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U.S. Department of the Interior
GLACIER NATIONAL PARK
Montana
Waterton-Glacier International Peace Park



Comprehensive Telecommunications Plan Environmental Assessment

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Contents

Chapter 1 – Purpose and Need for Action	1
The Proposed Action	1
Background	1
Scope of the Plan	2
Project Area.....	3
Chapter 2 – Alternatives.....	5
Alternative A – Proposed Action and NPS Preferred Alternative	5
Mitigation Measures.....	30
Alternative B – No Action.....	33
Chapter 3 – Affected Environment and Environmental Consequences	34
Visual Resources	35
Historic Districts	42
Recommended Wilderness	49
Natural Soundscapes	54
Grizzly Bears, Canada Lynx, and Wolverine	61
Visitor Use and Experience	67
Lists of Agencies and Persons Consulted	72
EA Preparers and Contributors	72
Appendix A: References	A-1
Appendix B: Alternatives/Alternative Elements Considered but Dismissed from Detailed Analysis	B-1
Appendix C: Consultation.....	C-1
Appendix D: Impact Topics Dismissed from Detailed Analysis	D-1
Appendix E: Federally and State Listed Species Dismissed from Detailed Analysis.....	E-1

Tables

Table 1: Summary of actions proposed under Alternative A	6
Table 2: Conditions and Parameters for commercially provided cell and Internet connectivity	27
Table 3: Project sites where telecommunications infrastructure and equipment are already present	35
Table 4: Changes in the visibility of proposed NPS vertical telecommunications infrastructure	37
Table 5: Historic properties that are within or near project sites	43
Table 6: Natural and existing sound levels for project sites	56
Table 7: Sound level (dBA) of common sound sources	56
Table 8: Estimated noise attenuation distances	58

Figures

Figure 1: Map of the project area	4
Figure 2: Examples of NPS telecommunications equipment poles, towers and masts	8
Figure 3: Examples of Land Mobile Radio Antennas	10
Figure 4: Example of a cable bridge, or ice bridge	11
Figure 5: Example of a single-bay telecommunications shelter with 20-foot mast and antenna	14
Figure 6: Examples of temporary scene-of-action repeaters	23
Figure 7: Examples of microcell site technology	25
Figure 8: Identified approximate allowable coverage areas for cell and Internet connectivity	26
Figure 9: Helicopter noise levels while hovering	59

Chapter 1 – Purpose and Need for Action

The Proposed Action

The National Park Service (NPS) is proposing a comprehensive telecommunications plan for Glacier National Park (Glacier) under which the park would 1) implement actions to correct deficiencies in NPS radio, phone, and computer/data-based communications that support park operations, and 2) establish conditions and parameters for commercially provided cellular and/or Internet connectivity in specified developed areas. The plan would allow a flexible response to changing communication needs and advances in technology. The purpose of this plan is to improve the effectiveness of mission-critical NPS telecommunications systems and establish a strategy to enable cellular and/or Internet connectivity for public and NPS use in developed areas of the park where it is most needed while also continuing to protect park resources.

Specific plan objectives and related desired future conditions are to:

- **Correct deficiencies in NPS telecommunications systems that support park operations.** Desired future conditions include reliable NPS radio coverage where coverage is poor or absent; backup radio capabilities; ability to communicate via radio with multiple staff at one time; integrated NPS phone, data, and Internet access that supports day-to-day park operations; simplified and integrated equipment management; reliable and standardized utility monitoring and alarm reporting capabilities; and remote access to DVR security systems.
- **Establish conditions and parameters for cellular and/or Internet connectivity in selected developed areas.** The desired future condition is cellular and/or Internet service in appropriate developed areas for both public and NPS use while minimizing the visibility of infrastructure, signal spillover into undeveloped areas, and other impacts to park resources. Through the establishment of conditions and parameters, this plan would provide a strategy for enabling service where it's most needed (e.g. certain developed areas with high visitor use and concessions operations) while protecting park resources.
- **Allow a flexible response to changing communication needs and technological advances.** The desired future condition is to have the ability to provide additional radio coverage if necessary; support communication needs of other agencies when needed; and employ new or developing technologies that would further benefit NPS communications and operational needs, minimize the amount of telecommunications infrastructure in the park, reduce impacts to park resources, decrease costs, improve safety for personnel and the public, enhance the quality of resource monitoring data, or other benefits.
- **Minimize impacts to park resources and values from both NPS and commercial telecommunications infrastructure and equipment.**

Action is needed because existing NPS radio, phone, and/or computer/Internet/data-based communications in Glacier are limited, unreliable, or unavailable in some areas. In addition, park management, visitors, concessioners, and partners increasingly rely on modern telecommunications services for daily needs, but access to such services in developed areas of the park is limited or nonexistent.

Background

NPS radio coverage is insufficient or non-existent in some areas of the park due to topography, dense vegetation, inconsistent repeater links, and because signals from portable radios cannot always reach repeaters. These issues limit communications for NPS law enforcement and backcountry patrols, create

challenges with transmitting sensitive information, can affect emergency-response capabilities, and present an increased safety risk to personnel. Slow Internet and network speeds, limited bandwidth, lack of phone or data access, lack of or outdated equipment, and inconsistency between phone and/or data systems limit NPS Internet and phone services in several locations. These limitations reduce administrative capabilities, interfere with the ability of NPS staff to serve visitors (including in remote but heavily used areas, such as Many Glacier and Two Medicine), interfere with concessions transactions, and limit utility monitoring/alarm reporting and remote access to digital video recording (DVR) security systems. The inability of Glacier's existing telecommunications systems to support park operations is expected to become increasingly problematic as the park experiences ever-increasing visitation. The park has made numerous efforts over the years to address the issues, resulting in some improvements. But a comprehensive suite of integrated actions is needed to improve the overall reliability and effectiveness of NPS communications in the park.

In addition, some level of connectivity (e.g. cellular and/or Internet) in certain developed areas has become increasingly important as modern life becomes more dependent on information and communication technologies. Cellular coverage is currently only available at Apgar and St. Mary as a result of signal spillover from commercial telecommunications sites outside the park boundary. Otherwise, except for a few places where weak and sporadic signals may be available from outside sources, coverage within the park is mostly absent, including in several developed areas with high levels of visitor use. Glacier uses the Internet to provide the best possible and latest information to visitors, and visitors need to be able to access that information for trip planning and to stay updated on current conditions such as unanticipated road, trail, and campground closures. Connectivity is also important to off-duty employees and their families to meet daily needs that are increasingly dependent on Internet access, such as paying bills and accessing bank accounts. Limited connectivity has led to difficulty in hiring personnel at some duty locations. Concessioners and park partners also require connectivity to support their activities, including retail operations. One of the park's concessioners is contractually required to provide connectivity to guests and, through the NPS environmental compliance and right-of-way (ROW) permitting process, is testing commercial broadband service in Many Glacier on a trial basis. Cellular and/or data connectivity may also enhance park communications in certain developed areas, enabling park staff to communicate more directly with text messaging and phone calls.

Therefore, a plan is also needed to identify appropriate developed areas in the park where commercially provided cellular and Internet connectivity could be authorized and to establish related conditions and parameters to ensure park resources are protected. Conditions and parameters on the placement, size, amount, and type of infrastructure and other factors are needed to 1) provide a consistent approach to the review of ROW permit applications and consideration of requests from commercial telecommunication providers to locate infrastructure and offer connectivity in the park; 2) identify appropriate areas where commercial connectivity could be provided for the public and support NPS operations if necessary; and 3) ensure consistent measures to minimize the visibility of equipment and impacts to park resources over the long term.

Scope of the Plan

The preferred alternative includes detailed actions for which the scope and design have been well-developed, as well as programmatic actions for which the project-level and site-specific scope and design are less developed. Impacts from well-developed actions are analyzed in detail at a site-specific level (Chapter 3, Affected Environment and Environmental Consequences). Impacts from programmatic actions are broadly analyzed based on what is known or can be reasonably assumed at this time. Once the scope and design are sufficiently developed, additional project-level environmental review, analysis, and compliance would be completed for programmatic actions prior to implementation.

The primary focus of the plan is to improve existing NPS radio, phone, and computer/Internet/data-based telecommunication systems that support park operations (i.e. are for government use). As for commercially provided cellular and/or Internet connectivity, this plan does not include proposals for specific commercial telecommunications services or infrastructure. Such service is typically provided by private telecommunications companies after they have applied for and received NPS approval for related ROW permits. ROW permit applications for proposed telecommunications uses would be evaluated based on the recommendations of this plan and applicable NPS policies. **Commercial technologies that require the least visible, smallest scale infrastructure feasible would be given foremost consideration. Highly visible large-scale towers (e.g. taller than 80 feet) would not be appropriate in Glacier National Park and would not be permitted (see Chapter 2, Section II, Programmatic Action No. 8 and Table 2). Commercial telecommunications infrastructure would not be authorized or installed in the park's Backcountry Zone (as defined in Glacier's 1999 General Management Plan) or recommended wilderness (although the project area includes sites in recommended wilderness where action would be taken to improve NPS telecommunications that support park operations).**

Project Area

The project area for this plan/EA consists of several sites and/or developed areas within the park, including several historic properties and four National Historic Landmarks (NHLs) (see Chapter 3, Historic Districts). Two sites are within recommended wilderness (Figure 1).

Developed areas include:

- Many Glacier developed area (including the Many Glacier Hotel [an NHL], employee housing, Many Glacier Campground, Swiftcurrent Motor Inn, horseback riding and boat concessions, and existing telecommunication sites at the ranger station, entrance station, and water tanks)
- Goat Haunt Ranger Station existing telecommunications site
- Chief Mountain Port of Entry (POE) existing telecommunications site
- Two Medicine developed area (including the ranger station and existing telecommunications tower, campground, Two Medicine Store [NHL], boat concession, employee housing, and entrance station)
- East Glacier Ranger Station existing telecommunications site
- Rising Sun developed area
- St. Mary Ranger Station existing telecommunications site
- Logan Pass Visitor Center area (existing telecommunications site)
- The Loop parking lot on the Going-to-the-Sun Road (NHL)
- Lake McDonald Lodge developed area (NHL)
- Apgar Mountain existing telecommunications site (Apgar Lookout)
- Polebridge Ranger Station
- Walton Ranger Station

The two sites within recommended wilderness where actions are proposed include:

- Elk Mountain (only if other options do not improve coverage on the south side of the park)
- Looking Glass Hill existing telecommunications site (temporary until it can be relocated outside the park)

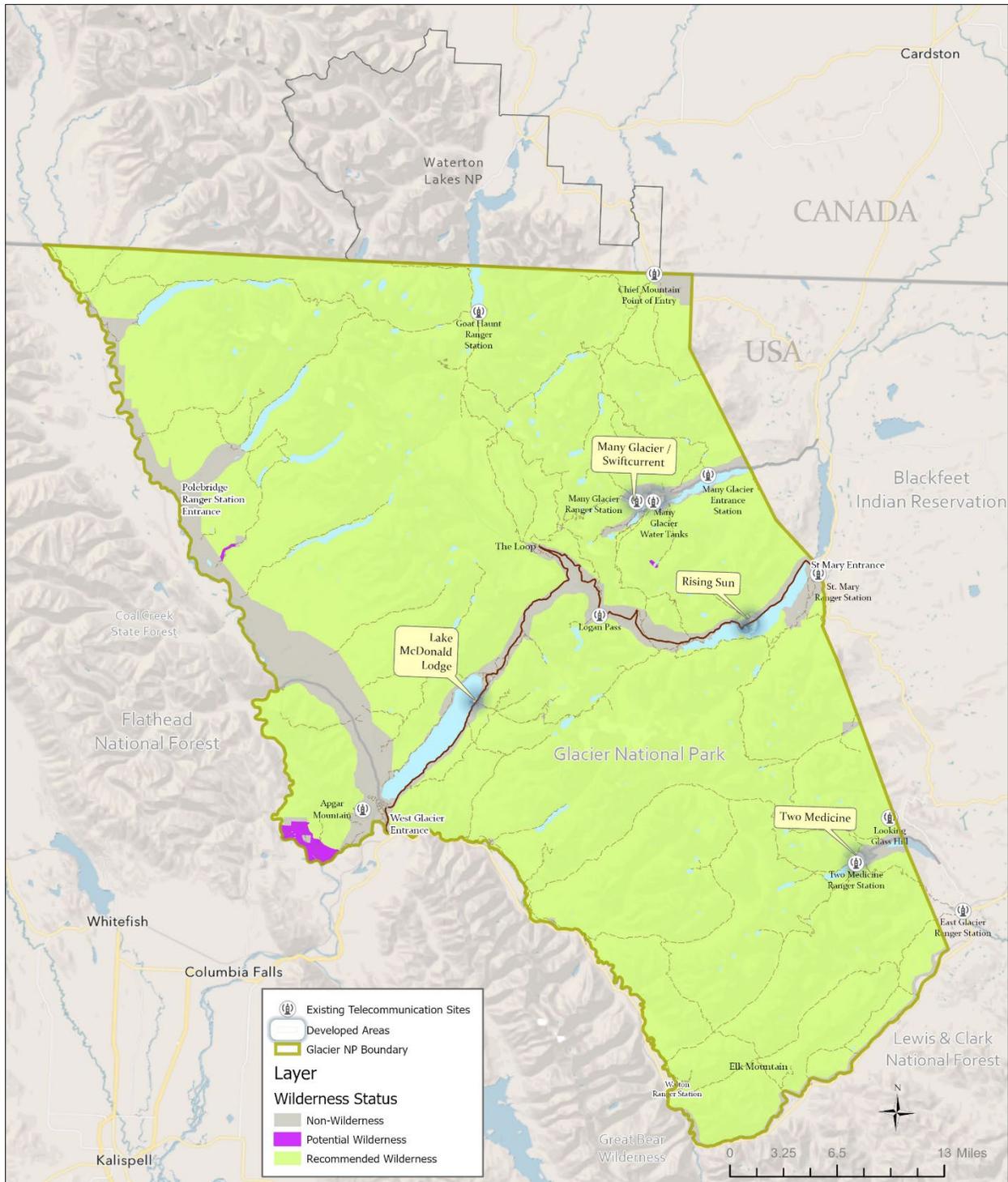


Figure 1: Map of the project area for Glacier National Park's Comprehensive Telecommunications Plan.

Chapter 2 – Alternatives

One action alternative (Alternative A) and a no-action alternative (Alternative B) have been carried forward for detailed analysis. Several alternative elements were considered but eliminated from further analysis and are briefly described in Appendix B.

Alternative A – Proposed Action and NPS Preferred Alternative

Alternative A is divided into two sections. Section I discusses actions with a well-developed scope and design; Section II discusses less developed, or programmatic, actions. Table 1 summarizes actions discussed in Sections I and II.

The following briefly describes existing NPS radio, phone, and computer/Internet/data-based telecommunications systems, which the park would continue to use but which would be improved under the plan as described later in this section:

Land Mobile Radio (LMR)

For radio communication, the park currently uses LMR push-to-talk technology, with one system for law enforcement (LE) and a separate system for administrative operations (ADMIN). The primary coverage needs for LE are roads and developed areas; ADMIN coverage needs include front and backcountry locations. Both systems operate by means of linked radio repeaters and direct user-to-user radio channels.

Phone Services

Glacier's administrative phone system supports in-park (office-to-office) and external calls by means of Voice over Internet Protocol (VoIP) and land line.

Computer, Internet, and Data

NPS operated computer, Internet, and data technologies in the park support NPS computer use and data capabilities, including the ability to obtain and transfer data and electronic files, use email, and access the Internet, databases, and applications, etc. This system includes local networks at park office locations as well as a wide-area network hosted by the Department of the Interior (DOI).

Park phone and data technologies also support DVR security systems as well as monitoring and problem-reporting capabilities for park utilities and alarms, such as panic/intrusion and fire alarms.

