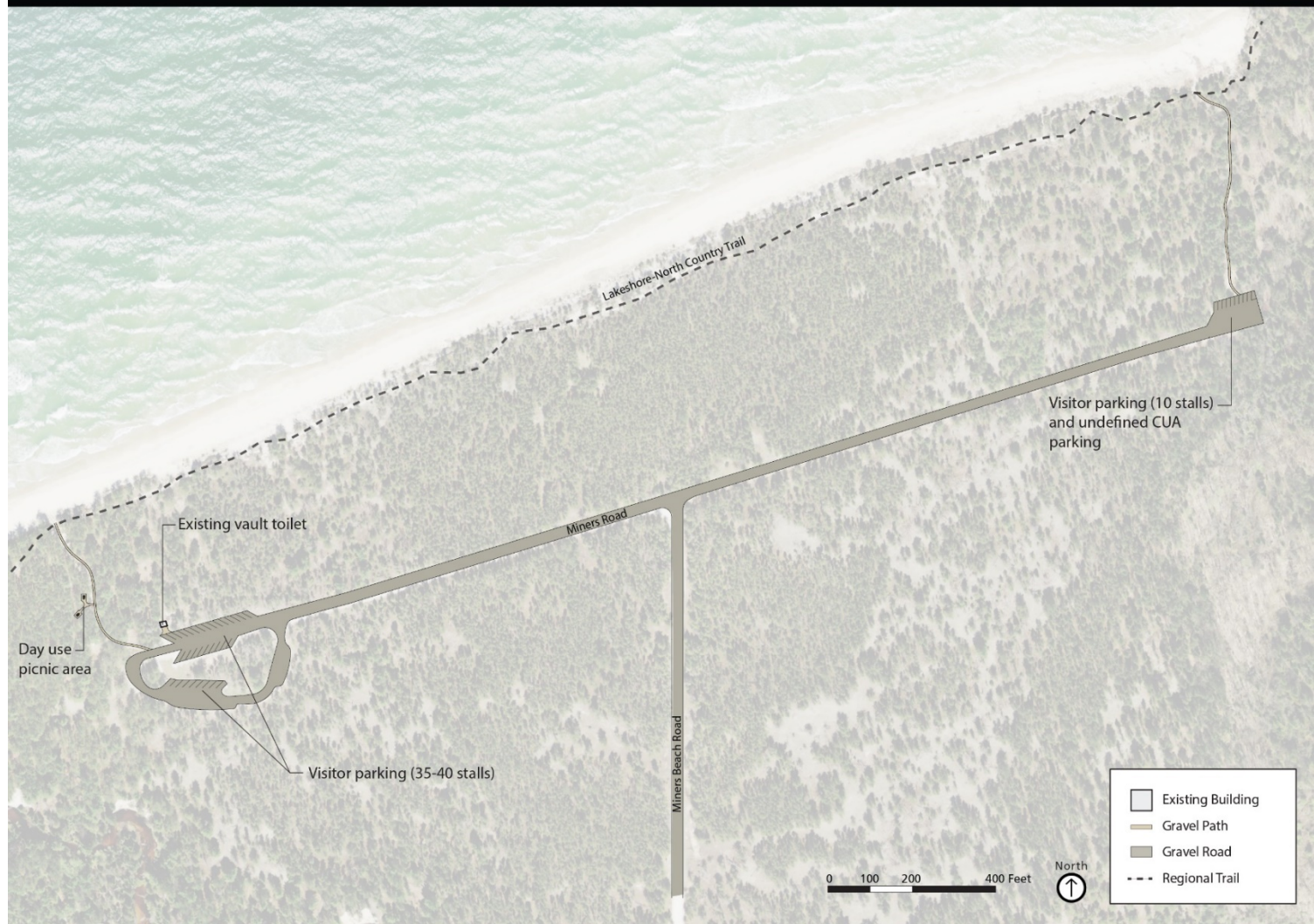


Figure A-1. Miners Beach – Alternative A

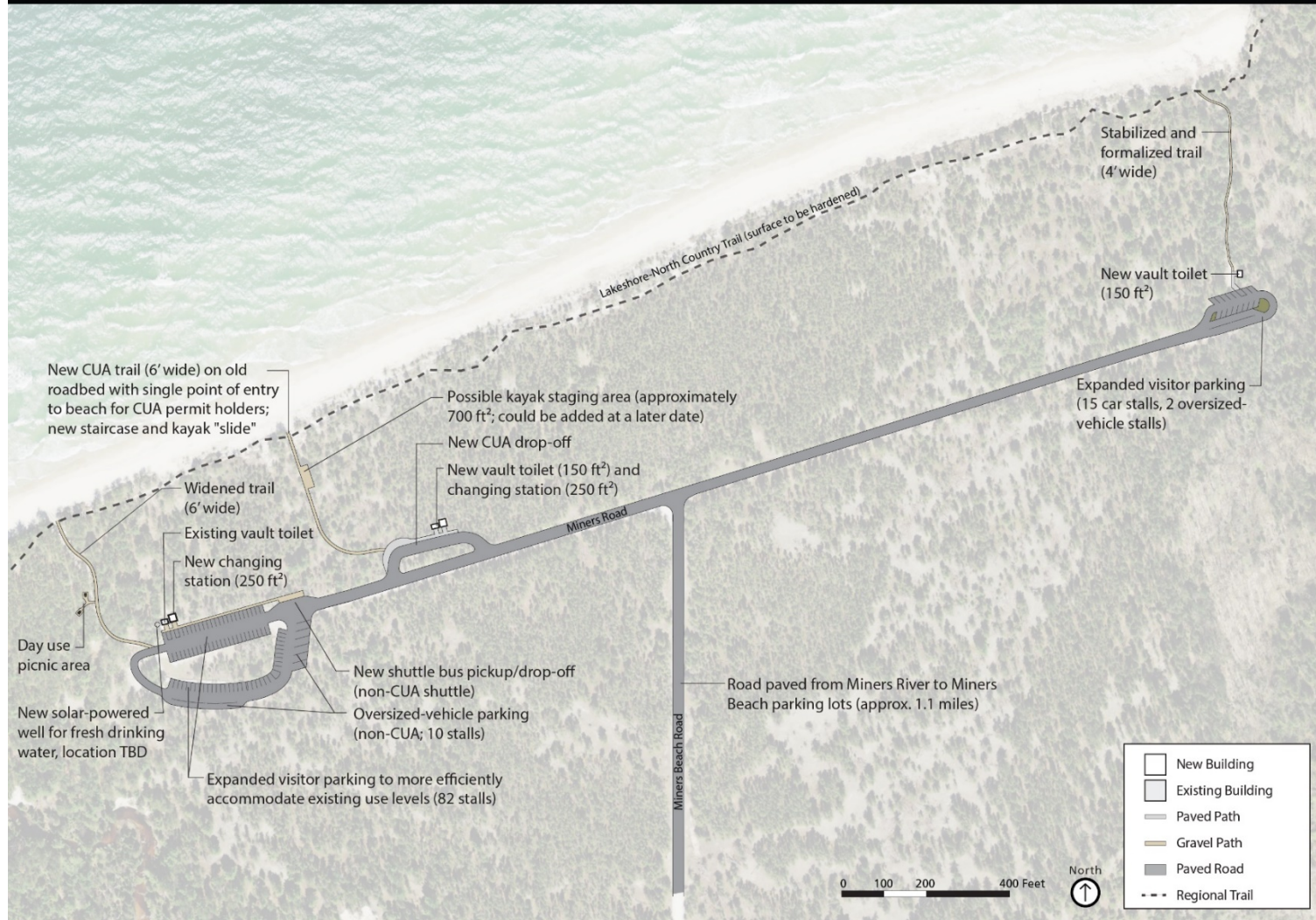


FIGURE A-2. MINERS BEACH – ALTERNATIVE B

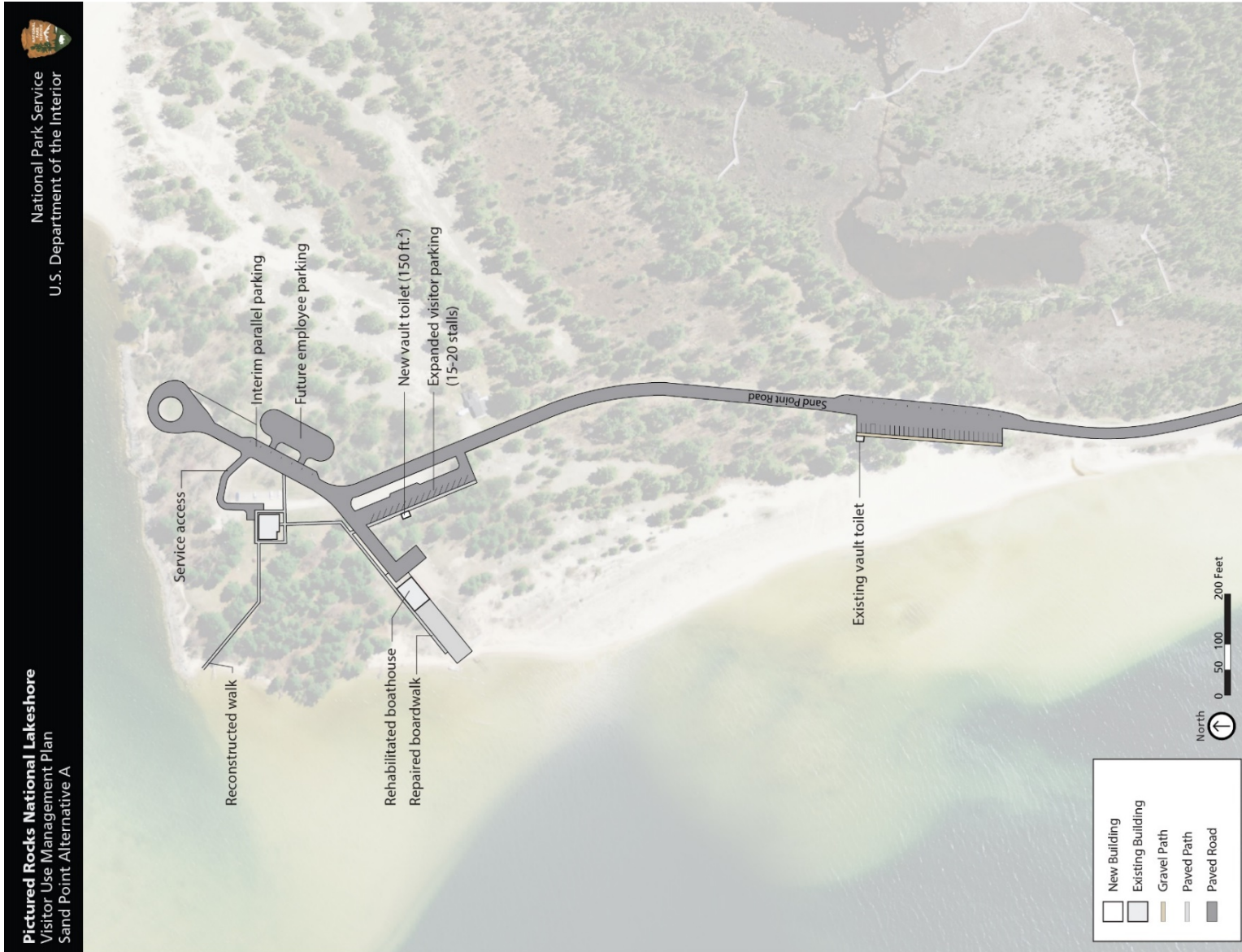


FIGURE A-3. SAND POINT – ALTERNATIVE A

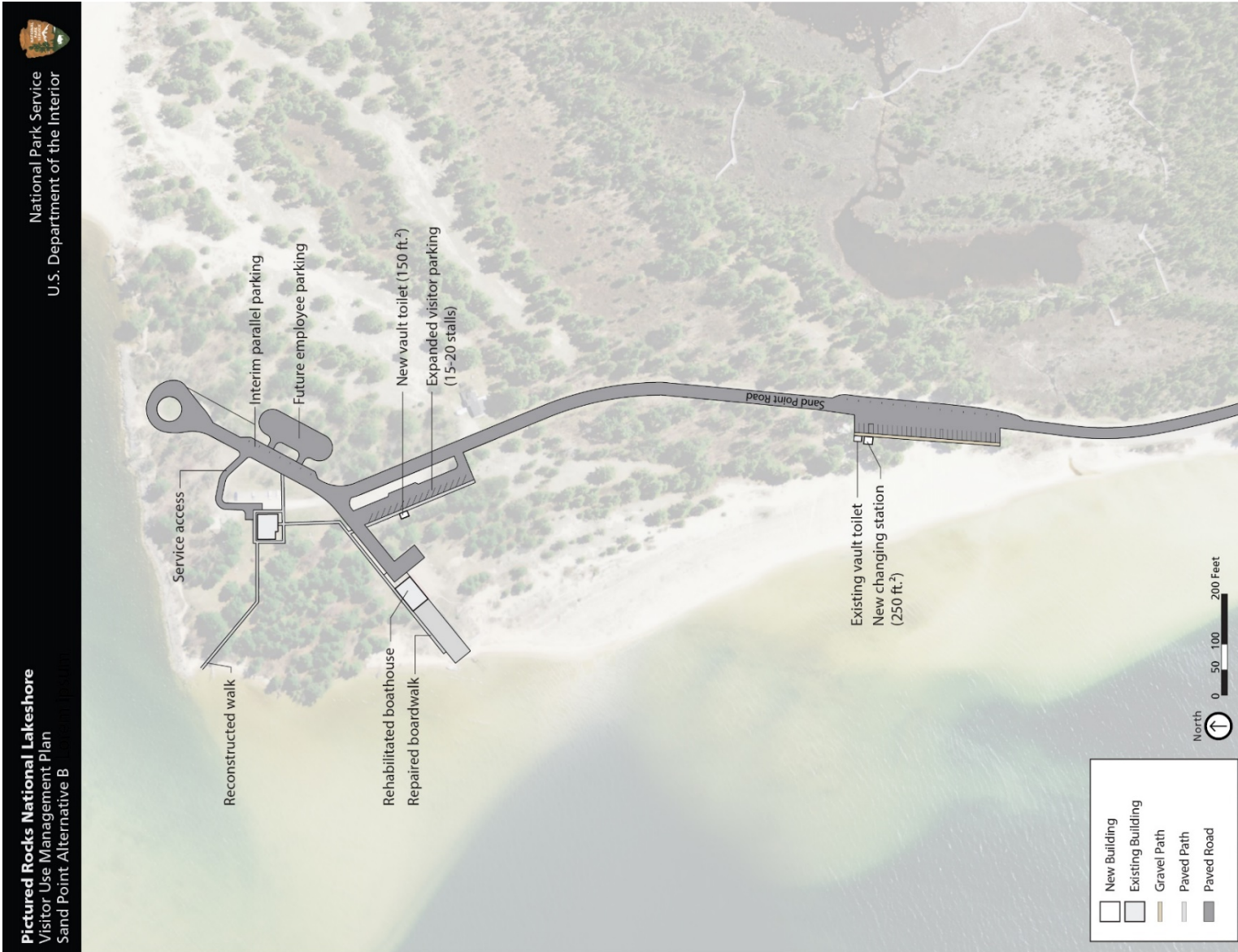


FIGURE A-4. SAND POINT – ALTERNATIVE B



FIGURE A-5. MINERS FALLS TRAILHEAD – ALTERNATIVE A

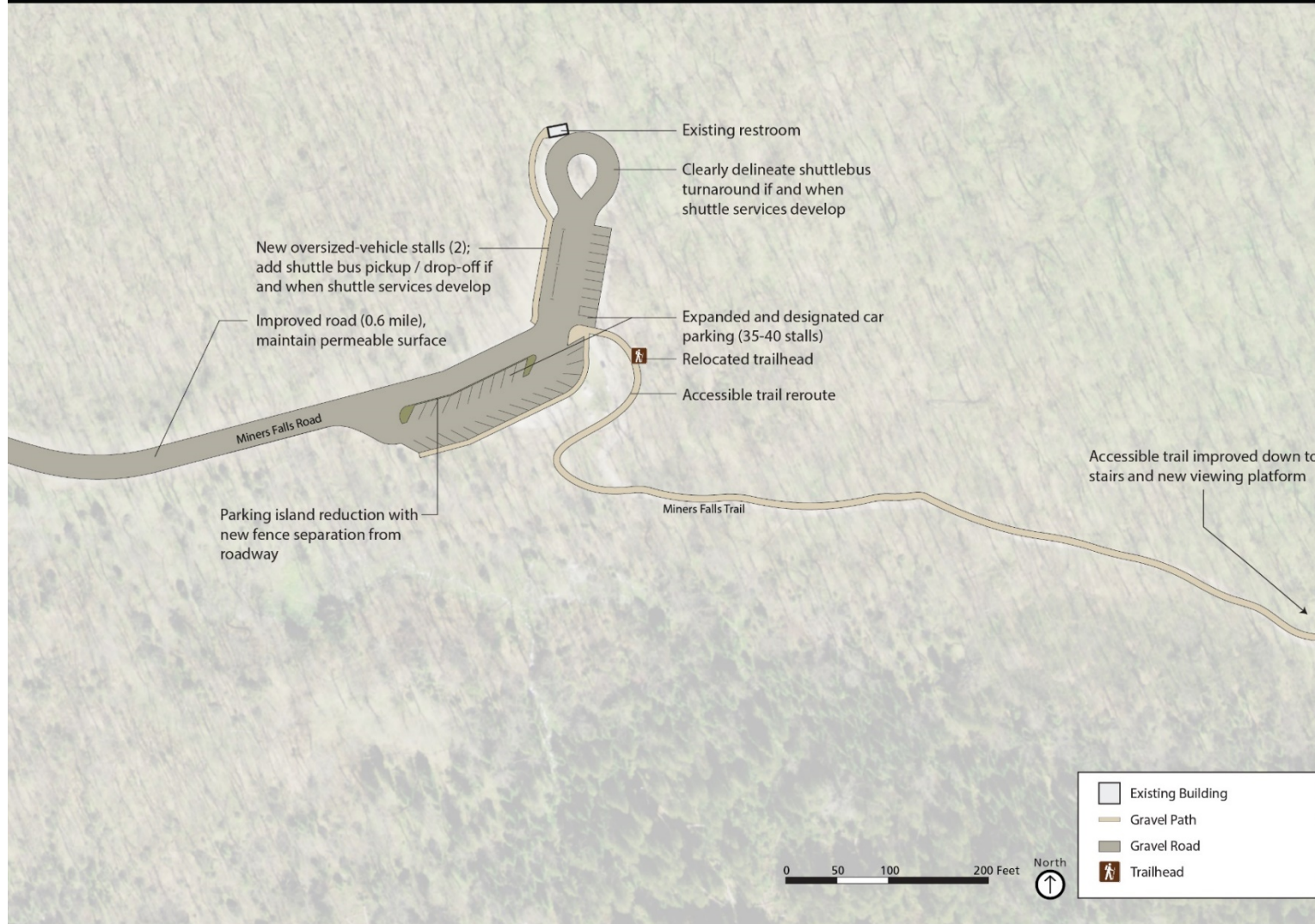


FIGURE A-6. MINERS FALLS TRAILHEAD – ALTERNATIVE B.

APPENDIX B: VISITOR USE MANAGEMENT MONITORING STRATEGY

INDICATORS AND THRESHOLDS

This section provides additional information about the monitoring strategy as it relates to the visitor use management (VUM) framework for Pictured Rocks National Lakeshore (the Lakeshore) VUM plan. For additional resources in the VUM framework please visit the following web address: <http://visitorusemanagement.nps.gov/> for a full description of the Interagency Visitor Use Management Council and Framework Guidance (IVUMC).

Indicators, thresholds, monitoring protocols, management strategies, and mitigation measures would be implemented as a result of this planning effort and are described below. Indicators would be applied to the action alternative described in this plan. Indicators translate desired conditions of the Lakeshore VUM plan into measurable attributes (e.g., linear extent of visitor-created trails) that, when tracked over time, evaluate change in resource or experiential conditions. These are critical components of monitoring the success of the plan and are considered part of the action alternative. Thresholds represent the minimum acceptable condition for each indicator and were established by considering qualitative descriptions of the desired conditions, data on existing conditions, relevant research studies, professional judgement of staff from management experience, and scoping on public preferences. A trigger is defined as 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.

The interdisciplinary planning team considered the central issues driving the need for the plan and developed related indicators that would help identify when the level of impact becomes cause for concern and management action may be needed. The indicators described below were considered the most critical, given the importance and vulnerability of the resource or visitor experience affected by types of visitor use. The planning team also reviewed the experiences of other park units with similar issues to help identify meaningful indicators. Not all of the strategies related to the indicators, thresholds, and visitor capacity would be implemented immediately, rather some would be implemented as thresholds are approached or exceeded. Those strategies identified for use as needed are labeled as adaptive management strategies. The impact analysis for all strategies is included in chapter 3 so that the park can employ those as necessary to achieve desired conditions.

- Number of vehicles at one time
- Number of people on trails
- Number of people per viewscape

Indicator Topic: Parking lot congestion and ability to find parking

Indicator

Number of vehicles at one time

Threshold

Vehicles at One Time (VAOT) would not exceed the design capacity of parking lots at the visitor destination more than 90% of the time per season.

Rationale