These NPS telecommunication systems are currently supported by the following infrastructure:

- NPS telecommunications towers (nine total)
 - three 80-foot towers
 - two 60-foot towers
 - two 40-foot towers
 - two 80-foot towers outside the park boundary
- A number of equipment poles, similar in appearance to telephone poles.
- Wireless point-to-point (microwave) infrastructure on some of the nine NPS towers and on park office buildings at four locations
- Infrastructure for NPS radio communications
 - radio repeaters at twelve sites (including 3 locations within the park's recommended wilderness, one of which is a temporary installation pending relocation under this plan [see

Programmatic Action No. 2, Section II)

- Fixed base radio sites inside NPS office buildings

Under Alternative A, improvements to NPS radio, phone, and computer/data-based systems would take place through a suite of similar and integrated actions. These actions are listed in Table 1 and described in detail in Sections I (Actions No. 1-11) and II (Programmatic Actions No. 1-7) of this chapter.

Additionally, Alternative A identifies four developed areas in which installation of commercial infrastructure for cellular and Internet connectivity for public and NPS use would be appropriate and could be authorized. Alternative A establishes conditions and parameters for such commercial connectivity, including the amount, type, size, and placement of infrastructure, extent of coverage areas, and other factors (Section II of this chapter, Programmatic Action No. 8). **Commercial telecommunications infrastructure would only be permitted in selected developed areas and would not be installed in the park’s Backcountry Zone (as defined in the park’s 1999 General Management Plan) or recommended wilderness.** Signal spillover outside the boundaries of the four identified developed areas (e.g. into the Backcountry Zone, recommended wilderness, or park roadways) would be minimized. Technologies that require the least visible, smallest scale infrastructure feasible with minimal impacts to park resources would be given foremost consideration, such as micro cell sites or wireless access points (or WAPs). **Large-scale, highly visible commercial towers (e.g. taller than 80 feet) would not be permitted in Glacier National Park.**

Table 1: Summary of actions proposed under Alternative A. See Sections I and II of this chapter for a more detailed discussion of each action listed, including methods of implementation.

Actions with a Developed Scope and Design – Section I	
1	<p>Improve NPS data/ Internet access, phone systems, and alarm management at Many Glacier; enable backup radio communications via Radio over Internet Protocol (RoIP).</p> <ul style="list-style-type: none"> • Entails replacing an existing equipment pole with a 40-foot tower at the Many Glacier Ranger Station and mounting one microwave dish; replacing an existing equipment pole with a 40-foot tower at the Many Glacier Entrance Station, mounting two microwave dishes, and thinning adjacent trees; mounting two microwave dishes at the existing communications shelter at the Many Glacier water tanks site and digging trench in previously disturbed ground.
2	<p>Connect the Two Medicine Entrance Station to the Local Area Network (LAN) by means of an NPS microwave data link.</p> <ul style="list-style-type: none"> • Entails removing a tree and mounting one microwave dish on the existing equipment pole at the Two Medicine Entrance Station, and mounting one microwave dish on the existing Two Medicine communications tower.
3	<p>Replace the existing job-box for the temporary NPS radio repeater on Looking Glass Hill (in recommended wilderness) with a manufactured equipment shelter with 20-foot mast and three solar panels.</p> <ul style="list-style-type: none"> • Entails helicopter flights to deliver equipment.
4	<p>Enable NPS backup radio communications via RoIP at the St. Mary Ranger Station.</p> <ul style="list-style-type: none"> • Entails installing land mobile radio (LMR) antennas on the existing NPS telecommunications tower.
5	<p>If necessary, install an NPS radio repeater on Elk Mountain (in recommended wilderness) to improve NPS radio coverage on the south side of the park.</p> <ul style="list-style-type: none"> • Entails installing an equipment shelter with 20-foot mast and solar panels, and helicopter flights to deliver equipment.
6	<p>Move an LE repeater to the existing NPS telecommunications site on Apgar Mountain to improve coverage.</p> <ul style="list-style-type: none"> • Entails installing land mobile radio (LMR) antennas on the existing NPS telecommunications tower.
7	<p>Replace the Polebridge Ranger Station phone system with a Voice over Internet Protocol (VoIP) system.</p> <ul style="list-style-type: none"> • Entails digging trench for cable in previously disturbed ground.
8	<p>Increase the height of the NPS tower at the Chief Mountain Port of Entry (POE) from 40 to 80 feet to increase NPS signal propagation; install an additional repeater.</p> <ul style="list-style-type: none"> • Entails extending the existing tower or replacing both the tower and foundation, and thinning trees.

Actions with a Developed Scope and Design – Section I	
9	Replace the existing equipment pole at the Goat Haunt Ranger Station with a 40-foot tower and install an NPS repeater to improve NPS radio coverage and enable secure radio communications for NPS law enforcement. <ul style="list-style-type: none"> • Entails installing a new foundation and digging a trench in previously disturbed ground.
10	Provide NPS Internet/data and NPS phone access at the Logan Pass Visitor Center for NPS operations by means of a DOI satellite Internet system. <ul style="list-style-type: none"> • Entails installing a 6 to 7-foot tall pipe, mounting a satellite dish on the pipe, and digging an approximately 50-foot trench in previously disturbed ground (if possible).
11	Install a Local Area Network (LAN) at the Walton Ranger Station to improve Internet and phone service for NPS operations. <ul style="list-style-type: none"> • Entails digging a trench for cable in previously disturbed ground.
Programmatic Actions – Section II	
1	Install additional microwave data links to improve NPS data/Internet, phone access, and radio and alarm management at East Glacier and Two Medicine. <ul style="list-style-type: none"> • Installing microwave data links would entail mounting one dish on the existing tower at the East Glacier Ranger Station and digging a trench from the ranger station to the barn (previously disturbed ground); mounting an additional microwave dish on the existing Two Medicine communications tower; and installing three microwave dishes at a third, undetermined site from which the signals could be propagated to a federal Internet circuit.
2	Relocate the NPS repeater and related equipment on Looking Glass Hill to a preliminarily identified site outside the park in order to remove infrastructure from recommended wilderness while maintaining NPS telecommunications in the area.
3	Install an NPS radio repeater at the Loop on the Going-to-the-Sun Road to improve park radio coverage. <ul style="list-style-type: none"> • Entails constructing a small enclosure attached to the back of the comfort station to house the repeater and installing a 30-foot mast and solar panels on the comfort station roof.
4	Install backup power at the existing NPS telecommunications site on Apgar Mountain. <ul style="list-style-type: none"> • May entail installing solar panels, digging a trench for cable (likely in undisturbed ground), and helicopter flights to deliver equipment.
5	As opportunity presents, upgrade or install advanced technology or additional equipment at existing NPS telecommunication sites or other NPS administrative sites to improve communications for NPS operations; remove unnecessary infrastructure; install fiber optic cable where appropriate to replace above-ground infrastructure.
6	Install temporary scene-of-action (SOA) repeaters as needed to support NPS radio communications for short-term situations. <ul style="list-style-type: none"> • Generally entails placing a repeater on the ground in portable cases, packs, or similar container with an expandable mast, foldable solar panels or mounted solar panel assembly.
7	If necessary, install up to 3 additional permanent NPS radio repeaters to support or improve NPS radio communications. <ul style="list-style-type: none"> • Likely entails installing an equipment shelter with a 20-foot mast and solar panels.
8	Identify specific developed areas where installation of commercial telecommunications infrastructure and cellular and Internet coverage for public and NPS use would be appropriate and could be authorized, and establish conditions and parameters for commercial telecommunications infrastructure and connectivity.

Figure 2 illustrates NPS telecommunications equipment poles, towers, and masts discussed in this plan. For example, poles are generally similar in size and appearance to a telephone pole; towers are generally free-standing, 3-legged, lattice frame towers; and masts are generally affixed to equipment shelters or repeater assemblies.

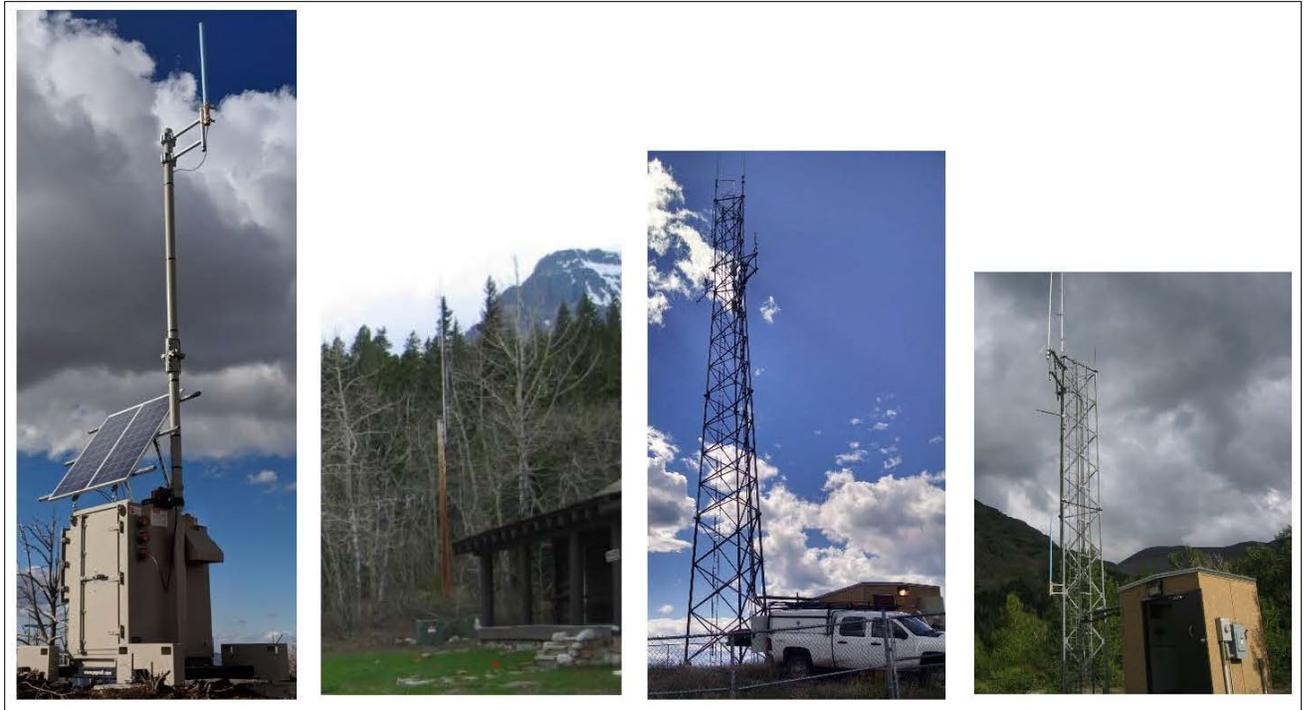


Figure 2: Examples of NPS telecommunications equipment poles, towers and masts discussed in this plan. **From left to right:** 20-foot mast (with antenna) affixed to a telecommunications equipment shelter; telecommunications equipment pole, similar in size and appearance to a telephone pole; 80-foot lattice frame tower; 40-foot lattice frame tower. NPS photos.

Section I:

Actions with a Developed Scope and Design

Section I lists actions for which the scope and design are developed well enough for a detailed impacts analysis (Chapter 3). A decision regarding whether to implement these actions would be based on the analysis in this EA, without the need for subsequent or additional project-level compliance review. This section describes each action, how each would improve telecommunications systems, and how each would be implemented, including the approximate size of infrastructure and equipment. As applicable to the specific actions, the following would apply except as noted in the detailed discussions of each action:

- Trenches and foundations would be dug in previously disturbed ground, such as existing road or utility corridors, whenever feasible.
- Foundations for three new 40-foot towers (replacing existing telecommunications equipment poles at Many Glacier Ranger Station, Many Glacier Entrance Station, and Goat Haunt Ranger Station; see site-specific discussions below) would be poured on-site if feasible. A foundation poured onsite would likely require an approximately 2.5-foot diameter, 4 to 6-foot deep hole. If a foundation cannot be poured on-site (if a pre-cast concrete footer must be used, for example), the size of the hole would be expected to increase to approximately 6-foot square and 6.5 feet deep (since extra space would be needed for machinery to place the footer into the hole).
- Machinery used to remove equipment poles, install towers, excavate trenches and foundations, pour foundations, etc. could include a chainsaw; boom lift; backhoe, track hoe, loader, and/or similar equipment; power trencher or similar machinery; and portable concrete mixer or

concrete truck and concrete pump.

- When in use, a boom lift would be expected to produce noise at approximately 85 dBA; machinery for excavation (e.g. a backhoe, track hoe, loader, power trencher or similar machinery) would be expected to produce noise at a maximum of approximately 76 dBA; a portable concrete mixer would be expected to produce noise similar to or less than that of a generator, at approximately 67 dBA; a concrete mixer truck and concrete pump truck would be expected to produce noise at approximately 81 and 84 dBA respectively; and a chainsaw would be expected to produce noise at approximately 79 dBA.
- Battery-operated hand tools would likely be used to install electronics equipment (such as antennas, cabling, and microwave dishes).
- Land mobile radio (LMR) antennas would vary in type and size, e.g. omni (spindle shape) or yagi beam style (resembling a wide-toothed comb) ranging from approximately 36 to 60 inches tall/long and up to approximately 5 inches in diameter (Figure 3); LMR antennas could be installed in vertical and/or horizontal orientations (Figure 3).
- Microwave dishes would likely be square panels that are approximately 18 x 18-inches square, except where otherwise noted.
- Equipment and infrastructure would be installed any time of year (except for timing restrictions included under Mitigation Measures).
- The duration of work at each site would vary. Estimates for the amount of time noise-producing equipment and machinery would be in use are provided where relevant in the detailed discussion of each action, below. In addition, personnel could be onsite for up to another week to ten days, estimated, depending on the complexity of the technology that is being installed.
- Equipment, materials, and personnel would be transported to project sites by road in areas where roads are present, and on foot and/or livestock using existing trails where roads do not exist. The exceptions would be the Elk Mountain and Looking Glass Hill project sites, where helicopters would be required to transport equipment and materials for installation (as described below for actions at these locations). Glacier limits administrative flights to 50 flights each year (round trip). The park conducts additional environmental review and analysis for projects that exceed the 50-flight limit. To keep the number of administrative flights as low as possible, park staff meet annually to evaluate flight needs and combine flights. The park would make every effort to keep helicopter flights for this plan within the 50-flight limit on administrative flights, and to combine flights with other administrative flights. The actual number of flights would depend on the size of helicopter available at the time (i.e. larger helicopters could carry more weight, possibly resulting in fewer flights). For the purposes of impacts analysis, this EA evaluates flights for this plan as if they were in addition to the 50-flight limit. Only flights needed for the initial installation of infrastructure could exceed the park's 50-flight limit; any later flights needed for maintenance or repairs (including equipment replacements) would be kept within the park's 50-flight limit.

Dimensions, specifications, and equipment etc. described below are estimates for the purposes of analysis and could change (e.g. as technology advances). Park staff would review each project prior to implementation to ensure that, if any changes to methods or design elements were needed, additional environmental analysis and compliance would be done as necessary.



Figure 3: Examples of Land Mobile Radio Antennas (LMR) discussed in this plan. **Top Left:** 44-inch tall omni style antenna with 1-inch base. **Top Right:** 60-inch tall omni style antenna with 2.75-inch base. **Bottom Left:** yagi or beam style antenna, 44 inches long horizontally with 14-inch tall vertical elements. **Bottom Right:** yagi or beam style antenna, 16 inches long horizontally with 13-inch tall vertical elements. NPS photos

1) Improve NPS Internet, computer, phone service, and alarm management at Many Glacier by means of NPS microwave data links at the Many Glacier Ranger Station and Many Glacier Entrance Station; enable backup radio communication via Radio over Internet Protocol (RoIP) at the Many Glacier Ranger Station.

The NPS wireless microwave links would improve multiple NPS communications systems at the Many Glacier Ranger Station and Entrance Station. This action would improve Internet speed and access; improve file and information sharing through integrated computer systems; integrate separate phone systems into the park's main system; add voicemail or enable remote voicemail access for each line; provide 4-digit dialing and additional and/or individual office phone extensions; eliminate small remote phone systems and reduce associated costs; simplify management of equipment and services; enable staff to remotely access DVR systems; provide more reliable, standardized reporting for utility alarms; and enable backup radio communications via RoIP.

Implementation Methods

Many Glacier Ranger Station

The existing 30-foot tall, 2-foot diameter pole (i.e. telephone pole) would be removed and replaced with a 40-foot tower in a new, less visible location next to the utility building

behind the ranger station. The new tower would be a free-standing (i.e. no guy-wires), 3-legged, lattice frame, fold-over tower (the tower folds over to enable access to cables and antennas from ground level without having to climb the frame); the face width (i.e. width between the tower legs) would be approximately 16-20 inches. The tower would be painted or otherwise disguised to minimize reflectivity and visibility (see also Mitigation Measures).

Machinery used would likely include a chainsaw and/or boom lift or loader to remove the existing equipment pole and install the new tower; a backhoe or track hoe to dig a hole for the foundation; and a portable concrete mixer to pour the foundation. Machinery would be expected to be in use for up to one or two days (8 to 12-hour days).

One microwave dish would be mounted on the replacement tower. An RoIP controller and backup base radio would be installed inside the utility building, with additional LMR antennas mounted onto the replacement tower (likely two antennas, approximately 42 inches tall and 1-inch in diameter, likely mounted vertically), replacing the antennas currently mounted on the pole.

Cabling between the tower and the utility building would be connected by a short (estimated less than 24 inches), above-ground cable bridge, which is generally an 8 to 10-inch wide (or less) steel grate bridging the distance between the building and the tower, beneath which the cables are suspended (Figure 4). A cable bridge is also known as an ice bridge because it protects cable against falling snow and ice. Because a cable bridge would be used, no trenching would be required between the tower and the building. The cable bridge would attach to the building and the base section of the fold-over tower. The cable would enter the utility building through existing holes.



Figure 4: Example of a cable bridge, or ice bridge, suspending transmission cable between a building and adjacent tower.

Many Glacier Entrance Station

The existing 40-foot tall, 2-foot diameter pole (i.e. telephone pole) next to the housing unit would be replaced with a 40-foot tower in the same location and footprint. The dimensions of the new tower and the methods to remove the existing pole and install the tower and foundation would generally be as described for the Many Glacier Ranger station, except the foundation for the new tower would likely be poured in the same hole as the existing foundation. The tower would be painted or otherwise disguised to minimize reflectivity and visibility (see also Mitigation Measures).

To ensure an open path for the microwave signal, approximately 15-20 trees (mixed species and age class; see Appendix D, Impact Topics Dismissed from Detailed Analysis, Vegetation and Soils) that are 40 feet or taller may need to be removed from an approximately 150 x

50-foot swath adjacent to the Many Glacier Road and immediately west of the entrance station residence, and approximately two to five trees may need to be removed from the east side of the residence driveway. A chainsaw would be used to fell the trees and cut them into removable sections and would be expected to be in use for an estimated 8-10 hours over the course of one or two days.

Two microwave dishes would be mounted on the replacement tower (replacing the 20-foot antenna currently mounted on the pole). One dish would be directed toward a microwave dish at the Many Glacier water tanks site (see below) and one would be directed toward a tower outside the park where there is an existing wireless microwave link to a federal Internet circuit at St. Mary.

Cable from the housing unit to the entrance station would be installed through existing conduit; there would be no new trenching since the conduit is exposed in both buildings.

Many Glacier Water Tanks Site (at the top of the hill, above the hotel dormitory)

Two microwave dishes would be mounted on the mast of the existing communications equipment shelter. One dish would be directed toward the Many Glacier Ranger Station and one toward the Many Glacier Entrance Station (to propagate the signal to/from the ranger station and, via the entrance station, the tower outside the park that is linked to St. Mary).

Powerlines (park lines) were recently laid in a shallow, hand-dug trench in previously disturbed ground between the shelter and existing nearby (estimated 30-50 feet) commercial power source. These same lines would be buried more deeply, to a depth of 24 to 36 inches following the same line as the existing hand-dug trench. Equipment used to dig the trench (e.g. a backhoe, track hoe, or similar machinery) would be expected to be in use for an estimated 8 to 12 hours for one day.

2) Connect the Two Medicine Entrance Station to the Local Area Network (LAN) by means of an NPS microwave data link.

Connecting the Two Medicine Entrance Station to the LAN (a local satellite Internet system that currently serves the Two Medicine District) would provide limited Internet access at the Two Medicine Entrance Station (where Internet is currently not available); enable internal networking, such as file sharing and sharing printers, between the entrance station and the Two Medicine District; and enable staff at the entrance station to remotely access DVR systems.

Implementation Methods

Two Medicine Entrance Station

One microwave dish would be mounted on the existing 20-foot equipment pole (approximately 2-foot diameter, i.e. telephone pole) behind the office building (replacing the radio antenna currently on the pole).

One 10-inch diameter cottonwood tree may need to be removed to avoid blocking the signal. A chainsaw would be used to fell the tree and cut it into removable sections and would be in use for an estimated 4 to 6 hours.

Cable would be installed from the office building to the kiosk through existing conduit; there would be no new ground disturbance since the conduit is exposed inside both buildings.

Two Medicine Communications Tower

One microwave dish would be mounted on the existing 40-foot lattice frame Two Medicine communications tower, located approximately 0.6 mile from the Ranger Station. The dish would link to the microwave dish installed at the entrance station, enabling connectivity with the LAN.

Cabling between the tower and the shelter would be connected by an existing above-ground cable bridge (no trenching necessary).

3) Replace the existing job-box for the temporary NPS radio repeater on Looking Glass Hill (inside the park's recommended wilderness) with a manufactured equipment shelter.

Replacing the existing job-box would provide a more secure environment for the radio repeater, better protecting it from weather, lightning strikes, vandalism, and animal damage. The taller mast would improve radio communications (for both ADMIN and LE) in the Two Medicine area.

NOTE: This proposed telecommunications plan includes eventually moving the existing repeater and associated equipment to a site outside the park (see Section II, Programmatic Action No. 2).

Implementation Methods

A single-bay communications equipment shelter with a 20-foot mast (see Figure 5 for example) and three solar panels would be installed to replace the existing job box, two solar panels, and 10-foot equipment pole. The existing job box is approximately 5 feet wide x 3 feet deep x 3 feet tall; the existing solar panels are approximately 3 x 5 feet in size. The new shelter would be approximately 5.5 feet wide x 3.75 feet deep x 5.5 feet tall, with outriggers and leveling jacks that extend the base to an estimated 7 x 7 feet. The three new solar panels would also be approximately 3 x 5 feet in size and would add an estimated 5 to 6 feet of height to the shelter. The new shelter would sit above ground on concrete pads in the same location as the existing job-box. Battery-powered hand tools would be used during installation.

A helicopter would be required to transport equipment to Looking Glass Hill because the size, weight and sensitivity of the communications equipment would prohibit transport on foot or livestock. Personnel (an estimated 5-person crew) would hike to the site. The helicopter would deliver equipment by means of long-line sling loads. At this time, an estimated seven round-trip flights over the course of one day would be expected. Following installation, flights would not be expected for routine maintenance (Preventive Maintenance and Inspections do not require helicopter flights) or battery replacements, but could be necessary to replace sensitive equipment; the likelihood of additional flights is low, however, given the proposal to relocate the repeater and all associated equipment outside the park (see Section II, Programmatic Action No. 2).



Figure 5: Example of a single-bay telecommunications shelter with 20-foot mast and antenna installed at Wupatki National Monument in the fall of 2019 (NPS photo).

4) Enable NPS backup radio communications via RoIP at the St. Mary Ranger Station.

Backup NPS radio communications at St. Mary would enable continued field-level radio communications between the east side of the park and Dispatch in the event of an east-west LMR link outage. RoIP technology would also improve radio communications between park Dispatch and field operations.

Implementation Methods

Additional LMR antennas would be installed on the existing 80-foot lattice frame free-standing communications tower (likely two antennas, both anticipated to be approximately 42 inches tall and 1 inch in diameter, likely installed in vertical orientation).

RoIP controllers and backup base radios would be installed inside the existing communications equipment shelter.

Cabling between the tower and the communications shelter would be connected via an existing cable bridge; therefore, no ground disturbance would be necessary.

5) If necessary, install a radio repeater on Elk Mountain (within recommended wilderness) to increase NPS radio coverage on the south side of the park.

This would be a contingency action, implemented only if NPS radio coverage on the south side of the park is not sufficiently improved by actions under this plan together with use of a radio channel in the Middle Fork that is owned by an outside agency but shared with Glacier LE staff.

Radio communications on the south side of the park are necessary for NPS staff to communicate with Dispatch during daily travel along Highway 2 where personnel must respond to incidents such as railcar derailments, avalanches, wildland fire, and, increasingly, traffic accidents. Coverage is also necessary for the NPS to patrol and manage backcountry trails in the area and east of Scalplock Lookout.

Implementation Methods

A single-bay telecommunication equipment shelter with two solar panels and a 20-foot mast would be placed on or near the summit of Elk Mountain, likely at the former fire lookout site (the foundation and anchor points for the lookout are still present and the shelter could be placed on the old foundation). The dimensions of the shelter would be similar to those described for the equipment shelter proposed for Looking Glass Hill (see Figure 5 for an example). One LMR antenna (anticipated to be approximately 60 inches tall, 2.75 inches in diameter) would be mounted onto the mast. Battery powered hand tools would be used during installation.

A helicopter would be required to transport equipment and materials to Elk Mountain because the size, weight and sensitivity of the telecommunications equipment would prohibit transport on foot or livestock, and the remote, steep terrain at the site would be too dangerous for livestock to carry heavy, cumbersome loads. An estimated 6-person work crew would hike to the project site and camp for two nights (using leave no trace practices); the crew would hike in on day 1, the helicopter would deliver the equipment on day 2 in an estimated seven round-trip flights, and the crew would hike out on day 3. The helicopter would deliver equipment by means of long-line sling loads. Following installation, flights would not be expected for routine maintenance (Preventive Maintenance and Inspections would be expected once a year and would not require helicopter flights). In the event of an equipment breakdown, additional flights may be necessary to replace sensitive equipment that cannot be transported by foot or livestock. Battery replacements may require a single helicopter flight every four to five years.

6) Move an LE radio repeater to the existing NPS telecommunication site on Apgar Mountain (at the Apgar Lookout site) to improve coverage.

The addition of an LE repeater on Apgar Mountain would improve radio coverage and reliability for NPS law enforcement staff in the Lake McDonald, Apgar, and West Glacier areas, and outside the park's western boundary for NPS staff travelling to and from the Flathead County Emergency Operations Center (EOC) in Kalispell.

Implementation Methods

The existing repeater at the communications shelter at the Apgar wastewater treatment plant would be moved to the Apgar Mountain telecommunications site and installed inside the existing equipment shelter.

Additional LMR antennas (anticipate two antennas, one at approximately 60 inches tall, 2.75-inch diameter, likely in vertical orientation; and one at approximately 40 inches long with up to approximately 14-inch vertical elements, likely in horizontal orientation) would be mounted onto the existing tower.

7) Replace the Polebridge Ranger Station phone system with a Voice over Internet Protocol (VoIP) system.

The existing NPS phone system at Polebridge is at "end-of-life." Replacing it with a VoIP system

would improve external calling capabilities, increase call-routing and office-to-office dialing, and provide a link to the voicemail system at Park Headquarters.

Implementation Methods

Additional VoIP phones would be installed in offices and work areas. Approximately 800 feet of trenches (each approximately 12 to 16 inches wide, 24 to 36 inches deep) would be dug in previously disturbed existing utility corridors to install cable for VoIP phone lines between individual buildings. Equipment used to dig the trench (e.g. a backhoe, track hoe, power trencher, or similar machinery) would be expected to be in use for an estimated three to five days (8 to 12-hour days).

8) Increase the height of the NPS tower at the Chief Mountain Port of Entry (POE) to increase NPS signal propagation, and install an additional repeater.

Increasing the height of the existing NPS telecommunications tower would increase signal propagation, coverage, and connectivity for NPS law enforcement staff using mobile (i.e. vehicle based) and hand-held radios on the Chief Mountain Road, and for hand-held radios in the Belly River drainage, especially toward the interior of the park. The increased tower height would enable the radio signal to pass over high-elevation terrain, also improving the reliability of the radio link with park Dispatch. Installing the additional repeater would provide for secure law enforcement radio communications.

Implementation Methods

The height of the existing free-standing lattice frame tower would be increased from 40 to 80 feet, either by extending it if the existing foundation (approximately 7 x 7 feet at the base, 5 feet deep) can support it, or by replacing both the tower and foundation. The new tower would also be a free-standing (i.e. self-supporting) lattice frame tower. The tower would be painted or otherwise disguised to minimize reflectivity and visibility (see also Mitigation Measures).

If constructed, the new foundation would likely be an estimated 10 x 10 feet at the base and 7 feet deep. Machinery used would likely include a backhoe to dig a hole of roughly the same general dimensions; concrete trucks and a concrete pump to pour the foundation; and a boom lift to remove the existing tower and install the new one. Machinery would likely be in use for an estimated one to two days (8 to 12-hour days).

An LE radio repeater would be installed in the existing communications shelter (an ADMIN repeater is already present) and additional LMR antennas (anticipate two antennas, one at approximately 60 inches tall, 2.75-inch diameter, likely in vertical orientation; and one at approximately 40 inches long with up to approximately 14-inch vertical elements, likely in horizontal orientation) would be mounted onto the new (taller) tower.

Trees taller than 15 feet (mixed species and age class; see Appendix D, Impact Topics Dismissed from Detailed Analysis, Vegetation and Soils) would be thinned over an estimated 0.25 to 1.0-acre area in the vicinity of the tower. A chainsaw would be used to fell the trees and cut them into removable sections and would be expected to be in use for an estimated 8-10 hours over the course of one or two days.

9) Replace the existing equipment pole at Goat Haunt Ranger Station with a 40-foot tower and install an NPS repeater and an RoIP link to improve coverage and enable secure radio communications for NPS law enforcement.

NPS law enforcement personnel in the Waterton Lake and Goat Haunt areas currently use the

ADMIN radio network to communicate with park Dispatch. Installing an LE repeater and RoIP link would improve coverage for law enforcement patrols and provide a secure means of transmitting sensitive information with Dispatch.

Implementation Methods

The existing 40-foot equipment pole (approximately 2-foot diameter; i.e. telephone pole) located behind the shelter would be replaced with a 40-foot tower in the same location. The dimensions of the tower would be as described for the Many Glacier Ranger station. The tower would be painted or otherwise disguised to minimize reflectivity and visibility (see also Mitigation Measures).

Personnel would likely remove the existing equipment pole with a chainsaw; dig the hole for the new foundation by hand; pour the new foundation with a portable concrete mixer; and dig the trench with a power trencher or similar portable equipment. Machinery would likely be in use for an estimated two to three days (8 to 12-hour days), primarily due to the time required to dig the trench.

An LE radio repeater would be added to the existing communications equipment shelter above the horse corral. An RoIP controller and backup base radio would be installed inside the existing shelter, with one or two LMR antennas (anticipate one at approximately 42 inches tall and 1 inch in diameter, and one at 60 inches tall and 2.75 inches in diameter, both likely in vertical orientation) mounted on the replacement tower (replacing the two existing antennas).

Cabling between the new tower and existing shelter would be installed through existing conduit, requiring no new ground disturbance.

The RoIP link would require a LAN connection. An approximately 0.25-mile trench (approximately 12 to 16 inches wide and 24 to 36 inches deep) would be dug from the existing shelter to the ranger station to replace existing faulty cable for the LAN, with links to each building; existing ethernet extenders would be used to connect with the LAN. Trenching would follow the same path as the existing cable.

10) Provide NPS Internet/data and phone access at Logan Pass Visitor Center by means of a DOI satellite Internet system.