This indicator is a measure of visitors' ability to find parking at popular destinations. The park would focus on monitoring the number of vehicles accommodated at key park areas. This indicator and associated threshold could also help park staff understand the number of visitors displaced to other areas of the park. Monitoring this indicator and threshold would also allow for a greater understanding of visitor use patterns, such as busy times of the year and the specific location that congestion is occurring. By monitoring this indicator, the park would be able to track resource damage when parking occurs outside of designated areas and provide key information about visitor interests.

Monitoring

Monitoring for this indicator would occur as a part of regular park operations using traffic-count data. Park staff would be able to generate reports on a daily or weekly basis. Park staff are working with the NPS social sciences office to update counting methodology.

Management Strategies

- Increased education and signage associated with parking in designated areas.
- Increased education and information during peak times about where to find available parking.
- Provide real-time information regarding parking and access opportunities (such as text alerts and radio station updates).
- Increased enforcement of parking outside of designated areas. Enforcement could occur through the use of a visitor use assistant or volunteer at peak times.
- Deploy Intelligent Transportation Systems to provide visitors with information on parking lot status. This information would be conveyed to visitors prior to and/or upon entry to the Lakeshore to facilitate seeking alternative experiences including those outside the Lakeshore.
- Post signs indicating parking is at capacity (return at a later, designated time).
- Increase public education efforts to encourage voluntary redistribution of use to off-peak times.
- Designate some short-term parking spaces at key locations to ensure that parking lot turnovers encourage a large number of people to visit that site over a day but to keep the people at one time (PAOT) within thresholds.
- Display information on park websites or social media and have park staff communicate areas that accommodate higher use when in contact with visitors.

Adaptive Management Strategies

- Consider a temporary queuing system until more vehicles leave the area. Actions might include turning vehicles away.
- Consider parking permits to alleviate congestion.
- Consider adding off-site parking as appropriate and feasible.

Indicator Topic: Crowding on Trails

Indicator

Number of encounters on trail segments in the Chapel Basin

Threshold

No more than 80% of days would exceed 12 encounters per hour on certain trail segments in the Chapel Basin.

Rationale

The Chapel Basin and Chapel Lake are managed as primitive under zoning established by the general management plan (GMP). The desired conditions for this zone emphasize low-impact visitor experiences, opportunities for solitude, and uncrowded places where visitors can interact with nature. This indicator and threshold are identified and prioritized as important to ensure park staff are able to achieve desired conditions for visitor experiences without unintended consequences of crowding that occur during peak use times. Specifically in the Chapel area, multiple user groups meet up in one spot on the beach. For example, kayakers and day hikers meet in the same area, which also happens to be popular with overnight use. Desired conditions at Chapel are not currently being achieved. However, through implementation of the action alternative and associated management strategies, this indicator would allow the park to accurately and efficiently evaluate the number of people on certain trail segments and compare those numbers to desired conditions for the area.

This indicator would help to monitor trail use and protect the primitive nature of the area. This is a commonly researched and applied indicator in the field of social science and public lands research, and it would allow managers to understand the density of visitor use occurring on certain trail segments. This indicator would address issues of crowding on trails which can lead to less-than-desirable visitor experiences. Increased visitor use also contributes to worsening trail conditions, such as erosion and trail widening.

The threshold of up to 12 parties per hour for certain sections of trails is comparable to other popular wilderness and backcountry hikes in the western United States that have mixed day and overnight use, such as high-use trails in Mt. Rainer National Park (at 8 encounters per hour) (Vande Kamp 2009) and in Yosemite (the Half Dome trail, at 16 encounters per hour) (National Park Service [NPS] 2012). This threshold would maintain good opportunities for visitors to achieve desired conditions aligned with the primitive zone, such as solitude and uncrowded places.

Note: The park made the decision to exclude the trail to Miners Beach from application of this indicator and threshold because it is considered beach access, rather than designated as a trail or

trail experience. The park will continue to monitor use in that area associated with other indicators.

Monitoring

Park staff would install trail counters by trail segment to monitor impacts on resources that are caused by visitors.

Management Strategies

- Designate some short-term parking spaces at key locations to ensure that parking lot turnovers encourage a large number of people to visit that site over a day but to keep the PAOT within thresholds.
- Use up-to-date technology, such as interactive maps and other technology or social media, to provide information to visitors before and during their visits.
- Provide information to visitors on sites that are likely to also be busy so they know of those conditions before they arrive.
- Increase monitoring frequency if threshold is approached. Ensure park staff targets additional monitoring on busy weekend summer days.

Adaptive Management Strategies

- Develop a permit or reservation system for backcountry day use.
- Manage group size at appropriate locations.

Indicator Topic: Crowding and Congestion at Miners Beach

Indicator

Number of people per viewscape (visitor view from a given location) at Miners Beach

Threshold

The number of people at Miners Beach would not exceed 24 people per viewscape during the peak time of day (11 a.m. and 4 p.m.).

Rationale

This indicator would provide the park the opportunity to monitor crowding and congestion at Miners Beach, one of the most popular areas in the Lakeshore. Miners Beach West is managed as casual recreation under zoning established by the general management plan. The desired conditions for this zone support social recreation experiences and a diverse range of recreation opportunities, including boating at Miners Beach. This indicator and threshold are identified and prioritized as important to ensure park staff are able to achieve desired conditions for social experiences without unintended consequences of crowding and congestion that can occur during peak use times. Desired conditions at Miners Beach West are not currently being achieved; however, through implementation of the action alternatives and associated management strategies, this indicator would allow the park to track progress towards achieving those desired conditions.

Further, this is a commonly researched and applied indicator in the field of social science and public lands research, and it would allow managers to understand the density of visitor use occurring at Miners Beach. This indicator is useful as it allows NPS staff to accurately and

efficiently evaluate the number of people per viewscape and compare those numbers to desired conditions for the area. People per viewscape refers to the total number of people (not boats) that are present at a site at any given point in time. Baseline data associated with this indicator was established by the University of Minnesota in the summer of 2016. In the summer of 2017, a follow-up study documented visitors' perceptions of crowding. Results indicate that visitors' average acceptability rating was when 24 people were on the beach. Visitors also noted that managing people was more important than managing boats. This information directly informed the identification of the threshold. Only 16% of total observations were above the 24 people per viewscape, so current conditions seem to be generally within the threshold providing further rationale for the threshold. Observations occurred every 15 minutes from 6 a.m. to sunset.

Monitoring

Park staff would conduct periodic visual observations at the beach using a systematic random sampling approach (varied day of the week and time of day) through the week. Observations would be collected and recorded.

Management Strategies

- Develop and implement a public information effort about the desired conditions for the park and actions the National Park Service is taking to achieve those conditions and how visitors can best experience the park.
- Use innovative technology or methods to communicate with the public on other opportunities that are available to them in or outside of the park.
- Use press releases/media prior to historically crowded weekends to inform the public to be prepared for crowds.
- Where possible, encourage visitors to use sites that can handle high volumes of use during peak use times.
- Provide information on other visitor destinations in the park or nearby.
- Increase maps and signage about various destinations in and outside of highly developed sites.
- Increase law enforcement.
- Manage to the visitor capacity for the area (see visitor capacity analysis for additional management strategies to be implemented as needed).
- Manage group size at appropriate locations.
- Designate some short-term parking spaces at key locations to ensure that parking lot use allows for a variety of people to visit that site over a day but keeps use levels within the thresholds.
- Develop permit or reservation systems for launch areas for the general visiting public.
- Regulate commercial use through updates to regulations and guidelines to operating concessions contracts and commercial use authorization (CUA) conditions.

VISITOR CAPACITY IDENTIFICATION

Overview

This visitor capacity identification provides additional information about the visitor capacity identification as it relates to the VUM framework for the Lakeshore VUM plan. Visitor capacity is the maximum amount 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 (IVUMC 2016). Visitor capacities were identified using best practices and examples from other plans and projects across the National Park Service. Based on these best practices, the planning team used the following guidelines to identify capacity:

1. Determine the analysis area,
2. Review existing direction and knowledge,
3. Identify the limiting attribute, and
4. Identify visitor capacity.

The Analysis Areas

Analysis areas were identified as destinations where high levels of use currently cause or are projected to cause impacts to natural and cultural resources and visitor experiences. For these key areas, a detailed analysis has been conducted to identify the visitor capacities. This analysis fulfills the requirements of the 1978 National Parks and Recreation Act (54 United States Code [USC] 100502), to identify visitor capacity for all areas that this planning effort addresses. Together, these analysis areas comprise the majority of the visitor use areas within the recreation area. The visitor capacities would be used to implement management strategies for these sites as part of the plan. Six key areas were identified

1. Miners Castle
2. Miners Beach
3. Miners Falls
4. Sand Point
5. Munising Falls
6. Chapel Falls and Mosquito Beach

To fulfill future monitoring of visitor use levels, indicators and thresholds would inform the National Park Service if use levels are at or near visitor capacities. If so, adaptive management strategies as outlined in this plan would be taken (see “Indicators and Thresholds” section). For each location, an overview of the analysis area is included.

Review Existing Direction and Knowledge

Pictured Rocks National Lakeshore Context. The 2004 general management plan, the 2002 personal watercraft use environmental assessment, and the 2017 cultural landscape report (NPS 2017) all provided important overarching guidance for managing the amounts, timing, distribution, and types of use throughout the Lakeshore, including providing some description

of desired visitor experiences, resource conditions, and appropriate support facilities. As identified as a need in past planning, this plan supplements the previous guidance by developing more specific VUM direction, including indicators, thresholds, and visitor capacity for the areas included in the scope of the plan.

During this plan, the planning team developed desired conditions, indicators, and thresholds, with particular attention to conditions and values that must be protected and are most related to visitor use levels. The amount, timing, and distribution of visitor use at the Lakeshore influence both resource conditions and visitor experiences. The majority of visitor use is concentrated at several key destinations in the project area and visitation focuses on water-based recreational opportunities. The majority of visitation to the Lakeshore occurs June through September at Miners and Sand Point Beaches.

Data sources used to identify the visitor capacity include the public use statistical abstract (Ziesler and Singh 2018), which can be located online at <https://irma.nps.gov/DataStore/Reference/Profile/2239338>. Researchers from the Department of Forest Resources at the College of Food, Agricultural, and Natural Resource Sciences of the University of Minnesota conducted observational research to evaluate visitor use and behavior at Miners Beach in 2016 and visitor perceptions of crowding at both Miners and Sand Point Beaches in 2017. These two studies are referred to throughout this chapter as Schneider and Pflughoeft 2016 and Schneider, Pflughoeft, and Choi 2018.

In addition, 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.

Identify the Limiting Attribute

This step requires identification of the limiting attribute(s) that most constrain 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 analysis area. This is an important step given that an analysis area could experience a variety of needs regarding the best tools for providing quality experiences and protecting resources.

Identify Visitor Capacity

To identify the appropriate amount of use at key areas, outputs from previous steps were reviewed to understand current conditions compared to goals and objectives for the area. This analysis, in combination with understanding visitation data collected annually by NPS staff to track levels of visitor use parkwide and by area, informed the identification of visitor capacities for each analysis area.

Analysis Area 1: Munising Falls

Review of Existing Direction and Knowledge

The Munising Falls area is mixed-use and falls into both the orientation/historic management prescriptions and casual recreation zones. The desired conditions for both zones include accessible facilities, a variety of nonmotorized, nonadventure recreational activities, and opportunities for encounters with park staff and other visitors. Munising Falls is accessible by a trail leading from the parking lot adjacent to the Munising Falls Interpretive Center. The short trail (800 feet, one way) and viewing platform are paved and fully accessible, and this trail is one of the only trails in the study area where leashed pets are permitted. Actions related to the alternatives call for minor improvements at Munising Falls.

Munising Falls generally sees the second-highest traffic counts in the park, following Miners Castle. Nearly half of the annual visitation to the area occurs during July and August, and 96% of annual visitation typically occurs from April through October (Ziesler and Singh 2018). The busiest month, July at Munising Falls, sees an estimated average of 5,000 visitors per weekend day. This estimation is calculated from NPS public use statistic reports. Vehicular traffic data counts report approximately 18,000 vehicles in the month of July 2018. On average, each of these vehicles contains about 3 passengers during the summer. Therefore, approximately 54,000 visitors arrive to Munising Falls by vehicle throughout the entire month of July. July 2018 had a total of 8 weekend days which included Saturday and Sundays when the majority of visitors come to the area. Based on experience, park staff conservatively assume that 75% of visitation occurs on the weekends, so with current use levels, about 5,000 visitors are at Munising Falls per weekend day.

$\frac{\# \text{ of visitors} \times \text{use rate assumption}}{\# \text{ of weekend days}} = \text{visitors per weekend day}$	$\frac{(18,000 * 3) \cdot .75}{8} = 5,000 \text{ visitors per weekend day}$
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The park used the parking lot stalls to identify the number of people capable of being at the site at one time under current conditions. The existing parking lot offers 54 stalls, plus 4 large stalls for oversized-vehicle parking. Assuming an 85% efficiency rate and 3 people per vehicle, the current parking accommodations allows for 145 people at the falls, on the trails leading to the falls, and in the visitor center at one time, not including passengers from oversized vehicles. The park also accounts for the possibility of 2 of the oversized vehicle stalls that could be occupied by 40-person busses filled to 85%. This contributes an additional 70 people to the site. Current use levels are approximately 220 PAOT in the analysis area. Munising Falls, the park's primary west-end contact station, may be relocated as a result of this planning effort; in that case, the identified capacity for this area may need to be reevaluated if/when that action occurs.

Limiting Attribute

The desired conditions for Munising Falls provide the opportunity for visitors to have *social recreation experiences, encounter NPS Lakeshore staff, and use facilities that support day use touring*. The current conditions at Munising Falls are providing just this type of experience.

Although the desired condition for the area is social recreation experiences, there is still the possibility that future use levels could negatively influence this experience, so the most limiting attribute is ensuring a quality social experience for visitors. The most relevant indicator to monitor to ensure desired conditions are being maintained and achieved is *the number of vehicles in a parking lot at a specific time of the day* because it has been determined that this directly relates to the number of encounters on the trail and the ability to achieve a quality experience. A contributing factor to how many people can be accommodated in this analysis area is that the volume of people in Munising Falls is physically constrained by a narrow river canyon that creates a one-way-in-and-out trail with no future opportunity for a loop or further expansion. Further, the Schoolcraft blast furnace is on the National Historic Register list, which cannot be expanded (per resource protection needs) to accommodate additional visitor use.

Visitor Capacity and Implementation Strategies

While assessing existing conditions (220 PAOT or 5,000 people per weekend day) 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. This amount of use is already supporting high quality social experiences in the analysis area; with this level of use maintained, the desired conditions for the area would be met. Per this plan, the visitor capacity for Munising Falls is identified as 220 PAOT. Park staff also estimate a 20-minute turn-over rate in the parking lot. The parking lot could turn over 20 times in a day and the park would still be able to maintain estimated current use levels of approximately 5,000 people on a weekend day.