A satellite Internet system would provide data, Internet, and phone access for NPS and partner operations at the Logan Pass Visitor Center, integrating phone and data services into the park's main system. Internet capabilities would also enable panic alarm notifications to park Dispatch and utility power system monitoring and reporting.

Implementation Methods

An approximately 6 to 7-foot tall, 3-inch diameter pipe for mounting equipment would be installed outside and adjacent to the visitor center employee break room (immediately south of the building). The pipe would be painted or otherwise disguised to minimize reflectivity and visibility (see also Mitigation Measures).

The pipe would be set in an approximately 4-foot deep concrete foundation, estimated at approximately 12-18 inches in diameter. The hole for the foundation would be dug by hand and the concrete for the foundation would be mixed and poured by hand onsite. One satellite dish (approximately 36 inches in diameter) would be mounted on the new pole.

An approximately 50-foot trench (approximately 12 to 16 inches wide and 24 to 36 inches deep) would be dug by hand from the new equipment pole to the visitor center and

employee break room to link the visitor center with the new satellite dish; if possible, the trench would be dug in ground previously disturbed from an old power installation. The trench path would be identified in consultation with the park's Resources Management Staff (e.g. Vegetation Management and Cultural Resources Specialists) to identify, mark, and avoid sensitive plant species and protect any archeological resources, and the site would be restored with native vegetation using hand tools (i.e. no heavy equipment would be used during restoration).

11) Install a Local Area Network (LAN) at the Walton Ranger Station to expand NPS administrative capabilities.

Installing the LAN would improve Internet speed and phone service at the Walton Ranger Station compound and enable NPS staff to use office space in the dormitory for official administrative duties.

Implementation Methods

An approximately 300-foot trench (approximately 12 to 16 inches wide and 24 to 36 inches deep) would be dug between the ranger station and dormitory to install cable for the new LAN connection. The trench would be dug in previously disturbed, existing road, path, and utility corridors. Equipment used to dig the trench (e.g. backhoe, track hoe, power trencher, or similar machinery) would be expected to be in use for an estimated one or two days (8 to 12-hour days).

Section II:

Programmatic Actions

This section lists programmatic actions that are broadly analyzed in this EA (Chapter 3) and which would undergo additional project-level review, analysis, and compliance once the scope and design are further developed. Subsequent project-level review and analysis would determine how these actions would be implemented with the least amount of impact to park resources.

The following lists each action, how each action would improve telecommunications in the park, and how each action would be implemented to the extent that methods are known, including approximate size of infrastructure and equipment. As relevant to the programmatic actions, the following conditions would apply:

- Trenches would be dug in existing road or utility corridors whenever possible.
- Battery-operated hand tools would likely be used to install electronics equipment but heavy equipment and power tools would be necessary for excavation.
- Equipment could be installed any time of year (except for any timing restrictions described under Mitigation Measures).
- Equipment, materials, and personnel would be transported to project sites by road in areas where roads are present, and on foot and/or livestock using existing trails whenever possible where roads do not exist. At this time, helicopter transport of equipment would likely be necessary for actions at Looking Glass Hill and Apgar Mountain (as described below for action at this site). Other actions in this section may also require helicopter support; this would be determined and evaluated during project level review and compliance. As stated in Section I of this chapter, the park would make every effort to keep helicopter flights for this telecommunications plan within the 50-flight limit on administrative flights, and to combine flights with other administrative flights. Only flights needed for the initial installation of

infrastructure could exceed the park's 50-flight limit; any later flights needed for maintenance or repairs (including equipment replacements) would be kept within the park's 50-flight limit.

Dimensions, specifications, and equipment etc. described below are estimates and could change (e.g. as technology advances); any such changes would be considered during subsequent project-level review and analysis.

1) Install additional microwave data links to improve NPS data/Internet, phone access, and radio and alarm management at East Glacier and Two Medicine.

Additional microwave data links would serve the East Glacier Ranger Station and the Two Medicine District, including the Two Medicine Ranger Station, Entrance Station, and LE Office. The microwave links would improve Internet speed and access and file and information sharing; integrate phone systems into the park's main system; improve remote access to DVR systems; provide more reliable, standardized reporting for utility alarms; and enable backup radio communications via RoIP. Detailed analysis must be deferred to project-level review and analysis because the park is still exploring options for a third site from which to propagate the microwave signals to an existing Internet circuit at St Mary.

Implementation Methods

East Glacier Ranger Station

One microwave dish would be mounted on the existing 40-foot lattice frame tower behind the barn.

One RoIP controller for the LE network and two backup base radios would be installed in the existing telecommunications room inside the barn, with one additional LMR antenna (anticipated at approximately 48 inches tall and 1 inch in diameter) mounted in vertical orientation on the existing tower.

An approximately 330-foot trench (approximately 12 to 16 inches wide, 24 to 36 inches deep) would be dug between the ranger station and the telecommunications room inside the barn to install cable linking the new microwave dish, base radio, and RoIP controller to the ranger station. Equipment used (e.g. a backhoe, track hoe, power trencher or similar machinery) to dig the trench would be expected to be in use for an estimated one or two days (8 to 12-hour days) at most.

Two Medicine

One additional microwave dish would be mounted to the existing NPS communications tower at Two Medicine.

An RoIP controller and backup base radio would be installed inside the existing telecommunications shelter, with one LMR antenna (anticipated at approximately 42 inches tall and 1- inch in diameter) mounted in vertical orientation on the tower. The dish and antenna would replace the radio antennas currently mounted on the tower. Cabling between the tower and the shelter would be connected by an existing above-ground cable bridge (no trenching necessary).

In order to propagate the microwave signal, three microwave dishes would need to be installed at a third, yet-to-be-determined site from which signals could be directed between East Glacier and Two Medicine and an existing tower outside the park where there is already a microwave link to a federal Internet circuit at St. Mary.

2) Relocate the NPS Two Medicine repeater on Looking Glass Hill to a site outside the park

Under this plan, in collaboration with the Blackfeet Tribal Business Council (see Appendix C), the park is proposing to move the repeater and associated equipment to an existing telecommunications site on the Blackfeet Reservation adjacent to Montana Hwy 49, as preliminarily agreed to with the Tribe. Because upgrading the repeater site under this plan (Section I, Action No. 3) would require helicopter flights to transport equipment to the site, it is likely that helicopter flights would also be needed to remove it. Detailed analysis of relocating the repeater must be deferred to project-level review and analysis because a detailed scope and design (e.g. the precise location, shelter size, tower height, equipment components, co-location with other agencies, etc.) are still under development with the Blackfeet Tribal Business Council.

3) Install a radio repeater at the Loop on the Going-to-the-Sun Road to improve NPS radio coverage between zones covered by other repeaters on the west side of the road corridor.

A repeater at the Loop would provide radio coverage and/or more reliable coverage where coverage is either weak or non-existent, including along the Loop Trail, at Packers Roost, and on the Going-to-the-Sun Road below the Loop. Detailed analysis must be deferred to project-level review and analysis because design plans are not yet available. The Going-to-the-Sun Road is a designated National Historic Landmark (NHL) and the Loop contributes to its designation.

Implementation Methods

An ADMIN repeater would be installed at the Loop on the Going-to-the-Sun Road at one of the parking lot comfort stations; the repeater would be programmed for all operational use (i.e. LE and ADMIN). A secure equipment enclosure (e.g. cabinet or closet) would be constructed on the back of the comfort station to house the new repeater, and a 30-foot mast (estimated height) with antenna and estimated 2-4 solar panels would be installed on the roof.

4) Install backup power at the existing NPS telecommunications site on Apgar Mountain, at the Apgar Lookout

Commercial AC (alternating current) is the primary power source for the NPS Apgar Mountain telecommunications site. In the event of a commercial power failure, backup power to this key radio repeater site would maintain parkwide ADMIN and LE communications during the outage. Detailed analysis of this action must be deferred to project-level review and analysis because options for the power source, equipment placement, and project design are still being explored.

Implementation Methods

At this time, the park would consider installing solar panels for backup power to the site. Under this scenario, an estimated six solar panels would be installed either on the Lookout structure or on a new structure designed to support the panels and orient them for maximum solar exposure.

Batteries would either be housed in the basement of the lookout or inside the existing equipment shelter. If the equipment shelter is used, a trench for power cables would be hand dug between the shelter and the solar panels.

A helicopter would likely be required to transport the solar panels and associated equipment to Apgar Mountain because the size, weight and sensitivity of the equipment would likely prohibit transport on foot or livestock. Personnel would hike to the site (or ski or snowshoe during winter). Following installation, flights would not be expected for routine maintenance. In the event of an equipment breakdown, additional flights may be

necessary to replace equipment that cannot be transported by foot or livestock. Battery replacements may require a single helicopter flight every four to five years.

5) As opportunity presents, upgrade or install advanced technology or additional equipment at existing NPS telecommunication sites or other NPS administrative sites; remove unnecessary telecommunications infrastructure; install fiber optic cable where appropriate to replace above-ground telecommunications infrastructure

Future advances in telecommunications technology may present an opportunity to further improve communications and/or minimize impacts to park resources from telecommunications equipment and infrastructure (e.g. smaller, less visible equipment, or the removal of unnecessary infrastructure). As such opportunities become available and/or as NPS communications needs evolve, the park may install upgrades or new equipment and infrastructure to existing NPS telecommunication sites or other administrative sites, or could remove existing equipment and infrastructure.

Equipment upgrades could also occur in response to the communication needs of other federal, state, and local agencies, some of which currently co-locate radio equipment on existing NPS telecommunication infrastructure in the park. Equipment would be co-located on existing infrastructure whenever possible.

Fiber optic cable would also be installed when feasible to replace above-ground telecommunications infrastructure and minimize visual impacts. Fiber optic cable would be installed in road or utility corridors or other previously disturbed ground whenever feasible and would likely either be direct-buried (i.e. plowed in), laid in an excavated and backfilled trench, or pulled through existing conduit with very little ground disturbance.

Subsequent project-level review and analysis would determine whether or how these actions would be implemented because it is not yet known whether such needs or opportunities will arise, where such action would take place, or what the specific nature of any new or additional equipment would be.

6) Install temporary scene-of-action (SOA) repeaters as needed

Temporary scene-of-action (SOA) repeaters (also known as tactical or field expedient repeaters) would enable additional, improved, or backup radio communications during short-term non-emergency projects or situations. The park already uses temporary SOA repeaters as needed during search and rescue (SAR) operations or other emergencies in areas where radio coverage is insufficient. Given the expected improvements to radio coverage from actions under this plan, the park does not anticipate that more than three non-emergency SOA repeaters would potentially need to be in operation to supplement radio communications at any one time. This EA provides a broad analysis of impacts based on this assumption. Detailed analysis of temporary non-emergency SOA repeaters must be deferred to project-level review and analysis because it is not possible to know where they would be installed nor the site-specific methods of installation until projects or situations arise that could require them.

SOA repeaters could also be used to enable high accuracy mobile GPS mapping for precision mapping of cultural and natural resource sites, facilities (e.g. manhole covers, utility valve locations), and locations along the Going-to-the-Sun Road or other roads during snow plowing operations, among other applications. Under a separate project, the park recently installed a base station consisting of an antenna and stationary GPS receiver at the existing telecommunications tower at the Apgar wastewater treatment plant. The base station transmits

GPS satellite data to a hand-held receiver in the field over a cellular signal or Internet, or over radio where cell and Internet service is not available. If this (or similar) technology is used in the future to transmit GPS data over the radio, an SOA repeater may be necessary to transmit the radio signal, since using existing repeaters could impact normal radio communications. As with other SOA repeaters, detailed analysis must be deferred to project-level review and analysis because it is unknown at this time where the technology would be used, what (if any) type of power would be needed, or the site-specific methods of setting up the repeater.

Implementation Methods

SOA repeaters and associated equipment vary in size but are generally smaller than standard repeaters. SOA repeaters could be temporarily set up in developed areas or along roads (e.g. mounted or parked in trailers), or placed in remote areas, including recommended wilderness. In remote areas, SOA repeaters would likely be placed on the ground, possibly in portable equipment cases, a large pack, or similar container with an expandable mast. The remote set-up may include foldable solar panels or a mounted solar panel assembly (see Figure 6 for examples). The installation of SOA repeaters in remote areas would not likely require ground disturbance because the repeaters would probably sit directly on top of the ground. Sites where SOA repeaters have been installed would be restored (i.e. revegetated with native plants) if their placement results in disturbance or compaction of soils or vegetation (see also Mitigation Measures). SOA repeaters would be transported to remote project sites by foot or livestock whenever possible, but helicopter transport may be necessary for areas where steep terrain is too dangerous for livestock and/or if livestock transport could put the equipment at risk of damage.

SOA repeaters would be set up on a temporary basis and removed once they are no longer needed; the duration over which they would be onsite would vary from weeks to months, possibly years, depending on the need. SOA repeaters would likely be in use primarily during spring, summer, and fall when most of the park's field activities are underway but could also be used during winter months.



Figure 6: Examples of temporary scene-of-action (SOA) repeaters at remote sites. **Top left:** Tactical-style SOA repeater with foldable solar panel, pelican case holding electronic components, and extendable 15-foot mast. Some tactical repeater assemblies can be transported in a backpack. **Top right and Bottom:** SOA repeater with mounted solar panel assembly and an approximately 10-foot mast placed temporarily on the summit of Elk Mountain several years ago in Glacier National Park. (NPS photos).

7) Install additional permanent NPS radio repeaters if necessary

While not anticipated, radio repeaters may need to be permanently installed in additional areas if other actions taken under this plan do not sufficiently improve radio communications. Should additional permanent repeaters be necessary, they would not be expected at more than three sites. Options outside recommended wilderness would be thoroughly explored before placing additional repeaters within the park's recommended wilderness. If necessary and no options outside recommended wilderness exist, areas preliminarily identified for possible new repeaters include the Belly River, Nyack, or Two Medicine backcountry areas, or on Mt. Brown, all within recommended wilderness. Implementation methods and the general size, footprint, and specifications of any additional repeaters would likely be as described for the new repeater proposed for Elk Mountain. As with SOA repeaters, any additional permanent repeaters would be transported to remote project sites by foot or livestock whenever feasible, but helicopter transport may be necessary for areas where steep terrain is too dangerous for livestock and/or if livestock transport could put the equipment at risk of damage. Detailed analysis of any additional permanent repeaters must be deferred to project-level review and analysis because it is not known whether they would be necessary, where or how they would be installed, or what specific equipment would be installed.

8) Identify specific developed areas where installation of commercial telecommunications infrastructure and cellular and Internet coverage for public and NPS use would be appropriate and could be authorized, and establish conditions and parameters for commercial telecommunications infrastructure and connectivity.

NPS Management Policies (2006) authorize the issuance of ROW permits for the installation of utilities, including communication facilities, on NPS lands where, generally, there is “no practicable alternative to such use of NPS lands (section 8.6.4.1)” and provided the use “would not cause unacceptable impacts on park resources, values, or purposes (section 8.6.4.2).” All applications for ROW permits in the park, including those for wireless telecommunications uses, would be processed in accordance with 36 CFR 14 and the National Park Service’s right-of-way permitting guidance document, Reference Manual 53B. NPS Policy requires park units to consider requests to site non-NPS telecommunications infrastructure on park lands “in accordance with the Telecommunications Act of 1996 (47 USC 332 note), which authorizes but does not mandate a presumption that such requests be granted absent unavoidable conflict with the agency mission” (Section 8.6.4.3 of the 2006 NPS Management Policies). Director’s Order No. 15 encourages park managers to use commercial telecommunication facilities where applicable, as long as they comply with Department of the Interior (DOI) and NPS guidelines (section 4.3.9). If a ROW permit application is inconsistent with the conditions and parameters established in this plan and any applicable NPS policies, it would be denied unless modified to ensure consistency.

The park would consider applications to install commercial telecommunications infrastructure for cellular and Internet connectivity only within the following developed areas of the park: Many Glacier, Two Medicine, Lake McDonald Lodge, and Rising Sun. These sites have been identified as areas where public connectivity is most needed and appropriate based on factors such as high levels of visitor use, concessions operations, the availability of stopovers (e.g. overnight accommodations and/or dining areas) where visitors are most likely to attempt to access cellular or Internet service, and connectivity needs for on and off-duty NPS staff. These areas are currently without cellular or Internet connectivity.

Commercial telecommunication providers would provide service subject to the conditions and parameters established in this plan (listed below in Table 2). The conditions and parameters have been developed to assure protection of natural and cultural resources, including visual resources. The conditions and parameters would govern the placement, size, amount and type of infrastructure that would be permitted, and the approximate extent of coverage allowed within each of the selected developed areas.

Only technologies with minimal impacts to park resources would be considered. **Highly visible large-scale towers (e.g. taller than 80 feet; see Table 2, No. 5) would not be appropriate in Glacier National Park and would not be permitted because they would result in too high of an environmental impact to park resources, such as visual resources and historic districts.**

Technologies that require the least visible, smallest scale infrastructure feasible would be given foremost consideration. For example, wireless access points (WAPs) (devices that allow wireless devices to connect to a wired network) can be placed indoors with minimal visibility, and microcell site technology allows for cellular coverage in small and directed footprints that target developed areas, thus minimizing the reach of coverage into remote locations and recommended wilderness. The transmit power of microcell sites is low, ensuring the signal only covers a short distance (e.g. estimated 50 yards up to 0.25 mile). Figure 7 includes examples of microcell equipment, which can be mounted to existing infrastructure.

If approved, cellular and/or Internet technology would be available to park visitors, concessioners, park partners, and off-duty concession and NPS employees. On-duty NPS staff would also use the technology in carrying out administrative duties, provided commercial technologies meet DOI Internet security and other requirements. Connectivity would be available at no additional cost to users beyond their monthly service plan and use fees (i.e. a user's cell phone plan that enables connectivity outside the park would also enable connectivity where provided inside the park). The exception could be in concessioner-operated facilities, where concessioners would provide and pay for connectivity and may or may not charge guests for access.

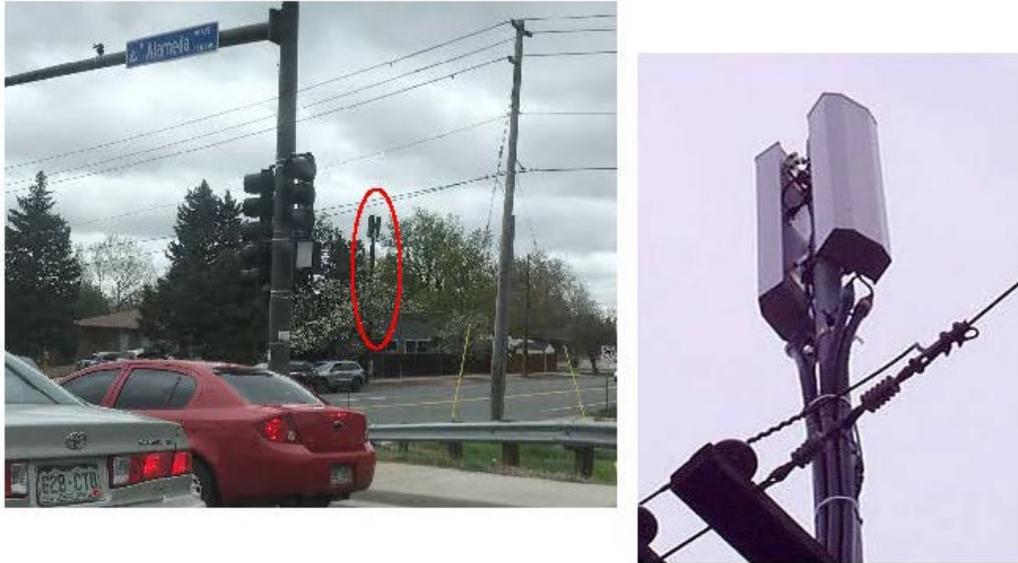


Figure 7: Examples of microcell site technology (NPS photos).

Figure 8 illustrates the approximate desired coverage areas for the four developed areas where the park would consider commercially provided connectivity. The coverage areas are within the park's Visitor Service Zone as defined by Glacier's 1999 General Management Plan (GMP) and are roughly delineated according to development footprints (as defined in park GIS files).

Commercial telecommunications infrastructure would not be authorized or installed in the park's Backcountry Zone (as defined in the 1999 GMP) or recommended wilderness (although the project area includes sites in recommended wilderness where action would be taken by the NPS to improve NPS communications that support park operations). Coverage would also not be provided along park roads outside the identified coverage areas. Some signal spillover may occur in portions of recommended wilderness, the Backcountry Zone, and on roadways that are immediately adjacent to approved coverage areas, but providers would be required to minimize spillover outside approved areas as much as technologically feasible (see Conditions and Parameters for Commercially Provided Cellular and Internet Service, Table 2, below).

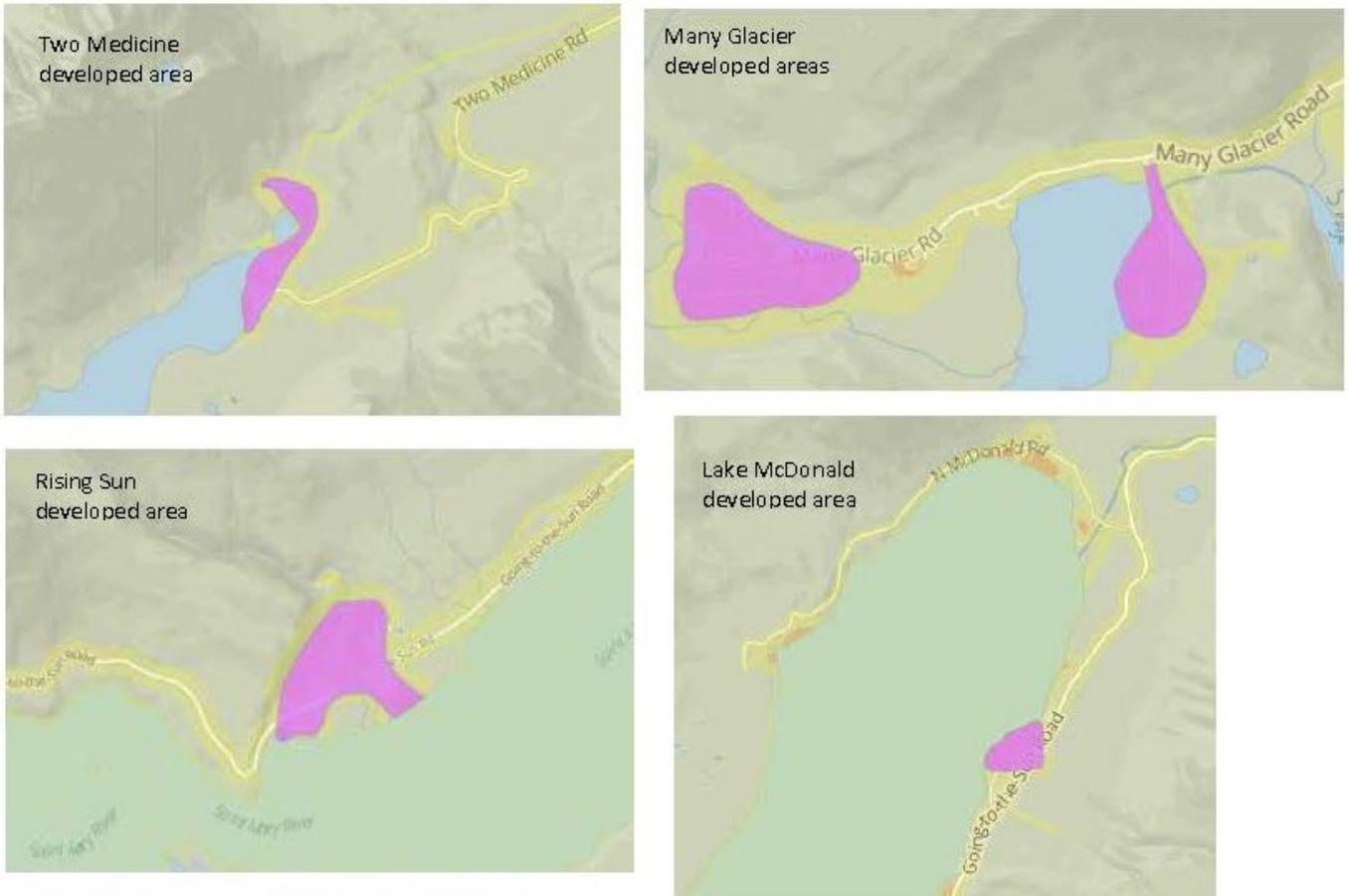


Figure 8: Identified approximate allowable coverage areas for the Two Medicine, Many Glacier, Rising Sun, and Lake McDonald Lodge developed areas. Purple polygons = approximate identified coverage areas; yellow highlight = Visitor Service Zone as defined by Glacier’s 1999 GMP.

Conditions and parameters for commercially provided cellular and Internet service.

Table 2 lists conditions and parameters for commercially provided cellular and Internet service that would be in effect when considering whether to approve, deny, or renew telecommunications ROW permits. These conditions and parameters would apply to any ROW permit for commercially provided cellular and Internet service, including service for the public, park partners, and concessioners, and any service used in support of NPS operations. The conditions and parameters include requirements from Director’s Order No. 53 Special Park Uses, Reference Manual 53B (Right-of-Way), and Section 8.6.4.3 of the 2006 NPS Management Policies, which provides direction for management decisions regarding non-NPS telecommunications sites and would be in effect regardless of whether the park implements a telecommunications plan. Conditions and parameters also include those that would be established under this plan in addition to NPS Management Policies. Additional conditions would be established on a site-specific basis. All applicable laws, regulations, policies, and orders pertaining to NPS ROW permits including, but not limited to, 54 U.S.C, 100902, 36 CFR 14, Reference Manual 53B (RM 53B), and Management Policies 2006 must be considered when evaluating any applications for new ROWs or renewals and amendments of existing ROW permits. Mitigation measures listed below Table 2 would also be in effect as applicable.

Table 2: Conditions and Parameters that would be in effect when considering applications for telecommunications ROW permits for commercial providers or National Telecommunications and Information Administration (NTIA) authorized non-commercial users. Conditions and parameters include those that would be established under this plan as well as requirements from the 2006 NPS Management Policies and other applicable NPS policies that would be in effect regardless of whether the park implements a telecommunications plan.

Conditions and parameters required in accordance with the 2006 NPS Management Policies, Section 8.6.4.3 Telecommunications Sites	Additional conditions and parameters under Glacier National Park’s proposed Comprehensive Telecommunications Plan
<p>Requests to site non-NPS telecommunication antennas and related facilities on NPS lands will be considered in accordance with the Telecommunications Act of 1996 (47 USC 332 note), which authorizes but does not mandate a presumption that such requests be granted absent unavoidable conflict with the agency mission, or the current or planned use of the property or access to that property.</p>	<p>1. Applications must include a detailed analysis of potential alternative service locations outside the park to confirm that, in order to provide service, telecommunications infrastructure and equipment are necessary inside the park boundary.</p> <p>The requirement outlined in Management Policies, Section 8.6.4.1 that a right-of-way “may be issued only pursuant to specific statutory authority, and generally only if there is no practicable alternative to use of NPS lands” will also apply.</p>
<p>Superintendents will accept an application for a telecommunications site only when the application is from a Federal Communications Commission licensee or from an agency regulated by the Department of Commerce through the NTIA, or when an application is accompanied by a properly licensed provider.</p>	<p>2. Commercial telecommunications infrastructure, equipment, and coverage would only be approved in the developed areas identified in this Comprehensive Telecommunications Plan/EA. Those areas are the Two Medicine, Many Glacier, Rising Sun, and Lake McDonald Lodge developed areas as shown in Figure 8.</p>
<p>The manner in which the park will manage the technology and related facilities should be addressed in an appropriate planning document.</p>	<p>3. Alternative technologies with minimal impacts to park resources (low visibility, for example) would be given foremost consideration, such as microcell sites or similar technology.</p>
<p>As with other special park uses, telecommunication proposals must not include uses that would cause unacceptable impacts.</p>	<p>4. The park would determine backhaul methods (the method used to move a signal between the infrastructure site and the provider’s main system). Fiber optic cable would be the preferred backhaul method. Microwave (wireless point-to-point) or other technologies (e.g. satellite) may be permissible until fiber is available. Commercial providers initially approved to use microwave or other technologies for backhaul would be required to transition to fiber optic cable once it becomes available. The exception to this could be if another backhaul method is identified that would have less environmental impact than fiber.</p>
<p>When considering whether to approve, deny, or renew permits, superintendents will:</p> <ul style="list-style-type: none"> • hold preliminary meetings with facility applicants to discuss pending applications and policy and procedural issues and other NPS concerns; • conduct NEPA and NHPA analysis expeditiously and consistent with all applicable statutes and Director’s Order No. 12, and within timetables established pursuant to Director’s Order No. 53; • consider the potential benefit of having telephone access to emergency law enforcement and public safety services; and • consider whether the proposal would cause unavoidable conflict with the park’s mission, in which case the permit will be denied. 	<p>5. Technologies that do not require additional vertical infrastructure (i.e. towers, poles, or masts) would be given foremost consideration, or existing and appropriate NPS vertical infrastructure (such as light poles) would be used whenever possible. (For example, microcell site technology requiring no new towers, poles, or masts would be used for the distribution of a cellular or data signal.)</p> <p>The height and overall visible footprint of any new commercial telecommunications infrastructure, including any vertical infrastructure (for microwave backhaul, for example), would be of the smallest size and scale necessary (i.e. the least visible) and/or would be proportional to or less than that of existing infrastructure and development. Given the scale of existing infrastructure in the areas where connectivity would be considered, new infrastructure taller than 80 feet would not be permitted; 80-foot tall infrastructure would only be approved if 80 feet is proportional to the height of existing infrastructure at the site in question.</p>

Conditions and parameters required in accordance with the 2006 NPS Management Policies, Section 8.6.4.3 Telecommunications Sites	Additional conditions and parameters under Glacier National Park’s proposed Comprehensive Telecommunications Plan
Superintendents will evaluate the entire footprint of new facilities when evaluating requests (including new electrical lines, communications lines, and vehicle access).	6. Equipment poles, masts, or other vertical infrastructure would be sited at or near existing communication sites whenever feasible.
Superintendents will avoid or minimize potential impacts of current and future telecommunications facilities by ensuring that the facilities and their supporting infrastructure: <ul style="list-style-type: none"> • are located where they would have the least impact on park resources and values; • are not located in scenic, historic, and/or sensitive areas integral to the park’s mission; • include the maximum potential for future co-location. 	7. Providers would be required to provide a visual analysis that evaluates impacts to viewsheds (i.e. identifies areas from which the infrastructure would be visible) before the approval of any vertical infrastructure (e.g. equipment poles, masts, or towers).
Superintendents will require the best technology available. For example, consideration should be given first to co-locating new facilities, constructing towers that are camouflaged to blend in with their surroundings, and installing micro-sites. New traditional towers (i.e. monopole or lattice) should be approved only after all other options have been explored and should not be visible from any significant public vantage point.	8. Lights would not be permitted on any communications infrastructure.
	9. Prior to installation, the permittee would provide documentation that demonstrates that the placement of equipment, the azimuths of antennas, and the technology used would minimize signal spillover into the park’s recommended wilderness and Backcountry Zone (as identified in Glacier’s 1999 General Management Plan) and along park roadways to the extent technologically feasible while providing coverage within approved areas. If microcell sites are permitted, antennas would be directional and would be oriented to direct coverage only to approved coverage areas.
	10. The amount of commercial telecommunications infrastructure and equipment (e.g. the number of microcell sites or other technologies) would be the minimum necessary to service approved coverage areas.
	11. Commercial telecommunications infrastructure and equipment would be: <ul style="list-style-type: none"> • designed to blend with surroundings (painted, for example) to minimize visual effects to National Register listed or eligible properties and other resources; • mounted to existing infrastructure whenever doing so is feasible and least intrusive; • sited indoors whenever feasible (such as WAPs, for example); and • the smallest size available and technologically feasible. Microwave or satellite dishes would not exceed 36 inches in diameter. WAP devices would not exceed 12-inches in diameter or height.
	12. Buried pipe or cabling would be installed in existing road or utility corridors or other previously disturbed ground.