Implementation strategies include the ongoing evaluation of potential options for the centralized visitor center outside of this planning effort. Park staff would continue to station interpretation rangers outside the visitor center to help with visitor circulation and information. This strategy would be implemented as funding is available.

Analysis Area 2: Sand Point

Review of Existing Direction and Knowledge

Sand Point is one of the more popular beach areas in the Lakeshore and is located in the orientation/historic management prescriptions zone. According to the desired conditions for that zone, a variety of nonmotorized, nonadventure recreational activities and large group social interaction environments are envisioned. Sand Point is a popular place for watching sunsets and higher visitor use levels in the evenings are a direct result of this activity. Facilities to support visitor activities include picnic tables, grills, and vault toilets. Private, permitted events are sometimes held in the area, and commercial kayak/paddleboard outfitters use it as a launching point. Special uses have increased, including the demand for wedding permits. Special park uses would continue to be managed through a special park use permit system that Lakeshore park staff currently implement. In 2017, the number of kayaks and paddleboards allowed at the beach at one time was limited to 12 each to ensure desired conditions were achieved in the area.

Crowding and congestion have been identified as challenges at Sand Point Beach and these concerns may continue to escalate as visitors use Sand Point Beach as a less-busy alternative to Miners Beach. Incidences of impacting behaviors such as dogs off leash and alcohol

consumption are trending upwards (Schneider, Pflughoeft, and Choi 2018) and informal parking has been noted to have affected roadside vegetation. Commercial use also occurs in this area from Sand Point Beach. This type of use is particularly prevalent during inclement weather when Miners Beach is more exposed. Sand Point is an ideal launching location under those conditions because of the protection Grand Island provides while still accommodating the visitor opportunity for kayaking on the lake.

Data from traffic counters indicate that around 80% of annual visitation occurs from May through October and this site, like many others at the park, is generally more crowded on weekends. The busiest month, August, receives an estimated average of 4,800 visitors per weekend day. This estimation is calculated using traffic data from the NPS public use statistic reports. Vehicular traffic data suggests approximately 19,120 vehicles in the month of August 2018. On average, each of these vehicles contains about 3 passengers during the summer months. Therefore, approximately 57,500 visitors arrive to Sand Point throughout the entire month. August 2018 had a total of 9 weekend days which included Saturday and Sundays when the majority of visitors come to the area. Based on experience, park staff conservatively assume that 75% of visitation occurs on the weekends, so with current use levels, about 4,800 visitors are at the Sand Point area per weekend day.

$\frac{\# \text{ of visitors} \times \text{use rate assumption}}{\# \text{ of weekend days}} = \text{visitors per weekend day}$	$\frac{(19,116 * 3) \cdot .75}{9} = 4,800 \text{ visitors per weekend day}$
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An analysis of photographs monitoring the Sand Point Beach parking area, at half-hour (or more-frequent) intervals, indicates that weekday visitors tend to stay at the site between 30 minutes and 1.5 hours, on average. Incidences of longer stays (2 to 3 hours) increase during the weekend and during warmer weather. The Sand Point area has a longer visitor use day than some of the other sites (e.g., Munising Falls), and visitors arrive earlier and are there later in the evenings for sunrise and sunset experiences. Some overnight parking was also observed during photo analysis. The parking lot at the beach area tends to be busiest from around 11:00 a.m. to around 6:00 p.m., and there is often another increase in visitor use levels around sunset. The park used the parking lot stalls to identify the number of people capable of being at the site at one time under current conditions. Under alternative B, improvements to parking area alignments would provide a total of 40 parking stalls. Assuming an 85% efficiency rate and 3 people per vehicle, this would result in approximately 100 PAOT in the Sand Point Beach area. Park staff assume that at any one time approximately 100 additional visitors could be in the larger Sand Point area, including those using the boat launch.

Limiting Attribute

The desired conditions for Sand Point, similar to Munising Falls, provide the opportunity for visitors to have *social recreation experiences, encounter NPS Lakeshore staff, use facilities that support day use touring*. Although the desired condition for the area is *social recreation experiences*, there is still the possibility that future use levels could negatively influence this experience, so the most limiting attribute is ensuring a quality social experience for visitors. The

most relevant indicator to monitor to ensure desired conditions are being maintained and achieved is the *number of vehicles in a parking lot at a specific time of the day* because this directly relates to the number of people at the boat launches and their ability to achieve a quality experience. A contributing factor to the amount of use that can be accommodated is that the volume of people at Sand Point is constrained by the need to protect and restore the cultural landscape. Further, human waste management is also a limiting attribute that constrains the ability to increase visitor use levels. Resource constraints such as adjacent wetlands, the Lakeshore shoreline, and a significant archeology site all further constrain the ability to expand parking and accommodate additional visitor use. Finally, Sand Point is accessible by a long access road through a private residential area. Increasing visitation could have a negative influence on the relationship between the National Park Service and park neighbors. Residents currently perceive excessive speed on this 25-mile-per-hour road.

Visitor Capacity and Implementation Strategies

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. The visitor capacity is 200 PAOT in the Sand Point area. Park staff also acknowledge about an estimated 30-minute to 1-hour length of stay at Sand Point. The area could turn over 25 times in a day and the park would still be able to maintain estimated current use levels of 4,800 people on a weekend day. In addition, the special park use program would continue to implement a permit system to manage special events such as weddings that occur during the summer months. The visitor capacity for weddings would provide for one wedding per weekend of no more than 100 PAOT and no more than 2 occurrences a month. Under the special park uses program, setup for events, such as weddings, would be required to occur after 3 p.m. in high-use areas.

Implementation strategies include effectively managing commercial use to coexist with noncommercial use. Park staff would designate the commercial boat launching to occur at the boat launch rather than the beach area. Commercial group sizes would remain small (per CUA conditions, around a dozen or less people) and be required to load and unload only at the boat launch while staging occurs in another area.

Analysis Area 3: Miners Castle

Review of Existing Direction and Knowledge

Miners Castle is located in the orientation/historic management prescriptions zone, and desired conditions for the area include accessible facilities, a variety of nonmotorized, nonadventure recreational activities, and large group social interaction environments. Actions related to the alternatives call for minor improvements that are common to all alternatives. Miners Castle is the most well-known of the pictured rocks and is one of the most visited areas of the park. Facilities to support visitor activities include interpretive panels, a popular overlook of Miners Castle, a sizeable parking lot, and restrooms. The Miners Castle Overlook Trail takes visitors about 1,300 feet (one way) to 3 overlooks that provide views of Miners Castle, Lake Superior, and Grand Island. The trail is paved but includes stairs and a steep slope on the portion leading to the lower overlook. A picnic area with grills is available, and an additional mile-long, unpaved section of the North Country National Scenic Trail leads to Miners Beach.

Data from traffic counters indicates that around 90% of annual visitation occurs May through October, with about half of the yearly visitation occurring during July and August. Visitation drops off steeply from November to April (Ziesler and Singh 2018). Vehicular traffic data counts report approximately 25,500 vehicles in the month of July 2018. On average, each of these vehicles contains about 3 passengers during the summer months. Therefore, approximately 76,500 visitors arrive to Miners Castle throughout the entire month. July 2018 had a total of 9 weekend days, which included Saturday, and Sundays when the majority of visitors come to the area. Based on experience, park staff conservatively assume that 75% of visitation occurs on the weekends, so with current use levels, about 6,400 visitors are at the Miners Castle area per weekend day.

$\frac{\# \text{ of visitors} \times \text{use rate assumption}}{\# \text{ of weekend days}} = \text{visitors per weekend day}$	$\frac{(25,500 * 3) * .75}{9} = 6,400 \text{ visitors per weekend day}$
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The current parking area offers 75 stalls for personal vehicles and 15 oversized-vehicle parking stalls but can accommodate about 100 vehicles without overflow out of the parking area. Assuming an 85% efficiency rate and 3 people per vehicle, this would allow for about 250 PAOT in the area given the parking supply. The average length of stay is approximately 40 minutes.

Limiting Attribute

The desired conditions for Miners Castle, similar to Sand Point and Munising Falls, provide opportunity for visitors to have social recreation experiences, encounter NPS Lakeshore staff, use facilities that support day use touring, and learn about and interact with the lakeshore. Although the desired condition for the area is social recreation experiences, there is still the possibility that future use levels could negatively influence this experience, so the most limiting attribute is ensuring a quality social experience for visitors. The most relevant indicator to monitor to ensure desired conditions are being maintained and achieved is the number of vehicles in a parking lot at a specific time of the day because this directly relates to the number of people using restroom facilities and the ability to achieve a quality visitor experience. A contributing factor to the number of people that can be accommodated is that the volume of people at Miners Castle is constrained by human waste management concerns in relation to resource protection needs at the site. Specifically, the ability of the existing septic system to sustainably accommodate visitor use is currently the primary constraint on visitor use levels in this area. However, a new utility system is being planned that would remove this constraint and ensure that resource protection needs are met.

Visitor Capacity and Implementation Strategies

While assessing existing conditions and limiting attributes in relation to the desired conditions for the area, park staff identified the opportunity to increase use in this area given a new utility system (a project the park is already working to complete) to accommodate existing and future use. The visitor capacity is 250 PAOT in the Miners Castle area to ensure quality visitor experiences can continue. However, daily capacity would be established at 10% higher than

current use levels, about 7,000 people per day, given the ability to more sustainably manage a higher volume of use and ensure resources are protected with the implementation of an improved utility system. Implementation strategies for the visitor capacity include adding this area as an expanded amenity fee area. In the future, the park might consider a permit or reservation parking system for the area if use levels continue to rise.

Analysis Area 4: Miners Falls

Review of Existing Direction and Knowledge

Miners Falls is located in the casual recreation zone. According to the desired conditions for that zone, the goals for the area include providing accessible facilities, a variety of motorized and nonmotorized recreational activities, and social recreation experiences. Visitors access the falls on a 1.2-mile (round trip) trail from a dedicated parking lot. The viewing areas are not Architectural Barriers Act (ABA) accessible (nearly eighty steps lead to the lower viewing platform). A vault toilet is located at the trailhead. Crowding was observed at the site by park staff and causes congestion in the area, placing strain on the current parking configuration. Data from traffic counters does not exist for this area. Additionally, Altran no longer delivers visitors to this site for drop off and pick up due to transportation-related challenges.

The park used the parking lot stalls to identify the number of people capable of being at the site at one time under current conditions. Under alternative B, expansion and/or improvements to parking areas would provide a total of 40 parking stalls plus 2 oversized-vehicle stalls. Assuming an 85% efficiency rate and 3 people per vehicle multiplier, this would allow for 100 PAOT in the Miners Falls area from personal vehicular traffic.

Limiting Attribute

The desired conditions for Miners Falls, as a part of the casual recreation zone, provide the opportunity for visitors to have *a diverse range of recreation opportunities, including enjoying scenery, short walks, social recreation experiences, and encounter other visitors and NPS Lakeshore staff*. Although the desired condition for the area is social recreation experiences, there is still the possibility that future use levels could negatively influence this experience, so the most limiting attribute is ensuring a quality social experience for visitors. The most relevant indicator to monitor to ensure desired conditions are being maintained and achieved is the *number of vehicles in a parking lot at a specific time of the day* because this directly relates to the number of people at using the area and the ability to achieve a quality experience. A contributing factor to the number of people that can be accommodated in this area is the need to protect resources near the falls from people scrambling and hiking off trail. Visitor safety related to this off-trail hiking is also a limiting attribute that could constrain visitor use levels. A wetland is near the Miners Falls area, so the ability of the National Park Service to expand parking is constrained by resources and the sloped landscape on either side of the existing parking lot. The existing facilities provide a small turnaround area where oversized vehicles can become stuck.

Visitor Capacity and Implementation Strategies

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 and to protect sensitive resources. The visitor capacity is 100 PAOT in the Miners Falls area. Implementation strategies to manage to the identified visitor capacity include enforcing designated parking, implementing vehicle-length requirements for the area, and improving delineated parking as a part of the alternatives for this plan. As an adaptive management strategy, the park would consider an overflow parking area with a shoulder sidewalk for safe access to the Miners Falls trailhead.