Conditions and parameters required in accordance with the 2006 NPS Management Policies, Section 8.6.4.3 Telecommunications Sites	Additional conditions and parameters under Glacier National Park's proposed Comprehensive Telecommunications Plan
	13. Multiple microcell sites, WAP sites, or other technologies may be established within a single approved coverage area. If multiple sites are approved, they would be interconnected by fiber or copper cabling, which would follow existing road or utility corridors whenever possible.
	14. More than one commercial provider could provide telecommunication services, but multiple providers would be required to co-locate on shared infrastructure to minimize the amount of telecommunications infrastructure in the park. If more than two commercial providers request permits for cellular technology, the park may require utilization of individual microcell sites using a distributed antenna system (DAS), meaning the providers would share a single antenna array (i.e. a single wrap of multiple antennas). This would only be feasible if the providers use a common frequency range. If multiple cellular providers are permitted at a given location, they would be required to share the backhaul method; if backhaul is fiber, multiple count fiber would be used so each provider has their own strand of fiber.
	15. Commercial telecommunications equipment would not be co-located on NPS telecommunications infrastructure.
	16. Interference and intermodulation studies in accordance with Director's Order No. 15 would be required to ensure all new sites and equipment installations within the park do not negatively impact existing NPS telecommunications equipment.
	17. If and when the park approves and issues ROW permits, except as provided in 36 CFR 14.26(c)(1), the commercial telecommunications company or other telecommunications use permittee would be responsible for building and maintaining the related infrastructure according to the terms and conditions of the permit and would pay a fair market value for the use of federal land.
	18. The park's Road Opening and Closing Directive 7.3, including seasonal road closures, would remain in effect. Roads closed during winter would not be plowed for vehicle access for maintenance or repair of commercial telecommunications sites. Commercial telecommunications providers would access closed roads in the same manner that park staff access the same areas; i.e. if NPS administrative access is limited to non-motorized access (hiking/skiing/snowshoeing, for example), then commercial providers would also use non-motorized access.
	19. Installation of commercial telecommunications infrastructure and equipment would require site-specific review in compliance with NEPA, the National Historic Preservation Act (NHPA), and other applicable laws.

Mitigation Measures

The following impact mitigation measures would be applied as relevant for both NPS and commercial telecommunications infrastructure and equipment (in addition to the conditions and parameters listed above for commercial telecommunications infrastructure).

Wildlife, including federally listed threatened species and state listed species of concern

- Project personnel would be trained on appropriate behavior in the presence of bears and other wildlife. Park regulations concerning proper storage of food, garbage, and other attractants would be strictly enforced.
- Project sites would be surveyed for bats and migratory birds in consultation with the park's wildlife staff. If migratory or nesting birds are present, thinning trees, brushing, or the removal of other vegetation and the use of heavy equipment would not occur until late summer or early fall, after the critical bird breeding and nesting period (between April 15 and August 15, possibly later in the summer depending on survey results). If bats are present, thinning trees would not occur until late summer or early fall when maternity roosts are no longer active. The park's wildlife staff would be consulted regarding timing for vegetation removal, tree thinning, and the use of heavy equipment.
- When thinning trees, trees that provide critical habitat (e.g. cavity nests or roost sites) for wildlife would be avoided (i.e. left standing). The park's wildlife staff would be consulted ahead of time to identify habitat trees.
- Project activities in the Many Glacier area would occur before the Many Glacier Road closes to public vehicle access (third week of November) to protect wildlife security in the road corridor.
- Project activities at the Goat Haunt Ranger Station project site would occur during the visitor use period to protect wildlife security when the area is closed for the season and human activity is low. Within this timeframe, work would not occur until late summer/early fall, after the critical bird breeding and nesting period, to avoid impacts to nesting bald eagles, waterbirds, and other migratory birds from noise during excavation with heavy machinery. The park's wildlife staff would be consulted regarding the appropriate timeframe for project activities.
- Project activities would occur during the daytime only; no night work would occur.
- During excavation, if trenches are to be left open overnight, trenches could be fenced and/or escape ramps would be constructed to avoid trapping reptiles, amphibians, and other wildlife.
- Any observation of grizzly bears or Canada lynx at project sites would be reported to the park's wildlife staff; appropriate action would be taken as necessary to reduce potential effects (hazing bears from developed project sites, for example).
- The following conservation measures as agreed to with the US Fish and Wildlife Service (USFWS) in the park's programmatic biological assessment for administrative flights (NPS 2018) are required for all park administrative flights and would be followed for any flights associated with this plan:
 - Flights would follow suggested flight paths away from sensitive areas. Where possible, flight paths would follow road corridors and occur over developed areas.
 - Flights would occur between one hour after sunrise and one hour before sunset from 1 May to 1 October to minimize impacts to grizzly bears. Grizzly bear denning activity peaks during den emergence from 15 March to 15 May and during den construction from 15 October to 15 November. No flights would occur over known dens or potential den habitat during den emergence and den construction. In order to conserve prey species, flights would avoid

ungulate winter range from 15 January to 1 May when wintering ungulates are most vulnerable.

- Flights would be restricted to the 1 May to 1 October period, or minimized outside that period, to eliminate or minimize impacts to sensitive wildlife.
- The helicopter would fly at a minimum of 2000 feet above ground level (AGL) over the park whenever possible, depending on mountainous topography, weather, and except when it is landing or taking off or delivering supplies via long line.
- To minimize impacts on denning Canada lynx, no flights would be permitted over known den sites from 1 May to 1 September.
- Flight paths would be designated so as to avoid open alpine meadows, talus slopes, or other areas where grizzly bears congregate but do not have access to cover. If a low-level flight or landing is needed in an alpine area and a bear is seen, the flight would be postponed. If the flight cannot be postponed, the flight would keep a maximum distance from the bear(s).
- The flight manager would be responsible for coordinating with the park biologist to identify sensitive sites prior to the flight.

Vegetation and Soils

- When thinning trees, sensitive tree species (e.g. whitebark pine, limber pine) would be avoided (i.e. left standing). The park's Vegetation Management Specialist would be consulted prior to thinning to identify sensitive species.
- In consultation with the park's Vegetation Management Specialist, large diameter trees (7 inches or more in diameter) would be left standing when feasible to maintain a representative age class.
- All trenching and other ground disturbing activities would occur in previously disturbed areas, such as roads and utility corridors, whenever possible.
- Trench paths would be selected in consultation with the park's Science and Resources Management staff, including the Vegetation Management Specialist, in order to identify paths that would have the least impact on vegetation and soils.
- Project sites would be surveyed for rare plants before work begins; locations of rare plants would be marked and avoided.
- Foundations would be poured on-site whenever feasible to minimize the size of the hole that must be dug for the foundation (rather than bringing pre-cast footers to the site, for example).
- When selecting equipment for excavating foundations and trenches, equipment that causes the least ground disturbance would be used whenever feasible (i.e. tracked machinery, which causes less disturbance than wheeled vehicles, would be used if feasible).
- Vertical infrastructure would be self-supporting (i.e. no guy wires) whenever feasible to minimize ground disturbance.
- Areas of disturbance would be rehabilitated and restored (e.g. re-seeded with hand tools) through consultation with the park's Vegetation Management Specialist. Site-specific restoration needs would be developed as needed for each site where ground disturbance would occur. Only seeds and plants originating from the park or from approved sources would be used in restoration activities.
- When trenching, empty conduit would be laid whenever feasible for the possible installation of fiber optic cable in the future; this would reduce the need to re-open trenches if installing fiber.

Natural Soundscapes

- Machinery that produces the least audible noise possible would be used (during excavation and tower placement, for example).

Visual Resources

- All new towers would be painted or otherwise disguised to blend with surroundings and minimize reflectivity from sunlight. If paint is used, paint that is approved for galvanized towers must be used so that it does not peel, slough, or slip off, and to ensure a non-slip climbing surface for technicians.
- All other telecommunications infrastructure and equipment (such as equipment shelters, antennas, masts, poles, and the like) would also be painted or otherwise disguised to blend with surroundings and minimize reflectivity whenever doing so would not interfere with the functionality of the equipment and is in accordance with manufacturer's specifications. (Sanding or bead-blasting, for example, could minimize reflectivity.)
 - Existing telecommunications infrastructure and equipment would likewise be painted or disguised during maintenance or other site visits.
 - Every effort would be made to obtain microwave dishes that are non-white in color (e.g. green or tan or otherwise colored to blend with surroundings). If non-white microwave dishes cannot be obtained from the manufacturer, dishes would be painted or otherwise disguised if in accordance with manufacturer's specifications.
- The park's Interdisciplinary Team (ID Team) would be consulted regarding materials and colors used to disguise towers and equipment.
- NPS telecommunications equipment would be located on existing NPS infrastructure whenever technologically feasible.

Recommended Wilderness

- For remote sites without road access, equipment that is small and lightweight enough for packing on foot or livestock would be selected whenever possible to avoid helicopter flights or reduce the number of flights.
- Scene of Action (SOA) repeaters and additional permanent repeaters would be sited outside of recommended wilderness whenever possible.
- Communications equipment sited inside recommended wilderness would be painted or otherwise disguised to blend with surroundings as much as possible (see Visual Resources mitigation measures).
- To minimize administrative helicopter use in recommended wilderness, the park would make every effort to include helicopter flights for this plan within the 50-flight limit on administrative flights. Flights would be considered with other proposed administrative flights, coordinated with other projects, and combined with other hauling needs whenever possible.
 - Only flights needed for the initial installation of infrastructure could exceed the park's 50-flight limit; any later flights needed for maintenance or repairs (including equipment replacements) would be kept within the park's 50-flight limit.
- A heavy lift helicopter would be used whenever available to carry as much heavy material as possible and reduce the number of flights. More efficient, lower noise models would be preferred.

Cultural Resources (Archeological Resources, Historic Districts, Historic Structures)

- Archeological surveys and, if necessary, inventories, must be conducted in consultation with the park's Cultural Resources Specialist prior to:
 - any ground disturbance (such as digging trenches and foundations),
 - removal of trees, and
 - placement, installation, or construction of structures, including those placed on top of the ground (such as equipment shelters at Looking Glass Hill, Elk Mountain, or other undeveloped sites).
- Telecommunications infrastructure would be designed to avoid known archeological resources.
- Trench paths would be identified in consultation with the park's Science and Resources Management Staff, including the Cultural Resources Management Specialist, in order to avoid disturbance to archeological resources.
- Where necessary as determined from survey results, archeological monitoring would be required during ground disturbing activities in consultation with the park's Cultural Resources Management Specialist.
- If cultural resources are discovered during ground disturbing activities, ground disturbance would immediately cease, and the park's Cultural Resources Specialist would be notified. Discovered resources would be evaluated for their potential eligibility for listing in the National Register of Historic Places (NRHP). Procedures would follow those outlined in 36 CFR 800, Protection of Historic Properties.
- A determination of eligibility (DOE) for listing in the National Register of Historic Places (NRHP) must be completed before an equipment shelter could be placed on Elk Mountain (due to the foundation remnant from an earlier lookout).
- Telecommunications equipment and infrastructure installed in historic districts would be located where it is least visible and would be designed to blend with surroundings (see Visual Resources mitigation measures).
- Telecommunications equipment and infrastructure would be of the smallest size available and technologically feasible.

Night Skies

- Lights would not be permitted on any towers or communications infrastructure.

Visitor Use and Experience

- If public connectivity is approved (only in one or more of the developed areas identified in this plan), the park would develop visitor messaging on how to minimize disturbance to others from cell phone use. Messaging may include suggestions to silence ringers, observe quiet times, and avoid streaming music and movies in public, for example, and reminders of the personal wellness benefits of enjoying the park while limiting personal use of cell phones and other devices.

Alternative B – No Action

Under Alternative B, there would be no change to the current management direction for upgrading or improving NPS radio, phone, and computer/data-based telecommunication systems that support park operations. The park currently uses the NPS radio, phone, and computer/data-based systems described at the beginning of Chapter 2 and would continue to do so under Alternative B. Improvements to those systems, including upgrades to equipment and infrastructure, are currently made as the need arises, on

a site-specific and case-by-case basis. Because a quick response is often necessary when addressing telecommunications issues that come up, there is typically little time or opportunity to develop integrated system-wide solutions, and most problems are dealt with individually. This approach would continue under Alternative B. Radio communications, computer, Internet, and data network functionality, and phone services may improve as modifications to existing infrastructure are made and/or new infrastructure is installed. However, the absence of integration and advance planning could result in missed opportunities to co-locate multiple systems at single sites and achieve widely applicable solutions, and may not fully address existing problems with the park's communications system. Routine maintenance of NPS telecommunications systems would continue, such as scheduled Preventive Maintenance and Inspections, equipment repairs, and small part replacements.

Commercially provided cellular and Internet connectivity would likely remain available at Apgar and St. Mary, as well as weak and sporadic signals elsewhere in the park, as a result of signal spillover from commercial telecommunications sites outside the park boundary. The NPS would continue to be required by NPS Policy to consider all ROW permit applications to install commercial telecommunications infrastructure on NPS lands in accordance with the Telecommunications Act of 1996. Under Alternative B, No Action, the NPS would receive and review applications to install telecommunications infrastructure in Glacier on a case-by-case basis, and the NPS may elect to approve or deny these applications. Future ROW permit applications would continue to be evaluated by the NPS in accordance with applicable laws, regulations, and policies. Criteria for placement of associated infrastructure would be identified on a case-by-case basis with the goal of avoiding or minimizing impacts to resources. However, ROW permit applications would not be evaluated according to comprehensive, park-specific guidance as to where services should be provided, how much and what type of infrastructure would be considered, and the extent of coverage. As a result, coverage may or may not be limited to the Many Glacier, Two Medicine, Rising Sun and Lake McDonald Lodge developed areas, and other conditions may not be in place, such as fiber optic cable as the preferred backhaul method and consistent guidelines on the height and placement of vertical infrastructure.

Chapter 3 – Affected Environment and Environmental Consequences

This chapter considers resources or impact topics that would be affected by the proposed plan and for which a detailed analysis of impacts to those resources is necessary. The general current status of each resource is described in the affected environment, followed by an analysis of impacts. Impact topics are retained for detailed analysis if they are pivotal or central to the proposed action or a point of contention among the public. Appendix D describes impact topics dismissed from detailed analysis.

Impacts from well-developed actions described in Chapter 2 are analyzed in detail in this chapter. Impacts from programmatic actions are analyzed based on what is known or can be reasonably assumed. Additional environmental review, analysis, and compliance would be completed separately for programmatic actions as necessary once the scope and design are sufficiently developed.

For both Alternatives A and B, routine maintenance of NPS telecommunications systems (such as scheduled Preventive Maintenance and Inspections, equipment repairs, small part replacements, etc.) is not analyzed because such actions are operational and their implementation would not alter the existing condition of park resources or have any potential to cause impacts. Maintenance actions that could impact park resources (e.g. installations of additional equipment or infrastructure or ground disturbance to replace or remove faulty infrastructure) are not analyzed in this EA because it is not yet known whether and where such needs would arise, or what the specific nature of the action would be. Such actions would be subject to appropriate project-level review, analysis, and environmental

compliance if/when the actions are identified (similar to Programmatic Action No. 5, Chapter 2, Section II of this EA).

Note: Referenced action and section numbers are from Chapter 2 of this EA.

Visual Resources

Affected Environment

Scenery has been a fundamental resource and value of national parks since the establishment of the NPS. The 1916 Organic Act includes the conservation of scenery, “unimpaired for the enjoyment of future generations,” as one of the primary purposes for establishing the NPS. Scenery is also integral to the significance of Glacier National Park, as described in significance statements in Glacier’s Foundation Document (2016). Spectacular mountainous viewsheds depict Glacier’s 1.6 billion-year geologic history and the geological processes associated with mountain-building and glaciation. Vast areas of undeveloped scenery in the park are an essential feature of Glacier’s wilderness character. The rustic visual character of cultural sites and associated landscapes represent Glacier’s historic context. This rich array of visual resources offers stunning aesthetic experiences as well as diverse interpretive and educational opportunities.

Visual resources at project sites for the Comprehensive Telecommunications Plan belong to landscapes and viewsheds with both natural and cultural contexts. The project area includes a number of historic properties, four of which have NHL status (see Historic Districts, below). Visual resources in these areas include rustic architecture and design elements that represent Glacier’s history of tourism and development. Two project sites are in recommended wilderness, where the visual landscape is undeveloped and naturally picturesque, and representative of the park’s outstanding geologic and ecological resources. At twelve of the sixteen known project sites, telecommunications infrastructure and equipment is already present and part of the existing visual landscape (Table 3).

Table 3: Project sites where telecommunications infrastructure and equipment are already present. LMR = Land Mobile Radio.

Project Site	Existing Telecommunications Infrastructure/Equipment
Many Glacier Ranger Station	30-foot tall NPS equipment pole with LMR antennas
Many Glacier Entrance Station	40-foot tall NPS equipment pole with 20-foot antenna
Many Glacier water tanks site	NPS equipment shelter with 40-foot mast, 4 solar panels, and LMR antennas (recently scheduled for installation as a separate project to replace the existing job box and 10-foot mast)
Two Medicine Entrance Station	NPS 20-foot equipment pole with LMR antenna
Two Medicine Communications Tower	NPS 40-foot lattice frame tower with webcams and 4 antennas
St. Mary Ranger Station	NPS 80-foot lattice frame tower with two Centurylink microwave dishes, one NPS microwave dish, and six NPS LMR antennas
Apgar Mountain	NPS 60-foot lattice frame tower with two microwave dishes, four LMR antennas
Chief Mountain POE	NPS 40-foot tall lattice frame tower with three LMR antennas
Goat Haunt Ranger Station	NPS 40-foot equipment pole with two LMR antennas
East Glacier Ranger Station	NPS 40-foot lattice frame tower with two LMR antennas
Logan Pass Visitor Center	Satellite dish mounted on the southwest eave and radio antennas mounted on the roof of the visitor center
Looking Glass Hill (recommended wilderness)	Temporary NPS radio repeater housed inside a job-box with 10-foot mast and 2 solar panels

Among the project sites with existing telecommunications infrastructure, five are associated with one or more viewsheds that are part of the NPS Enjoy the View (ETV) Visual Resource Inventory Database. The NPS manages inventoried ETV views as a scenic resource, tracks them over time for changes (both natural and human-caused), and minimizes alterations from administrative activities as feasible, with the goal of maintaining essential elements. The existing Apgar telecommunications tower is within the “Howe Ridge” viewshed, at the peripheral southwest edge, and is visible under certain conditions, such as reflective sunlight. The Apgar tower is also within the “View from Hwy 2” viewshed and could be visible depending on conditions such as sunlight angles and cloud cover. The Many Glacier Ranger Station is within the geographic range of the “Many Glacier Hotel” viewshed, but the existing equipment pole is likely not visible due to screening from trees and because the hotel dominates the view. The St. Mary Ranger Station is within the geographic range of the “St. Mary Bridge” viewshed but is not visible from the inventoried observation point due to distance, vegetation, and topography. It may also be visible from the observation point for the “St. Mary Visitor Center” viewshed but is not within the viewshed itself. The Logan Pass Visitor Center is within the geographic range of the “Oberlin Overlook” viewshed but is not visible due to topography. The observation point for “The Loop” viewshed is at the Loop, so existing infrastructure at the Loop may be peripherally visible when observing the viewshed, which looks southwest across the upper McDonald Valley.

Environmental Consequences

Impacts from Alternative A (Proposed Action and Preferred Alternative) to Visual Resources

Impacts from improvements to NPS telecommunications systems

This analysis uses GIS-based viewshed modeling to assess the visibility from a distance of proposed NPS vertical telecommunications infrastructure (i.e. equipment poles, masts, and towers) within a 5-mile radius. The visibility of replacement vertical infrastructure is compared with existing, where applicable. Visibility outside of a 5-mile radius is not considered because it is assumed (based on the professional experience of park subject matter experts) that the infrastructure would not realistically be visible beyond five miles. Because viewshed modeling does not account for vegetation, the model was combined with vegetation data (Landfire 2016) to factor in tree-dominated areas, which provide visual screening and reduce the amount of area over which vertical infrastructure may be visible from a distance. Analysis results are summarized in Table 4.

Table 4: Changes in the visibility from a distance of proposed NPS vertical telecommunications infrastructure (i.e. equipment poles, masts, and towers) compared with the visibility of existing infrastructure. Based on GIS-based viewshed modeling combined with vegetation data (Landfire 2016) showing tree-dominated areas. (Telecoms = telecommunications; sq km = square kilometer)

Project Site (Action and Section numbers are from Chapter 2)	Height of existing vertical telecoms infrastructure	Height of proposed vertical telecoms infrastructure (to replace existing)	Modeled area over which existing infrastructure is visible within a 5-mile radius	Modeled area over which proposed infrastructure would be visible within a 5-mile radius	Percent change in modeled visibility
Many Glacier Ranger Station (Action No. 1, Section I)	30-foot pole	40-foot lattice frame tower	10.8 sq km	10.9 sq km	1.0% increase
Many Glacier Entrance Station (Action No. 1, Section I)	40-foot pole	40-foot lattice frame tower	11.8 sq km	11.8 sq km	No change
Goat Haunt Ranger Station (Action No. 9, Section I)	40-foot pole	40-foot lattice frame tower	16.0 sq km	16.0 sq km	No change
Chief Mountain POE (Action No. 8, Section I)	40-foot lattice frame tower	80-foot lattice frame tower	29.4 sq km	32.2 sq km	9.5% increase
The Loop (Action No. 3, Section II)	No existing telecoms infrastructure*	30-foot mast	18.1 sq km (for existing comfort station)	18.8 sq km	3.9% increase
Looking Glass Hill (recommended wilderness; Action No. 3, Section I)	10-foot mast	20-foot mast	20.8 sq km	24.0 sq km	15.4% increase
Elk Mountain (recommended wilderness; Action No. 5, Section I)	No existing telecoms infrastructure	20-foot mast	N/A	20.0 sq km	N/A

*The height of the existing, non-historic comfort station was analyzed.

At the Many Glacier Ranger Station, viewshed modeling combined with vegetation data indicate that the new 40-foot tower would be visible over an approximately 10.9-square kilometer area within a 5-mile radius. This would be about a 1.0 percent increase in visibility (approximately 0.1 square kilometer more) compared with that of the existing 30-foot equipment pole, which is visible over 10.8 square kilometers (Table 4). Modeling suggests that the increased visibility of the new tower would be most apparent from vantage points at the Many Glacier Hotel and along the east shore of Swiftcurrent Lake, extending an estimated 200-250 meters west of the area from which the model shows the existing equipment pole as currently visible. The affected view includes the NPS ETV “Many Glacier Hotel” viewshed. But the taller tower is not likely to stand out visually since the viewshed is dominated by the hotel, surrounding mountain peaks, and forested areas.

At the Many Glacier Entrance Station (Action No. 1, Section I) and the Goat Haunt Ranger Station (Action No. 9, Section I), GIS modeling indicates no change in visibility of the new towers from a distance because they would be of the same height as the existing equipment poles (Table 4).

At the Chief Mountain POE, viewshed modeling and vegetation data indicate that the new 80-foot tower would be visible over an approximately 32.2-square kilometer area within a 5-mile radius. This would be about a 9.5 percent increase in visibility (approximately 2.8 square kilometers more) compared with that of the existing 40-foot tower, which is visible over approximately 29.4 square kilometers (Table 4). Modeling indicates that visibility would increase from an area encompassing approximately 2.0 square kilometers outside the park boundary on Blackfeet Nation land. Other areas from which modeling shows

increased visibility, including the US/Canada border and lower elevations on the north aspect of Chief Mountain, are tree-dominated, which would mask the increase in visibility. Modeling shows little if any increased visibility of the taller tower from the summit of Chief Mountain. The prevalent sun angle (from the south) and reflectivity could cause the tower to be visible from the summit, but the potential for this would be mitigated by painting the tower and equipment to blend with surroundings and dull reflectivity. The model results also show that the new tower would be visible from approximately 26.2 square kilometers in Waterton Lakes National Park. However, tree dominated areas have not been factored into viewshed modeling for areas north of the border because the most current available vegetation data is dated several years prior to, and is therefore inconsistent with, the 2016 Landfire data used for Glacier. Because some degree of visual screening from trees can be assumed, the actual area over which the taller tower would be visible north of the border would be less than predicted by modeling.

At the Loop (Action No. 3, Section II), viewshed modeling combined with vegetation data indicates that the existing comfort station is visible over an area of approximately 18.1 square kilometers, and the 30-foot mast would be visible over an area of approximately 18.8 square kilometers within a 5-mile radius (Table 4). This represents an approximately 3.9 percent increase in visibility of the mast (approximately 0.7 square kilometer more) at a distance compared with that of the comfort station. Model results show the slight increase in visibility along the Going-to-the-Sun Road in the vicinity of Haystack Creek, from a switchback on the Loop Trail, and near the hairpin on the Flattop Mountain Trail. Elsewhere within the 5-mile radius, modeling indicates little to no increased visibility of the 30-foot mast compared with that of the comfort station. However, the model is based on height alone (i.e. it does not account for width), and it is not likely that the small diameter mast (estimated at approximately 2.5 inches) would be more visible at a distance than the building.

For the Many Glacier Ranger Station and Entrance Station, Goat Haunt Ranger Station, Chief Mountain POE, and the Loop, these modeling results show only very small increases in the visibility from a distance of proposed NPS telecommunications infrastructure (Table 4). The greatest increase would occur from the taller replacement tower at Chief Mountain, but impacts would be less than indicated by modeling since screening from vegetation north of the US/Canada border has not been accounted for. Given that vertical infrastructure already exists at these sites and that the visibility of telecommunications infrastructure would barely increase (as demonstrated by modeling), proposed changes to NPS vertical infrastructure at the sites would not meaningfully, or perhaps even noticeably, change the essential elements and fundamental appearance of associated viewsheds.

At close proximity, lattice frame towers would generally be more visible than the existing equipment poles they replace due to their greater width. The addition of satellite dishes, antennas, and cable bridges would also increase the overall amount of visible equipment in the immediate areas. However, this would not appreciably change existing visual conditions because NPS telecommunications equipment is already present (Table 3), and because the new towers and equipment would be in the same locations as existing infrastructure. The exception would be at the Many Glacier Ranger Station, where the new tower would be installed in a new, but less visible location than the existing equipment pole. For this reason and because the site is well forested, the new tower and equipment would likely not be visible from most vantage points within the Many Glacier Ranger Station compound. Dense forest would also block visibility of the replacement tower and equipment at the Goat Haunt Ranger Station. At the Loop, while telecommunications equipment is not currently present, the proposed 30-foot mast would not be out of context with a developed area and would be relatively small in scale compared to the amount of existing development. The observation point for the NPS ETV "The Loop" viewshed is at the Loop itself and the mast may be peripherally visible. The view looks away from the Loop, however,

toward a mountainous expanse to the southwest, and the mast is not likely to stand out from existing development at the site, which includes the comfort station, a road, and signage in an area with heavy vehicle traffic. No other elements that contribute to the visual character of these sites would be altered and, therefore, they would retain their current, overall visual qualities.

At the Logan Pass Visitor Center (not modeled), installing a six to seven-foot tall pipe with a 36-inch satellite dish outside and immediately adjacent to the employee break room (Action No. 10, Section I) would increase the amount of telecommunications equipment, but the adjacent buildings would detract from the visibility of the equipment such that it would not meaningfully change the appearance of the site and would likely go largely unnoticed. The equipment would also not stand out visually at a distance because it would be lower in height and, thus, in the visual shadow of the larger building. Since there would be no other alterations to the site's visual character, the Logan Pass Visitor Center would retain its fundamental existing visual qualities. The same would be the case for other developed project sites, including the Many Glacier water tanks, Two Medicine Entrance Station and existing Two Medicine communications tower, East Glacier Ranger Station, and St. Mary Ranger Station, where antennas and/or microwave dishes would be installed and/or replaced under Alternative A, but where NPS telecommunications infrastructure and equipment is already onsite (Table 3).

Thinning trees at the Many Glacier Entrance Station and the Chief Mountain POE would reduce visual screening, contributing to an increase in visibility of the replacement towers in the immediate vicinities. But because the surrounding areas are well-forested, the removal of the trees would not alter the overall visual character of either site. At the Chief Mountain POE, trees left standing combined with an unthinned, forested swath between the thinned area and the POE would provide screening such that the new, taller tower would not dominate the view or substantially detract from the existing appearance and visual character of the site. Removing a single tree at the Two Med entrance station (Action No. 2, Section I), if necessary to clear the signal path, would change the appearance of the immediate site but, since the area is forested, would not meaningfully alter the overall visual character.

Visual impacts would be more apparent at Looking Glass Hill and Elk Mountain since these sites are undeveloped. At Looking Glass Hill, GIS-based viewshed modeling combined with vegetation data indicates that the taller 20-foot mast would be visible over an approximately 24.0-square kilometer area within a 5-mile radius. This would be an approximately 15.4 percent increase in visibility (approximately 3.2 square kilometers more) compared with that of the existing 10-foot mast, which is visible over approximately 20.8 square kilometers (Table 4). Visibility of the mast would primarily increase from scattered areas outside the park boundary on Blackfeet Nation land, including from places along Highway 49 where there is sporadic visual screening from trees. Inside the park, visibility of the mast would increase along an approximately 500-foot swath of open terrain between the park boundary and the repeater site. Modeling does not indicate a notable increase in visibility of the taller mast from nearby trails, including the Mt. Henry Trail, from which the existing 10-foot pole is sporadically visible, and the Dry Fork Trail, which is in a tree-dominated area so unlikely to be noticeably affected. While the new infrastructure at Looking Glass Hill would be more visible from a distance, the increase would not represent a substantial change since the undeveloped visual character of the site is already being impacted by the presence of a radio repeater. At close proximity, the new infrastructure would be more visible than what is currently at the site due to the larger shelter size, taller mast, and additional solar panel. Changes to visual resources at Looking Glass Hill, as well as any existing impacts, would be temporary because the radio repeater was originally installed on a temporary basis and all associated equipment, including that installed under this plan, would be moved to a telecommunications site outside the park (Programmatic Action No. 2, Section II).

At Elk Mountain (Action No. 5, Section I), the park would only install a radio repeater if other actions do not sufficiently improve NPS radio communications in the area; therefore, this action may not be implemented. Modeling indicates that a 20-foot mast associated with the repeater would be visible over an area of approximately 20.0 square kilometers within a 5-mile radius (Table 4). Of this, about 2.6 square kilometers would be outside the park boundary, leaving the mast visible from about 17.4 square kilometers inside the boundary. Outside the park, the mast would primarily be visible from high-elevation, open areas and cliff faces in the vicinity of Elkcalf Mountain on US Forest Service land. Inside the park, the mast would be visible from upper elevations and surrounding peaks, including the Elk Mountain Trail near the approach to the summit and the summits of Mt. Shields, Little Dog Mountain, and Brave Dog Mountain. The mast would be less apparent from lower elevations due to screening from forested areas but would be sporadically visible along the Ole Creek and Autumn Creek Trails. The degree to which the mast is visible from a distance would vary with changing weather, cloud cover, and sunlight angles, which at times may make it fairly difficult to discern, especially given the scale and visual dominance of the surrounding mountainous landscape. At close proximity, the repeater infrastructure would be readily apparent at the summit and out of context with the undeveloped visual character of the site, but would be less apparent off the summit (except for the approach from the Elk Mountain Trail) due to topography and masking from trees. The area of impact would be negligible compared with undiminished surrounding viewsheds and the amount of undeveloped land in the park (3,753.66 square kilometers of the park is recommended wilderness), such that the vast majority of the park's undeveloped visual landscape would remain unaffected.