Analysis Area 5: Miners Beach

Review of Existing Direction and Knowledge

Miners Beach is located in the casual recreation zone. According to the desired conditions for that zone, the goals for the area include providing a variety of motorized and nonmotorized recreational activities and social recreation experiences. Facilities at the site include a vault toilet at the west end and a portable toilet at the east end. Lines are often reported at the restrooms, though these appear to be largely due to visitors using them as changing rooms. Park staff has also noted crowding and congestion at the site that has led to negative impacts on park resources and visitor experiences. Managing use at Miners Beach could result in increased displacement of visitors to other sites such as Sand Point Beach.

Miners Beach is the most popular beach area at the Lakeshore. Measuring approximately a mile long, it is accessed by two short trails, approximately a half-mile apart, that lead from parking areas at the west and east ends of Miners Road. Visitors frequent the west end of the beach more often than the east end (Schneider and Pflughoeft 2016; Schneider, Pflughoeft, and Choi 2018). In addition, Miners Beach is very popular for commercial use. These kayak and paddleboard groups are not currently restricted by number of participants or number of trips, though guides are encouraged to use designated areas of the beach for equipment staging and safety briefings, and (as of 2016) are required to use a shuttle system from Memorial Day through Labor Day.

From 2015 to 2016 the total CUA use at Miners Beach drastically increased with the popularity of kayaking the lakeshore and visitors' desire to experience the pictured rocks from on the water. Figure B-1 demonstrates the increase in use since 2016. Some of the 2018 decrease in CUA use, as depicted in this graph, is a movement of one company from a land-based launching operation in the park to boat-based launching outside the park. Further, since 2015 the park began updating CUA conditions to help alleviate some of the congestion and crowding occurring in the Miners Beach area.

Kayakers and commercial outfitters usually stay for several hours. The eastern parking area generally sees lighter use than the western one, though some informal overflow parking was noted there on weekends. During the peak summer season, both parking lots are usually mostly full from 12:30 p.m. to 6:30 p.m., but can remain busy up until 8:00 p.m., especially on warmer days. There are approximately 50 parking stalls at Miners West and 18 at Miners East. There is abundant roadside parking and the adjustments in the alternatives are intended to reduce the

occurrence of undesigned parking by updating parking circulation and flow to accommodate vehicles currently parking along the road. The park used the parking lot stalls to identify the number of people capable of being at the site at one time under current conditions but does not include CUA drop offs. Under alternative B, parking would be improved or expanded to include 90 stalls at the west beach (plus 5 stalls for commercial use authorizations) and 15 stalls at the east beach (no CUA use). Assuming an 85% efficiency rate and 3 people per vehicle, this would result in approximately 267 PAOT in the Miners Beach Area (229 west beach, 36 east beach). A 1-mile trail leading from the Miners Castle Overlook may nominally contribute to visitation at the west beach.

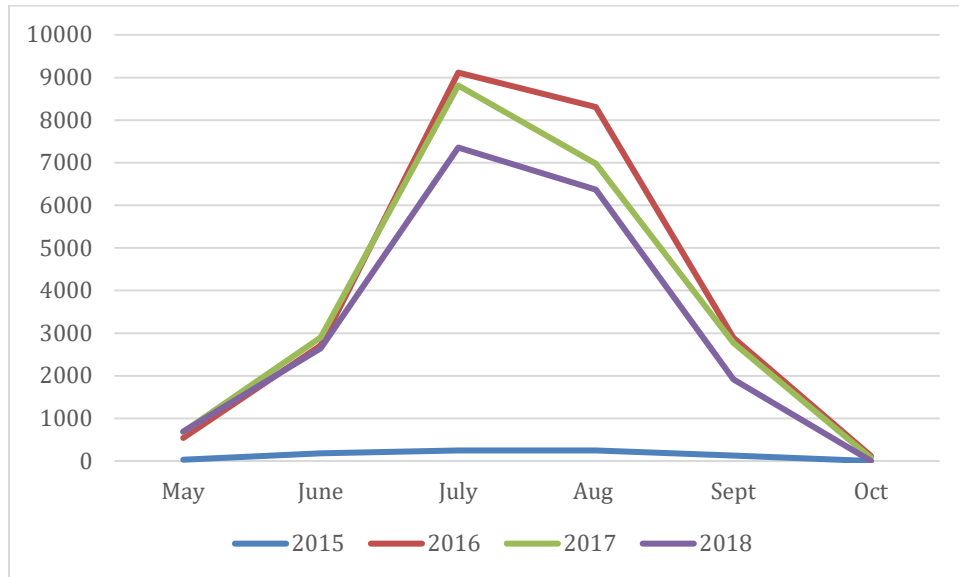


FIGURE B-1. TOTAL COMMERCIAL USE AUTHORIZATION USE BY YEAR AND MONTH AT MINERS BEACH

From the University of Minnesota research study, the highest documented use levels observed combined between west and east was approximately 270 PAOT including use at the river. That use level matches the parking lot proposal in alternative B at the 85% occupancy assumption. The park assumes that beach use is a 2-hour average length of stay based on the data collection. Researcher-observed average use when people were present at both east and west was 40 PAOT (Schneider, Pflughoeft, and Choi 2018). While the University of Minnesota data captured both private and commercial use at Miners Beach the park estimates that due to commercial use drop offs, there is likely to be more people at Miners Beach at one time than the estimated 270 people.

During the busiest month of the summer kayaking and associated CUA season, July 2018, Miners Beach CUA holders reported approximately 7,400 visitors to the area. The primary CUA holders delivering visitors to Miners Beach are Northern Waters and Paddling Michigan referred to as Uncle Ducky's. These companies guide kayak tours in the summer daily and tours fill months in advance for every day of the week. Park staff and CUA operators estimate that there might be a slight drop in CUA use during the week, but it would be very slight. July 2018 had 31 days in the month when 7,400 visitors arrived at Miners Beach for CUA use. Therefore, as estimated 240 people per day arrived at the area for CUA use during the busiest month of the

year with the majority of those drop offs occurring during morning hours when scheduled tours depart from Miners Beach.

Limiting Attribute

The desired conditions for Miners Beach, provide the opportunity for visitors to participate in a *variety of motorized and nonmotorized recreational activities and social recreation experiences*. Although the desired condition for the area is *social recreation experiences*, there is still the possibility that future use levels could negatively impact this experience, so the most limiting attribute is ensuring a quality social experience for visitors. The most important indicators to monitor at Miners Beach to ensure desired conditions are maintained and achieved are the *number of vehicles in a parking lot at a specific time of the day* and *the number of people per viewscape*. A contributing factor regarding the amount of people that can be accommodated is that the volume of people at Miners Beach is constrained by the need to protect the visitor experience from ongoing congestion and conflicts that results at peak times.

Visitor Capacity and Implementation Strategies

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 (270 PAOT) in the area for private noncommercial use to promote the unique beach experience in this area and provide visitors opportunities to achieve their recreation goals. The park would also seek to redistribute visitor use to other less-busy times of the day. The park would also monitor the people per viewscape indicator to ensure that conditions remain acceptable on the beach while the visitor capacity is identified for the entire loading and unloading zone for the Miners Beach area.

While assessing existing conditions in relation to the desired conditions for the area, park staff identified the opportunity to increase commercial use slightly (10%) by accepting additional commercial use authorizations. This would contribute to providing a diversity of opportunities and experiences for visitors. The slight increase in capacity and current use levels would be accommodated by redistributing use to off-peak times through the implementation strategies listed below. The visitor capacity for commercial use authorizations at Miners Beach would be 8,200 visitors per month, which is an approximately 10% (750-visitor) increase from current conditions of 7,400 visitors to the area with commercial use authorizations or, on average, an additional 20 people a day in the area for a daily visitor capacity of 260 for commercial use.

Commercial Use Implementation Strategies

Update CUA conditions to include the following:

- Loading/unloading (only, such as equipment staging) would occur before 10 a.m. and after 4 p.m. to separate commercial and noncommercial types of use and associated congestion at Miners Beach.
- All gear must be attended. Each company is provided parking for one vehicle and one trailer for purpose of moving gear in the Miners area. This is in addition to the physical separation of access points occurring under alternative B.

- Size restrictions, load restrictions, and chauffeur license are required.
- No parking for people moving vehicles.
- Uniforms are required (shirts, shorts and logo with name).
- All vehicles must be marked.
- All boats have to have boat registration (MC) numbers turned in to the National Park Service.
- Mandatory leave-no-trace education provided by commercial use authorization. Park would provide 8-hour training on leave no trace, safety, resource management, and mission of the agency.
- Attendance required at end-of-year meeting with commercial use authorizations. This is an opportunity to review the season.
- Boats must be carried (i.e., no dragging).

Adaptive Strategies to be implemented as needed:

- Manage the following:
 - Number of people/day
 - Number of people/group
 - Number of registered kayaks per CUA
- Distribute commercial use over time and launching areas
 - Specify launching days of the week
 - Specify number of trips per day and/or total number of trips
- Compete commercial use authorizations
- Implement management strategies to improve human waste management (leave-no-trace education, wag bags, creative removal)
- Implement an expanded amenity fee for Miners area

Analysis Area 6: Chapel Falls and Mosquito Beach

Review of Existing Direction and Knowledge

Chapel Falls and Mosquito Beach share a parking area but are located between two separate management zones, the casual recreation and primitive zones. The trails leading to the falls and Chapel Beach shoreline are located in the casual recreation zone, which calls for a variety of motorized and nonmotorized recreational activities and social recreation experiences. Other trails and Mosquito Beach are in the primitive zone, the desired conditions for which include a variety of appropriate human-powered/nonmotorized recreational activities and specify opportunities for solitude, tranquility, and visitor use that does not degrade natural or cultural resources.

Park staff have observed congestion and crowding in the area, though to a somewhat lesser extent than at Miners and Sand Point Beaches. This area has the largest diversity of visitor use types including kayakers, motorboaters, day hikers, longer-distance trail hikers, overnight campers, backcountry overnight users, picnickers, partiers, and commercial use authorizations on the beach. The park assumes that hiking to Chapel Beach from the parking area occurs for

about 40% of visitors, while hiking to Chapel Falls or Mosquito Falls occurs for about 60% of visitors.

Data from traffic counters indicates that around 65% of annual visitation to this area occurs from June through August. Vehicular traffic data counts report approximately 4,200 vehicles in the month of August 2018. The person per vehicle multiplier at the Lakeshore is 3 during the summer months. Therefore, approximately 12,600 visitors arrive to the Chapel area throughout the entire month by personal vehicle. August 2018 had a total of 9 weekend days which included Saturdays and Sundays when the majority of visitors come to the area. Based on experience, park staff conservatively assume that 75% of visitation occurs on the weekends; therefore, with current use levels, about 1,050 visitors arrive at the entire Chapel area from personal vehicles per weekend day.

$\frac{\text{\# of visitors} \times \text{use rate assumption}}{\text{\# of weekend days}} =$ <p><i>visitors per weekend day</i></p>	$\frac{(4,200 \times 3) \cdot 75}{9}$ <p><i>= 1,050 visitors per weekend day from personal vehicles</i></p>
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The park used the parking lot stalls to identify the number of people capable of being at the site at one time under current conditions. Under alternative B, the park is proposing no changes to the existing trailhead parking. Assuming 85% efficiency rate and 3 people per vehicle, the existing 50 parking stalls would allow for 130 PAOT in the area; however, a limited number of visitors may access Mosquito Beach and/or Chapel Falls using trails leading from other areas of the park. A proposed management action common to all alternatives in this plan involves exploring opportunities to partner with the City of Munising and Alger County Transit for the purpose of offering a bus route from downtown Munising that would stop at the Chapel Basin trailhead. If a shuttle route is established, the identified capacities for this area may need to be adjusted.

Visitors can access several backcountry campsites from the shared parking area. There are five backcountry campsites (maximum of 6 people) and one backcountry group campsite (7-20 people) available near Mosquito Beach. If all the campsites were full with the maximum amount allowed per site at one time, overnight camping would contribute 50 overnight visitors to current use levels in the area.

In addition to accessing the site by personal vehicle, Chapel Beach is a popular cove for private motorized use. The park assumes that this type of use is about 10% of the total use at the site and contributes no more than 2 to 3 motorized boats at one time with 2 to 5 people per boat. This type of use would contribute an additional 15 people for day use to the area. The visitor capacity at Miners Beach for commercial use is a factor at Chapel Beach and could contribute up to an additional 260 people per day to the area.

Limiting Attribute

The desired conditions for Chapel Falls and Mosquito Beach vary despite the shared parking area. The desired conditions for the trails leading to the falls and Chapel Beach shoreline are

aligned within the casual recreation zone, which calls for *a variety of motorized and nonmotorized recreational activities, and social recreation experiences*. The desired conditions for the other trails and Mosquito Beach within the primitive zone include *a variety of appropriate human-powered/nonmotorized recreational activities and specify opportunities for solitude, tranquility, and visitor use that does not degrade natural or cultural resources*. Although the desired condition for Chapel Beach is for *social recreation experiences*, the desired conditions for Mosquito Beach and trails provide *opportunities for solitude*. As a whole, this area has the biggest opportunity for growth (since there are so many types of uses) and is one of the more challenging areas to manage given the diversity of visitor use types. It is for these reasons, that the quality of the visitor experience is the limiting attribute that has the greatest potential to constrain visitor use levels. As previously stated, the Chapel area attracts a variety of visitor uses, including overnight and day use, but specifically kayaking, day hiking, and motorized boat use. Protecting opportunities for visitors to experience tranquility and solitude is a part of the desired conditions for this area. A contributing factor to the volume of use in the area is human waste management. Waste management is a challenge at Chapel given the remote location. This management of human waste also directly affects the visitor experience. Further, the available linear feet of beach is very small and visitors lack the opportunity to spread out at the ends because much of the area is rock. This constrains the volumes of visitor use because it limits the types of activities in which visitors can participate and increases the densities of visitors in the area. The most relevant indicators to monitor to ensure desired conditions are being maintained and achieved are the *number of vehicles in a parking lot at a specific time of the day* and *number of people on the trail* because these directly relate to the number of people on the trails and at the beach and the ability to achieve a quality experience.

Visitor Capacity and Implementation Strategies

Current use levels include 130 PAOT from personal vehicle access in the parking area, 50 overnight visitors, and 15 people from motorized boat use. Given the assessment of existing conditions in relation to the desired conditions for the area, park staff identified the need to maintain current visitor use levels in the area. Therefore, the visitor capacity in the Chapel area would be approximately 200 PAOT with the addition of up to 260 people per day from commercial use originating at Miners Beach. In addition to maintaining current visitor use levels, the park staff would manage (monitor and treat) for invasive species introduced through proposed management actions.

Implementation strategies include the potential to partition the beach, target an increase in day use visitor capacity by implementing a permit system, and require day use hikers to pack in and pack out. Effective management of commercial use authorizations at Miners Beach would also contribute to managing to the visitor capacity at Chapel Beach since that is the launching location for commercial and private kayak use in the study area. The park would also consider designating overnight parking or requiring overnight parking outside of the Chapel area. Other strategies from the indicators and thresholds that also apply to implementing visitor capacity include developing a permit system for backcountry use and managing group sizes for permits and commercial use authorizations.

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APPENDIX C: MITIGATION MEASURES AND BEST MANAGEMENT PRACTICES

NATURAL RESOURCES

- The National Park Service (NPS) would apply best management practices according to NPS 2016 Management Policies, specifically with reference to 4.4.2 – Management of Native Plants and Animals; 4.4.2.3 – Management of Threatened or Endangered Species; and 4.4.4 – Management of Exotic Species, and other sections that would apply.
- Staff would consult with an NPS biologist before beginning construction to ensure impacts to vegetation and wildlife are kept to a minimum.
 - To minimize the potential for incidental take to federally endangered bats (tree removal), apply the US Fish and Wildlife Service (USFWS) final 4(d) rule for the northern long-eared bat.
 - For wildlife, and shorebirds specifically (both breeding and migratory), implement the general and habitat protection measures found in the USFWS Nationwide Standard Conservation Measures (USFWS 2019c), with reference to individual species' periods of activity.
 - Specific to the ecology of species in the park, refer to guidance from the Michigan State Wildlife Action Plan, and the Michigan Natural Features Inventory. Please refer to table C-1 to review sensitive species status, park management priority, and period of activity management recommendations.
- The National Park Service would continue to monitor water quality parameters to ensure water quality standards are maintained.
- During all construction activities, best practices for weed and erosion management would be used, including the following:
 - Minimize new ground/soil disturbance to the greatest extent possible and select previously disturbed areas for construction staging and stockpiling.
 - Fence or clearly mark construction limits to protect sensitive areas.
 - Enforce prevention of disturbances to vegetation and soil outside construction limits.
 - Ensure project personnel make daily checks of clothing, boots, laces, and gear to ensure no exotic plant propagates and no off-site soil is transported to the work site.
 - Thoroughly pressure-wash equipment to ensure all equipment and machinery are clean and weed free before being brought into the study area.
 - Cover all haul trucks bringing materials from outside the park to prevent seed transport and dust deposition.
 - Obtain all fill, rock, topsoil, or other earth materials from approved or inspected sites.
 - Implement erosion control measures, such as planting or seeding at vulnerable sites within management areas.
 - Use siltation control devices, such as silt fencing and mulch stabilization to reduce erosion, capture eroding soils, and prevent sediments from entering wetland areas.

- Revegetate so as to reconstruct the natural spacing, abundance, and diversity of native plant species as much as possible. Restore all disturbed areas as much as possible to pre-construction conditions, including decompaction of soils, shortly after work is completed.
- Use erosion control matting that is appropriate for the climate and vegetative community, with respect to wildlife safety, wherever it is implemented.
- Monitor vegetation for impacts caused by maintenance of all facilities and infrastructure associated with the implementation of this plan and general park operations.
- Follow management and avoidance recommendations associated with sensitive and state species of special concern during any construction activities (Table C-1).

TABLE C-1. SENSITIVE AND STATE SPECIES OF SPECIAL CONCERN AND MANAGEMENT INDICATIONS

Taxa	Species	Scientific Name	Status	Presence in Park	Period of Activity Management Recommendations
Mammal	Little brown bat	<i>Myotis lucifugus</i>	State Species of Concern	Common; breeder.	
Bird	Red-shouldered hawk	<i>Buteo lineatus</i>	State Threatened	Occasional. Park management priority.	Migration from fourth week of February to second week of March. Nesting from third week of March to fourth week of June. Migration from fourth week of August to fourth week of October.
Bird	Northern harrier	<i>Circus cyaneus</i>	State Species of Concern	Occasional.	Migration from fourth week of March to fourth week of April. Nesting from fourth week of April to third week of July. Migration from third week of August to third week of November.
Bird	Trumpeter swan	<i>Cygnus buccinator</i>	State Threatened	Unknown abundance in park.	Migration from fourth week of March to third week of April. Nesting from fourth week of April to fourth week of July. Migration from third week of October to first week of December.
Bird	Merlin	<i>Falco columbarius</i>	State Threatened	Occasional; breeder. Michigan data indicate numbers are rebounding. Center for nesting activity is north of park.	Nesting trees should be protected, and human activity should be limited within a buffer around nests. Nesting from third week of May to fourth week of July.
Bird	Peregrine falcon	<i>Falco peregrinus</i>	State Endangered	Occasional. Park management priority.	Migration from first week of March to fourth week of March. Nesting from first week of April to fourth week of June. Migration from first week of October to fourth week of November.

Taxa	Species	Scientific Name	Status	Presence in Park	Period of Activity Management Recommendations
Bird	Common loon	<i>Gavia immer</i>	State Threatened	Uncommon. Park management priority.	Migration from second week of March to third week of May. Nesting from first week of May to fourth week of July. Migration from third week of October to third week of December.
Bird	Osprey	<i>Pandion haliaetus</i>	State Species of Concern	Occasional.	Migration from fourth week of March to second week of April. Nesting from third week of April to fourth week of July. Migration from first week of September to third week of November.
Plant	Little goblin moonwort	<i>Botrychium mormo</i>	State Threatened	Rare. Park management priority	Occurs in mature as well as second growth mesic northern hardwood forests and, much less commonly, in coniferous forests in soil with a rich humus layer. Minimize development and fragmentation.
Plant	Tuckerman's pondweed	<i>Potamogeton confervoides</i>	State Species of Concern	Unknown abundance in park.	Protection of habitat and maintenance of hydrology. Susceptible to excessive recreational during low water periods.
Plant	American dune grass; American dune wild rye	<i>Leymus mollis</i>	State Species of Concern	Rare. Park management priority	Protection of natural dune processes (e.g., erosion, sand deposition, water level fluctuations), microsite habitat, and maintenance is necessary. Vulnerable to excessive foot traffic and motorized use. Survey for undocumented occurrences from third week of June to fourth week of August.
Invertebrate	Lake Huron locust	<i>Trimerotropis huroniana</i>	State Threatened	Uncommon. Park management priority. Dune specialist.	Protection of dune habitat is critical, especially from development and off-road vehicle use. Species does not survive well in weedy habitat or disturbed sites where dune dynamics are altered through complete removal of vegetation.

Sources: Derosier et al. 2015; Michigan Natural Features Inventory, accessed April 24, 2019.

CULTURAL RESOURCES

- The National Park Service (NPS) would practice good resource stewardship with regard to the protection of archeological resources, historic structures, and cultural landscape resources. Desired conditions and indicators and thresholds developed as part of this plan would signal when cultural resources were sustaining a maximum acceptable level of impact.
- The National Park Service would continue, and possibly enhance, ongoing cultural resource monitoring programs by its staff.
- In consultation with the State Historic Preservation Officer, Advisory Council on Historic Preservation, and other interested parties the National Park Service would apply the following measures to avoid or minimize impacts on cultural resources:
 - All activities would comply with The Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation and Director's Order 28: Cultural Resource Management.
 - Archeological inventory and/or evaluation would precede any and all ground-disturbing activities (such as enlarging the visitor center, construction of staff housing units, or trail development) where inventories have not been previously conducted.
 - Archeological monitoring would continue during construction in areas where there is potential for buried resources.
 - Archeological resources would be identified and delineated prior to project work. All construction projects would be sited to avoid impacts as much as possible.
 - The National Park Service would ensure that all contractors, subcontractors, and lessees are informed of the penalties for illegally collecting artifacts or intentionally damaging archeological sites. Contractors and subcontractors would be instructed on procedures to follow if previously unknown archeological resources are uncovered during implementation.
 - Equipment and material staging areas used during construction projects would avoid known archeological resources.
 - Fencing off highly sensitive archeological and ethnographic sites in the study area would be implemented as needed.
 - If previously undiscovered archeological resources are uncovered during construction, all work in 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 Michigan State Preservation Office and associated tribes. Newly discovered archeological sites would be assessed for significance and national register eligibility by an NPS-approved archeologist. The archeologist would then determine if the area should be excluded from construction activities and how the exclusion would be made. All project personnel would be briefed to stay out of areas of sensitive archeological resources.
- In the unlikely event that human remains, funerary objects, or objects of cultural patrimony are discovered during construction activities, applicable provisions of the

Native American Graves Protection and Repatriation Act (Public Law 101-601) and its implementing regulations would be followed.

VISITOR EXPERIENCE AND SAFETY

- Past and ongoing monitoring would inform future mitigation measures to avoid impacts on the cultural and natural resources in the study area, as well as on the visitor experience. These include the following:
 - Monitoring of visitation through various methods such as visitor surveys and transportation data.
 - Periodic visitor surveys and data collection to determine visitor use patterns, visitor characteristics, visitor use conflicts, and visitor preferences and satisfaction with visitor opportunities and other programs, services and facilities.
 - Documenting and monitoring of law enforcement incidents.
 - Resource condition surveys, as needed.
 - Proactive addressing of safety measures using signs, bulletin boards, and sharing of safety information during staff interactions with visitors.
- Future monitoring would also inform mitigation measures to minimize impacts on the cultural and natural resources in the study area, as well as the visitor experience. These could include the following:
 - Enhancing ongoing monitoring programs by park staff and partners.
 - Implementing measures to reduce adverse effects of construction on visitor experience and safety. Measures may include, but are not limited to, phasing construction, temporary queuing system, noise abatement, visual screening, providing information to visitors on the purpose and need for construction, and directional signage to help visitors avoid construction activities.
 - Using feedback from routine patrols and ranger interactions with visitors and results from other resource monitoring programs to analyze and manage current or future recreational activities and opportunities.
 - Developing a visitor education program with consistent messaging on behaviors appropriate to visitor use in the study area. Information could be shared through additional appropriate signage, park staff and volunteer messaging, the park website, and printed/visual materials available to visitors throughout the unit. Additional efforts could reach visitors prior to their arrival, for example, through the cooperation of commercial operators.
 - Ensuring that facilities, programs, and services of the National Park Service and its partners are accessible to and usable by all people, including those who are disabled. This policy is based on the commitment to provide access to the widest cross-section of the public and to ensure compliance with the Architectural Barriers Act and the Rehabilitation Act.
 - Responding to visitor conflicts and incidents using law enforcement protocols. Incidents would be reviewed by safety committees and incident reports generated and dispersed to park staff.
- Manage to established visitor capacities based on an analysis of desired conditions, current visitor use information, monitoring of relevant indicators and thresholds, and

implementation potential management strategies such as visitor education, site management, visitor use regulations, rationing or reallocation of visitor use, and enforcement.

- Continue to hire seasonal staff to assist/manage access during peak use times.
- Consider visitor safety in all planning and projects and general operation.
- Consider using the principles of operational leadership in planning safe visitor access to park features.

EDUCATION AND INTERPRETATION

- Continue to update online information for interpretation and education.
- Continue to use all available information tools such as social media to provide up-to-date messaging on visitor opportunities, use patterns, congestion, and appropriate times to access popular areas.

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APPENDIX D: NECESSARY AND APPROPRIATE CRITERIA AND DETERMINATIONS FOR COMMERCIAL SERVICES IN PICTURED ROCKS NATIONAL LAKESHORE

The National Park Service (NPS) is authorized by specific laws, regulations, and policies to allow commercial visitor services, leasing, and special park uses within areas under the NPS's jurisdiction. A summary of the requirements the National Park Service must meet for each of these authorities follows.

GENERAL STATUTORY, REGULATORY, AND POLICY FRAMEWORK

The National Park Service was established in 1916 with the passage of the National Park Service Organic Act. The Act defined the mission of the National Park Service "...to conserve the scenery and the natural and historic objects and the wild life therein to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations." Safeguarding resources thus became the paramount concern for the National Park Service and has since been balanced with the need to provide visitor services to ensure enjoyment by the public. It is from this original law that the NPS Commercial Services Program evolved.

Commercial services within units of the National Park System are governed by the 1998 Concessions Management Improvement Act (Public Law 105-391). The 1998 Act, as it is commonly referred to, requires that contracts for visitor facilities and services "...be limited to those that are necessary and appropriate for public use and enjoyment..." of the national park area in which they are located, "... and that are consistent to the highest practicable degree with the preservation and conservation of the areas...". Regulations governing visitor use and behavior in units of the national park system are contained in Title 36 of the *US Code of Federal Regulations* (36 CFR). These regulations have the force of law and include a variety of use limitations, such as limits on commercial activities. Part 51 of title 36 defines how the National Park Service solicits, awards, and administers concession contracts.

In order to implement the requirements of law, the National Park Service has in place a specific set of management policies that guide agency operations. These policies are an indispensable tool to help NPS employees manage parks responsibly and make rational, well-informed decisions. The general public may also refer to these policies to better understand how the National Park Service will meet its park management responsibilities under the 1916 NPS Organic Act. Chapter 10 of *NPS Management Policies 2006* provides management guidance specific to commercial visitor services.

The preamble to *NPS Management Policies 2006* for commercial services articulates the important alignment of the 1998 Act with the overall NPS mission:

"The National Park Service will provide, through the use of concession contracts, commercial visitor services within the parks that are necessary and appropriate for visitor use and enjoyment. Concession operations will be consistent with the protection of park resources and

values and demonstrate sound environmental management and stewardship.” (NPS Management Policies 2006, Chapter 10)

OVERVIEW OF NATIONAL PARK SERVICE COMMERCIAL SERVICES

Commercial services are defined as any activity or service that occurs in a park for which compensation is made. By law, all commercial services must be authorized in writing by the park superintendent. The two most common mechanisms for delivering commercial services are concessions contracts and commercial use authorizations (CUAs). Commercial use authorizations are permits authorizing appropriate commercial services to park visitors. Concession contracts are typically 10-year agreements for larger commercial activities, granted after a competitive solicitation process. There are three different types of concession contracts based on the amount of land or facilities assigned to the concessioner. Commercial service providers that do not operate under an NPS concessions contract must have a valid commercial use authorization to legally operate in a national park. One type of commercial service that should be managed through a commercial use authorization is road-based commercial tours. Beginning October 1, 2019 road-based commercial tour operators are required to obtain a commercial use authorization for each park in which they operate. Road-based commercial tours are defined as consisting of one or more persons traveling on an itinerary that has been packaged, priced, or sold for leisure or recreational purposes by an organization that realizes financial gain through the provision of the service.

Necessary and Appropriate Criteria

Necessary and appropriate criteria help parks determine which commercial services will enhance the visitor experience without negatively impacting the park or its ability to carry out its mission. They allow a park to easily identify which services can be considered for a commercial use authorization or a concession contract.

Appropriate criteria help to answer the question, “Can the park authorize this service without compromising the reason it is a unit of the National Park System?” These criteria provide insight into the critical components of the park and visitor service, while also describing the potential negative impacts of commercial services the park must prevent. All commercial services—whether a commercial use authorization or concession contract—must meet all appropriate criteria to operate in the park.

Necessary criteria help to answer the question, “Why is this service important for the park?” These criteria describe how a commercial service could enhance the visitor experience and further the goals and mission of the park. Necessary criteria are unique to NPS concession contracts: while commercial use authorizations do not need to meet any necessary criteria, concession contracts must meet at least one necessary criterion to operate in the park.

Appropriate Criteria: (Commercial services *must meet all* appropriate criteria.)

- Consistent with the park purpose and significance
- Consistent with laws, regulations and policies
- Does not compromise public health and safety

- Does not cause unacceptable impacts to park resources or values
- Does not unduly conflict with other park uses and activities
- Does not exclude the general public from participating in limited recreational opportunities

Necessary Criteria: (Concession contracts *must meet at least one* necessary criterion. Commercial use authorization may be issued without meeting any necessary criteria.)

- Contributes to visitor understanding and appreciation of a park's purpose and significance
- Enhances visitor experiences consistent with the park's purpose and significance
- Assists the National Park Service in managing visitor use and educating park visitors
- Provides an essential service or facility not available within a reasonable distance from the park

PICTURED ROCKS NATIONAL LAKESHORE MANAGEMENT GUIDANCE

In addition to law and policy, park management principles aid the administration and protection of the park's resources. These principles set broad boundaries for the types of commercial activities that may occur within the park.

The following management guidance are drawn from the park's 2004 final general management plan and wilderness study. In order to operate in the park, commercial visitor services must be consistent with the purpose for which the park was established and have minimal impacts on the park's resources and values. The park's purpose and fundamental resources and values are described in chapter 2 of the visitor use management (VUM) plan.

Management Prescriptions

The 2004 final general management plan and wilderness study identified management prescriptions in each particular area of the national lakeshore. The management prescriptions in relation to this plan do not provide specific guidance on commercial services; however, each prescription includes the types of activities and facilities that are appropriate in that management prescription. The area-specific management prescriptions that are relevant to this necessary and appropriate determinations are as follows:

- Munising Falls, Sand Point, and the Miners Castle area are included in the *orientation/history zone*. These areas are highly managed where orientation and interpretation is emphasized. Structured visitor opportunities, such as interpretive programs and tours, are provided, but self-guided opportunities are also available. Orientation and interpretation facilities such as visitor centers, contact stations, kiosks, wayside exhibits, and other interpretive media are appropriate. Sightseeing, walks, educational programs, visiting cultural resources, and other organized activities are common in this zone.
- The area between Munising Falls and Miners Beach is included in the *casual recreation zone* which was designated to provide rustic, convenient, and easily accessible visitor experiences. Facilities that support visitor touring are present (overlooks, boat ramps,

short trails, picnic areas, parking areas, restrooms, and rustic drive-in campgrounds). Bicycle use is not permitted on trails in the shoreline zone. Appropriate activities in this zone include enjoying scenery, short walks, beach strolling, casual driving, motorized and nonmotorized boating, and camping. Hunting is allowed except where specifically prohibited. Snowmobiling is allowed on roads that are open to motorized vehicles during snow-free seasons.

- The *mixed use zone* was designated to continue opportunities for extractive and recreational activities as authorized in the legislation that established the Lakeshore. This zone offers visitors a relatively primitive, independent experience. Access is via primitive roads or trails. Motorized and nonmotorized transportation are acceptable in this zone, including all-terrain vehicles, bicycles, snowshoes, horses, dog sleds, motorcycles, and snowmobiles. Bicycle and motorized use on the North Country National Scenic Trail are prohibited. Hunting, fishing, hiking, camping, and cross-country skiing are appropriate activities in this zone.
- The area between Miners Beach and Spray Creek, which includes most of Chapel Basin and Chapel Lake, are part of the *primitive management zone*. This zone was designated to provide a sense of remoteness and immersion in nature. It provides visitors the opportunities for challenge and adventure. Tolerance for noise, visual intrusions, and social interaction are low. Facilities are limited to primitive footpaths and backcountry (tent) campgrounds with minimal facilities. Only nonmotorized activities are allowed and include hiking, camping, hunting, fishing, snowshoeing, kayaking, canoeing, and skiing. Bicycle use is not permitted on trails in this zone.
- The developed area is not intended for visitor use. This includes the area around the park's Munising maintenance facility as well as residential development areas along Carmody Road, Miners Castle Road, Monette Road, and Chapel Road.

GENERAL MANAGEMENT OF COMMERCIAL SERVICES IN PICTURED ROCKS NATIONAL LAKESHORE

To ensure that the Lakeshore's fundamental resources and values are not being adversely affected by commercial visitor services, the National Park Service will monitor the guided operations using the indicators and thresholds described in appendix B. All guides operating in the park will receive information regarding the purpose and significance of the park as well as leave-to-trace practices to provide to clients.

EVALUATION OF COMMERCIAL VISITOR SERVICES OPPORTUNITIES AREAWIDE (MUNISING FALLS TO SPRAY FALLS)

The following evaluation of general public use, current commercial services and potential new services within the study area are based on an analysis of relevant laws and policies as well as input from park staff. As previously mentioned, regulations governing visitor use and behavior in units of the national park system are contained in Title 36 of the *US Code of Federal Regulations*. Pertinent regulations are identified where applicable. All commercial services need to be consistent with the desired conditions identified by zone (see chapter 1). Commercial service activities will be consistent with identified visitor capacities (see appendix B).

General Public Use and Services Within the Study Area.

Boating. Lake Superior's rugged shoreline invites boaters to explore the beautiful Lakeshore with its miles of colorful sandstone cliffs and long stretches of sandy beaches. Boats and motors of any size are permitted on Lake Superior. Boats may be launched into Lake Superior at the City of Munising's boat ramp. Sand Point is only launch site in the Lakeshore. Vessels and their operation on all waters subject to NPS jurisdiction are governed in accordance to state and federal laws. Lake Superior can be rough and small craft are easily swamped; therefore, specialized skills and knowledge and seaworthy equipment are required for nonmotorized paddling on Lake Superior. In the study area, Miners Beach and Chapel Lake are popular options for canoes and recreational kayaks and are accessible by carrying in the equipment. Personal watercraft such as jet skis may travel in the Lakeshore from the western boundary near Sand Point to the eastern terminus of Miners Beach. In the park, personal watercraft may be launched from the Sand Point boat ramp. As per 36 Code of Federal Regulations (CFR) § 3.9(a), personal watercraft are not permitted elsewhere within the lakeshore's one-quarter mile offshore jurisdiction along the Lake Superior shoreline. Due to horsepower restrictions, personal watercraft are not allowed on inland lakes in the park.

Hiking and Backpacking. With numerous trails in the Lakeshore, visitors can choose short or long and easy or vigorous trails that provide spectacular vistas of the lake, cliffs, dunes, and waterfalls. Trails in the study area include parts of the 42.8-mile North Country National Scenic Trail that traverse the park, Sand Point Marsh Trail, Munising Falls, Miners Castle Overlook, Miners Castle to Miners Beach, Miners Falls Trail, and a number of different trails and hikes in the Chapel Basin/Mosquito Falls area. Nature trails include self-guided interpretive information.

Camping. In the study area, backcountry camping is available at four small campgrounds (each with multiple sites). Forests, dunes, beaches, and great views can all be experienced along the trail. A backcountry camping permit is required for all overnight stays in the backcountry, including in winter.

Fishing. With its many streams, inland lakes, and Lake Superior, the Lakeshore offers a variety of fishing opportunities. Section 5 of the park's establishment legislation (Public Law 89-668) permits fishing in the park. State of Michigan fishing regulations apply. Fishing in the Mosquito River for trout is popular with anglers from spring through fall. Sand Point is another popular area for fishing in the summertime.

Hunting. The park's varied topography, lakes, streams, and mixed coniferous and hardwood forest provides habitat for a variety of game animals. Along with fishing, hunting is an activity specifically allowed by the Congress when it established the park. Hunting is permitted in the park in accordance with federal migratory bird laws and federal and State of Michigan regulations. Most hunting is for white-tailed deer, grouse, woodcock, bear, and snowshoe hare. The hunting season begins in mid-September with bear and grouse seasons and continues through the winter with snowshoe hare season. Hunting is prohibited parkwide from April 1 through Labor Day. Certain developed and high visitor use areas are closed to hunting for public safety.

Bicycle Riding. The Lakeshore offers beautiful riding and sight opportunities from dunes, forests, and beach. As per 36 CFR 4.30, the use of bicycles is prohibited except on roads, in parking areas, and designated routes. Bicycles are permitted on the visitor use roads when traveling with the flow of traffic. Due to the sandy nature of the soil at the Lakeshore, bicycles, including mountain bikes, are not permitted on trails in the park including on the North Country National Scenic Trail, as they would quickly destroy the trails.⁷

Visitor transportation services. These services are available for hikers wishing to take a bus to the starting point and hike back to their vehicle. AlTran is a county government transportation service provider that services the surrounding community, including the park.

Existing Commercial Services.

Concessions Contract. The park does not have any concession contracts operating within the study area.

Current Commercial Use Authorizations. The National Park Service issues commercial use authorizations that allow an individual, group, company, or other for-profit entity the opportunity to conduct commercial activities and provide specific visitor services in the Lakeshore. In 2018, there were 18 businesses with commercial use authorizations to provide recreational services in the Lakeshore. Commercial activities currently taking place in the study area include guided backpacking and hiking, guided kayak/canoe/paddleboard tours, photography workshops, and visitor transportation.

Nonmotorized Boating. Canoeing, kayaking and paddleboarding Lake Superior's rugged shoreline invites boaters to explore the beautiful Lakeshore with its miles of colorful sandstone cliffs and long stretches of sandy beaches. Vessels and their operation on all waters subject to NPS jurisdiction are governed in accordance with state and federal laws. Lake Superior can be rough and small craft are easily swamped; therefore, sea kayaks with a spray skirt, recommended equipment, the proper skills, and good weather are needed to paddle on Lake Superior. Peaceful inland lakes invite boaters to linger in the north woods. In the study area, Miners Lake and Chapel Lake provide opportunities for canoeing and kayaking and these areas are accessible by carrying in the equipment.

People who kayak/canoe/paddleboard are subject to limitations pertaining to length of stay; party size; wood fires; and modification of campsites with rock walls, new fire rings, or other structures (all of which are prohibited). Kayaking/canoeing/paddleboarding requires specialized skills and knowledge, employs special equipment, involves special safety and natural resource concerns, and may also offer opportunities for technical skills development. Nonmotorized boating allows visitors to use and enjoy the Lakeshore in a manner that is consistent with preservation of the Lakeshore's fundamental resources and values, to experience a natural and scenic environment, and to avail themselves of extraordinary opportunities for group recreation as well as being immersed in the natural setting of the park. Kayaking/canoeing/paddleboarding meets all the appropriate criteria and can be authorized as a commercial use authorization.

6. From 2004 GMP response to comments

Additionally, it contributes to visitor understanding and appreciation of the Lakeshore's purpose and significance and enhances visitor experience thereby meeting two of the necessary criteria. Limited parking and crowding at boat launch points can negatively impact the visitor experience and cause localized impacts to riparian vegetation.

Types of commercial services that directly support kayaking/canoeing/paddleboarding are guided tour services that assist visitors in safely conducting the activity in appropriate locations, including providing localized knowledge and up-to-date weather forecast. Guided canoe, kayak, and/or paddleboard tour services consist of providing clients tours to destinations in the boundaries of the Lakeshore by a seaworthy, nonmotorized vessel while maintaining continuous presence at all times with the visitors/clients between the hours of sunrise to sunset. In 2018, there were five CUA holders providing guided kayak/canoe/paddleboard tour services. In the future, based on interest, performance of CUA holders, visitor experience, and financial viability, the park could consider authorizing guided kayak tour services under the concession contract authority.

To avoid causing unacceptable impacts to park resources and values and avoid excluding the general public from participating in limited recreational opportunities, guided canoe, kayak, and/or paddleboard tour services are and would continue to be guided to designated Lakeshore launch points. Furthermore, visitors would be guided to more stable and resilient Lakeshore access points such as sandy beaches and low-angle slopes. Fencing and signs may be installed to protect high use areas that exhibit vegetation loss. Revegetated areas proximal to launch areas would be protected with signs, fencing, and/or natural barriers such as rocks and logs. Additional conditions may apply depending on the holder's request and would be stipulated in the body of the individual CUA application for each activity.

Day Hiking and Backpacking. Hiking is a traditional and one of the most popular ways to experience the park. With numerous trails in the Lakeshore, visitors can choose short or long and easy or vigorous trails that provide spectacular vistas of the lake, cliffs, dunes, and waterfalls. Trails in the project include a 42.8-mile section of the North Country National Scenic Trail that traverses the park, Sand Point Marsh Trail, Munising Falls, Miners Castle Overlook, Miners Castle to Miners Beach, Miners Falls Trail, and a number of different trails and hikes in the Chapel Basin/Mosquito Falls area. Nature trails include self-guided interpretive information. Hiking allows visitors to realize and experience the recreational and other values of the park and is an appropriate activity in the park.

Overnight camping is a traditional recreational activity that is integral to multi-day trips involving hiking, fishing, hunting, kayaking, and canoeing among other activities. Overnight camping allows visitors to immerse themselves in the exceptional variety of scenery and wildlife viewing opportunities in the Lakeshore. Overnight camping contributes to visitor understanding and appreciation of the park's purpose and significance, enhance visitor experience, and assist park staff in educating park visitors. In the study area, backcountry camping is available at four small campgrounds (each with multiple sites). Forests, dunes, beaches, and exceptional views can be experienced along the trail. A backcountry camping permit is required for all overnight stays in the backcountry, including in winter. To avoid causing unacceptable impacts to park resources or values, overnight camping is currently only permitted in designated locations and is

subject to limitations pertaining to length of stay, party size, food storage, and fires use. These limitations ensure the activity remains compatible with the park purpose and significance. Subject to these limitations, hiking and backpacking are determined to meet the necessary and appropriate criteria.

Types of commercial services that may directly support day hiking and backpacking are guided services that assist visitors in finding appropriate locations for these activities and provide local knowledge or education about natural and cultural resources. Guided hiking and backpacking tour services consist of providing clients tours by escorting visitors/clients to destinations in the boundaries of the Lakeshore by foot between the hours of sunrise and sunset. In 2018, there were eight CUA holders providing guided hiking trip services in the park.

Photography. Taking photographs is a popular way for the public to realize the scenic purpose of the park and, as such, is an appropriate activity. Photography can complement the fundamental experiences of park visitors and serve to interpret and educate the public about park resources. Photography workshops allow visitors to use and enjoy the park in a manner that is consistent with preservation of the park's fundamental resources and values; is consistent with laws, regulations, and policies; and does not compromise public health and safety. Photography is currently permitted in all areas of the study area, with the exception of a limited number of areas that may be off limits to protect resources. To avoid unduly conflict with other park uses and activities or preclude the public from enjoying recreational opportunities, photography workshops are subject to limitations pertaining to party size and the requirement to stay in established walkways and trails open to the general public to minimize resource impacts. These limitations ensure the activity remains compatible with the park purpose and significance. Subject to these limitations, photography is determined to meet the appropriate criteria and may be authorized as a commercial use authorization. Additionally, photography contributes to visitor understanding and appreciation of the park's purpose and significance, and it enhances visitor experience thereby meeting two of the necessary criteria.

Types of commercial services that may directly support photography are guide services based on assisting visitors in finding appropriate locations for these activities and providing technical skill development. Guided photography tour services at the Lakeshore consist of providing clients tours by escorting visitors/clients to destinations in the park with a focus on providing clients an educational and or artistically enhanced opportunity. In 2018, there were two CUA holders providing photography workshop services.

Potential New Commercial Services.

The addition of new commercial services would provide a variety of new visitor experiences and support the park in resource protection, visitor education, visitor safety, and managing visitor access. Activities such as guided services, road-based commercial tours, and similar activities may be appropriate and may be authorized if conducted under the terms and conditions outlined in the individual commercial use authorization and are consistent with the park's VUM plan and/or in legislation authorizing these types of commercial uses. The following potential new commercial services were identified through staff input and it is not a comprehensive list of other potential new commercial services that may be considered in the future:

Guided Jet Ski Tours. This use is appropriate in the park if it does not conflict with other park uses or activities. Such conflicts would most likely occur during summer and holiday weekends and around popular destinations where the park already experiences high use. To avoid this, the number and schedule of guided jet ski tours allowed at key locations at one time can be addressed in the operating conditions specified in a CUA or concession contract. Potential guided jet ski tours would be subject to the provisions and requirements outlined in the park's 2019 Personal Watercraft Use Revised Environmental Assessment and Finding of No Significant Impact.

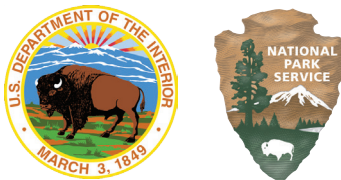
Road-based Commercial Tours. These tours are appropriate in the park if they do not conflict with other park uses or activities. Such conflicts would most likely occur during summer and holiday weekends when the park already experiences high use. To avoid this, the number and schedule of road-based commercial vehicles allowed at key locations at one time can be addressed in the operating conditions specified in a CUA or concession contract.

Inappropriate Commercial Activities.

Equipment Rental without Guided Services. Boating on Lake Superior requires specialized skills and knowledge, employs special equipment, and involves special safety and environmental condition concerns including a thorough understanding of how suddenly and unexpectedly the weather can change while on the lake. The rental of water-based equipment such as kayaks, canoes, and paddleboards without continuous guide presence at all times creates public safety hazards due to the unpredictable weather on Lake Superior and the specialized skills and knowledge that canoers, kayakers and paddleboarders must have to ensure their own safety while recreating on the lake. Because of these concerns, the National Park Service has determined that equipment rental without continuous presence at all times by guides does not meet all the criteria for “necessary and/or appropriate,” as described in the “Necessary and Appropriate Criteria” section.

Parasailing. Launching sites in the study area are limited. Congestion and crowding at launch point areas (land and water) impact the visitor experience and cause localized impacts to park resources. Adding additional activities at launch point areas would unduly conflict with existing public use including guided canoe, kayak, and paddleboarding; would cause unacceptable impacts to park resources and values; and may compromise public safety due to the large berth needed to safely conduct this activity (this large berth does not exist during the summer season). Furthermore, the availability of parasailing rides along the lakeshore departing from Munising renders parasailing rides originating from within the park unnecessary. Because of the above-mentioned concerns and the availability of this service just outside park boundaries, the National Park Service has determined that parasailing does not meet all the criteria for “necessary and/or appropriate” as described in the “Necessary and Appropriate Criteria” section.

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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 historical 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.