Sunlight reflecting off new towers and, where installed, microwave dishes and/or solar panels, could increase the visibility of telecommunications infrastructure at a distance beyond the areas predicted by modeling. This is impossible to quantify, however, since it would be based on changing atmospheric conditions and angles of the sun relative to an observer's position. Given the ever-changing nature of atmospheric conditions as well as mitigation measures to paint towers and other equipment to blend with surroundings, any increase in visibility that occurs from reflectivity would be occasional and not expected to measurably change the essential elements of associated viewsheds. Sunlight reflectivity could cause solar panels installed at Apgar Mountain (Programmatic Action No. 4, Section II) to be visible from a distance, including within the NPS ETV "Howe Ridge" and "View from Highway 2" viewsheds. But because any reflective visibility of the solar panels would vary with changing atmospheric conditions, whereby the panels may not be visible at times or may only be peripherally noticeable, these viewsheds would retain the essential visual characteristics that make them iconic.

If SOA repeaters or additional permanent repeaters are installed (Programmatic Actions No. 6 and 7, Section II), impacts would be similar to those described for the Loop if they are placed in developed areas, or to those described for Elk Mountain if installed in undeveloped areas. If placed in developed areas, the equipment would not likely stand out visually or be an appreciable change from existing visual conditions given other visible signs of development. If placed in undeveloped areas, they would be an observable change to the visual landscape. Impacts from SOA repeaters would be expected to be relatively low in intensity given the small-scale appearance of the equipment (Figure 6) and because SOA repeaters would be installed on a temporary basis. Additional permanent repeaters would not be anticipated since other actions under the plan are designed to sufficiently improve NPS radio communications without the need for more repeaters. Impacts from additional permanent repeaters are, therefore, unlikely. If additional permanent repeaters are necessary in the Belly River, Nyack, or Two Medicine areas or on Mt. Brown, they would likely be primarily visible from upper elevation areas and surrounding peaks, and less visible from lower elevations, especially in tree-dominated areas. Infrastructure in the Belly River and Nyack areas would likely be the least visible since these areas are relatively densely forested. Infrastructure installed in the Two Medicine area would be more visible due

to less heavily forested terrain. Infrastructure on Mt. Brown would likely be the most visible due to the elevation of the summit and its visual prominence from surrounding areas. Impacts to undeveloped visual resources would be apparent locally and within areas of visibility around the sites but, given the amount of undeveloped terrain in the park, would not substantially change the overall visual character of Glacier's undeveloped scenic landscape, and the vast majority of the park's undeveloped visual resources would remain unaffected.

Impacts from commercial telecommunications infrastructure

At the Many Glacier, Two Medicine, Rising Sun, and Lake McDonald Lodge developed areas, where the park would allow commercially provided cellular and Internet connectivity (Programmatic Action No. 8, Section II), conditions and parameters established under Alternative A would ensure commercial infrastructure and equipment, if approved, would only be peripherally apparent in the context of existing development (if noticeable at all, in some cases). Therefore, existing resources and values would continue to define the visual character of each area.

Impacts from Alternative B (No Action) to Visual Resources

Under Alternative B, without a comprehensive and integrated plan for upgrading or improving NPS telecommunications, the result would be a case-by-case approach to the park's large-scale need for improved telecommunications. Such an approach could miss opportunities to co-locate multiple NPS systems at single sites and to streamline or minimize the amount of equipment at each site. Over time, this could result in the installation of more infrastructure and equipment at more locations than proposed under Alternative A, including in undeveloped areas, and additional vertical infrastructure (equipment poles, masts, and towers) at sites where none now exists. The effect can also be described as "technology creep." The park would continue to manage NPS telecommunications infrastructure in accordance with NPS policy and in a way that minimizes impacts to park resources as much as possible. But without an integrated plan that aims in advance to achieve widely applicable solutions with the least amount of infrastructure and equipment in as few locations as possible, the potential for more infrastructure in more locations would increase over time, thus increasing the potential for adverse impacts to visual resources. Alternative B would also not establish advance guidance on the placement, amount, size, and type of commercial infrastructure and equipment. As a result, commercial infrastructure could, over time, be located in more areas than those identified under Alternative A, lack consistent limits on size and visibility, and potentially include more equipment. Actions that would not be permitted under Alternative A, such as installing commercial towers taller than 80 feet, would have an increased chance of occurrence because limitations would not be established in advance.

Cumulative Impacts to Visual Resources

Past, present, and reasonably foreseeable actions with impacts to visual resources in the park include existing NPS telecommunications infrastructure (summarized at the beginning of Chapter 2), satellite dishes in employee housing areas (for residential use), non-NPS telecommunications infrastructure (such as CenturyLink dishes on the St. Mary tower, a Glacier National Park Conservancy satellite dish under the roof eave of the Logan Pass Visitor Center, and telecommunications equipment belonging to other federal, state, and local agencies), and other administrative installations (e.g. weather stations and scientific monitoring or resource management equipment, such as fish passage barriers), all of which involve visible infrastructure or equipment. Most of this infrastructure or equipment is located in developed areas, where it does not notably detract from existing visual character. Others, including some scientific monitoring installations and three radio repeater sites, are in undeveloped areas where they are more visually apparent and, thus, out of context with site-specific visual character. Collectively, all of these actions have had and/or will continue to have adverse impacts on visual resources. When the impacts of Alternative A are combined with those of past, present, and reasonably foreseeable

actions, the cumulative impacts to visual resources would continue to be adverse, with other actions contributing the majority of the impacts. Therefore, the incremental impacts of Alternative A would contribute slightly to, but would not substantially change the impacts that are already occurring.

When the impacts of Alternative B are combined with those of past, present, and reasonably foreseeable actions, the cumulative impacts to visual resources would continue to be adverse, with other actions and Alternative B potentially contributing in equal measure to the impacts. The potentially widespread and numerous impacts from Alternative B could notably increase the amount of impacts that are already occurring.

Conclusion for Impacts to Visual Resources

The majority of impacts under Alternative A would not appreciably change existing visual conditions because they would occur at sites where NPS telecommunications equipment is already present (Table 3) or where they would not be out of context with existing development. GIS-based viewshed modeling and vegetation data show little increase in the visibility of the new towers (Table 4). Visual impacts would be of greater intensity at Looking Glass Hill and Elk Mountain since repeaters would be out of context with the undeveloped visual character of these sites. Impacts at Looking Glass Hill would be temporary until the radio repeater can be moved outside the park. Repeater infrastructure at Elk Mountain (which may not be installed) may not be discernable at times due to the visual dominance of the surrounding landscape. Impacts from SOA repeaters would be temporary and of low intensity because the equipment is small in scale and the repeaters would be installed on a temporary basis. Impacts from three additional permanent repeaters in undeveloped areas would be similar to those for the repeater at Elk Mountain, with higher visibility in less heavily forested areas. Conditions and parameters would minimize the visibility of commercial infrastructure and equipment, if approved, such that existing visual resources and values would continue to define visual character. Cumulatively, Alternative A would contribute to but would not notably change the level of adverse impacts from past, present, and reasonably foreseeable actions.

Under Alternative B, impacts to visual resources could be more widespread and of greater site-specific intensity due the potential for increases in the amount and size of visible infrastructure and equipment for both NPS improvements and commercial connectivity. Cumulatively, Alternative B could potentially increase adverse impacts from past, present, and reasonably foreseeable actions.

Historic Districts

Affected Environment

The National Register of Historic Places (NRHP) defines a historic district as a geographically definable area with buildings, sites, structures, or objects “united by past events or aesthetically by plan or physical development,” or separate elements “linked by association or history” (36 CFR §60.3). There are over 40 historic districts in Glacier National Park, including those listed as such in the NRHP and others that have been recommended or are eligible for consideration. Project sites for the Comprehensive Telecommunications Plan are associated with ten historic districts listed on the NRHP, five properties that are recommended for listing as historic districts, two properties that have not been evaluated but are treated as eligible for listing (per NPS policy until they can be evaluated), and four of the park’s six National Historic Landmarks (NHL). NHLs are historic properties that represent an outstanding aspect of United States history and culture (NPS 2021). Table 5 lists these properties and the project site(s) and actions proposed under the plan within or near each property (as described in Chapter 2).

Table 5: Historic properties that are within or near project sites where actions are proposed under the Telecommunications Plan, including districts listed on the National Register of Historic Places (NRHP), National Historic Landmarks (NHLs), properties recommended for listing on the NRHP as historic districts, and properties that have not been evaluated but are treated as eligible for listing in accordance with NPS policy.

Historic Properties	Project Site and Proposed Action(s) (as described in Chapter 2 of the EA)
<u>Historic Districts listed on the NRHP</u>	
Swiftcurrent (Many Glacier) Ranger Station Historic District	Many Glacier Ranger Station Action #1 under Section I Action #8 under Section II
Sherburne Ranger Station Historic District	Many Glacier Entrance Station Action #1 under Section I
Many Glacier Hotel Historic District	Many Glacier developed area Action #8 under Section II
Swiftcurrent Auto Camp Historic District (Swiftcurrent Motor Inn)	Many Glacier developed area Action #8 under Section II
Rising Sun Auto Camp Historic District	Rising Sun developed area Action #8 under Section II
St. Mary Utility Area Historic District	St. Mary Ranger Station Action #4 under Section I
East Glacier Ranger Station Historic District	East Glacier Ranger Station Action #1 under Section II
Walton Ranger Station Historic District	Walton Ranger Station Action #11 under Section I
Going-to-the-Sun Road Historic District	The Loop Action #3 under Section II
Lake McDonald Lodge Historic District	Lake McDonald Lodge developed area Action #8 under Section II
<u>National Historic Landmarks (NHLs)</u>	
Many Glacier Hotel	Many Glacier developed area Action #8 under Section II
Two Medicine General Store (camp store)	Two Medicine developed area Action #8 under Section II
Going-to-the-Sun Road	The Loop Action #3 under Section II
Lake McDonald Lodge	Lake McDonald Lodge developed area Action #8 under Section II
<u>Recommended for listing on the NRHP</u>	
Many Glacier Campground	Many Glacier developed area Action #8 under Section II
Rising Sun Campground	Rising Sun developed area Action #8 under Section II
Two Medicine Campground	Two Medicine developed area Action #8 under Section II
Glacier Route 2 (Two Medicine Road)	Two Medicine Entrance Station Action #2 under Section I
Glacier Route 3 (Many Glacier Road)	Many Glacier Entrance Station Action #1 under Section I
<u>Unevaluated, treated as eligible</u>	
Goat Haunt Ranger Station	Goat Haunt Ranger Station Action #9 under Section I
Two Medicine Ranger Station	Two Medicine developed area Action #8 under Section II

The Swiftcurrent (Many Glacier) Ranger Station Historic District includes 12 buildings, including the ranger station, cabins, woodsheds, fire cache, trails office, and support buildings. The site plans and modest, Swiss chalet-inspired architecture were designed to complement the nearby Many Glacier Lodge. Built in 1938 to replace the ranger station lost in a wildfire, the district represents an important park administrative site from the 1920s and 30s when the Many Glacier Valley was (as it is today) one of the most popular destinations in the park (Historical Research Associates 1984a).

The Sherburne Ranger Station Historic District includes six buildings, including the entrance checking station, mess hall, barn, garage/woodshed, and ranger cabin, constructed between 1925-19396. The buildings are representative of typical NPS rustic design and construction, combining log, fieldstone, and rough-hewn lumber, and the complex represents an important administrative site (Historical Research Associates 1984b).

The Many Glacier Hotel was constructed in 1914-15 and designated an NHL in 1987 as one of the remaining Great Northern Railway Buildings within the park. As with other Swiss chalet style buildings in the park, the buildings in the Many Glacier Hotel Historic District are a composite of Swiss massing, roof patterns and exterior design elements with the typical materials of American rustic style, i.e. field stone, logs, and timber components. The district includes nine buildings and structures: the Many Glacier Hotel, two dormitories, and several concessions, utility, and support buildings. Other historic structures in the district include the bridge overpasses and an access road near the hotel. The Many Glacier Hotel was the original terminus for the Many Glacier Road and, at one time, the sole concessioner operation providing overnight accommodations in Many Glacier (NPS 1975).

The Swiftcurrent Auto Camp Historic District includes 45 buildings. Among these are a general store/coffee shop and numerous guest cabins grouped in six circular configurations with connecting paths. The district reflects changing trends in recreation infrastructure in response to the rise of auto tourism, and NPS efforts to meet the evolving needs of the travelling American public through the establishment of automobile camps in the 1920s, 30s, and 40s. Accordingly, the district features a mix of rustic, log construction with more economical wood-framed buildings, reflecting the intent to provide services to visitors on a modest budget (Historical Research Associates 1995a).

The Rising Sun Auto Camp Historic District consists of 24 buildings, including a general store/coffee shop, two dormitories and other support buildings, and small, rustic-style guest cabins concentrated in an irregular configuration along natural topographical lines. The facilities were constructed by the Glacier Park Hotel Company in 1940-41 in response to the increasing number of auto tourists who wanted more modest, less expensive accommodations and reasonably priced meals (Historical Research Associates 1995b).

The St. Mary Utility Area Historic District has 11 buildings, including a dormitory, residence, blacksmith shop, gas and oil house, sheds, and a number of support structures. Buildings in the complex are representative of both NPS rustic and Mission 66 design, a more streamlined, modernist style common during the 1950s and 1960s in national park architecture. The district represents the establishment of more housing and maintenance infrastructure on the east side of the park in response to increased automobile traffic and visitation between 1933-1945, including the completion of the Going-to-the-Sun Road. The site is also associated with the New Deal Civilian Conservation Corps (CCC) development (Historical Research Associates 1995c).

The East Glacier Ranger Station Historic District consists of nine buildings, including the ranger station/residence, other residential buildings, garages, and utility and support buildings. The district characterizes the simple design of NPS administrative and maintenance buildings from the 1920s-30s and is one of two ranger station complexes in the park featuring total frame construction. Prior to the

construction of Highway 2 and the Going-to-the-Sun Road, the East Glacier Ranger Station was the main administrative site for the east side of the park (Historical Research Associates 1984c).

The Walton Ranger Station Historic District consists of four buildings, including the ranger station/residence, barn, and support buildings, and represents NPS rustic design. The ranger station was constructed in 1932 to replace the old Paola Ranger Station (six miles downriver) and to locate a ranger station near the newly constructed Roosevelt Highway (Highway 2) (Historical Research Associates 1984d).

The Going-to-the-Sun Road was officially opened in 1933 and designated an NHL in 1997. In addition to the road itself, there are 15 structures that comprise the Going-to-the-Sun Road Historic District, including bridges, tunnels, culverts, and other features. The Going-to-the-Sun Road is significant for its engineering and landscape and represents a pioneering federal attempt to design and construct an automobile road that harmonized with its environment and showcased its natural surroundings. The Loop, where action is proposed under the telecommunications plan (Action No. 3, Section II in Chapter 2), is the road's largest switchback, above which the road climbs through steep alpine terrain. A non-historic, accessible comfort station, constructed in 2005, is located about 375 feet below the Loop switchback and is accessed from the accessible Loop parking via a concrete walkway (NPS 1996).

The Lake McDonald Lodge Historic District consists of 57 buildings, including the Swiss chalet style Lake McDonald Lodge and numerous other log and frame structures. In addition to the lodge, buildings include several cabins and outbuildings, the Garden Court, Cobb House and Snyder Hall Dormitories, the Neitzling Cabin, the General Store, the Recreation Hall, and the Boatmen's Residence. Designed by a NPS landscape architect, the boulevard serves as the main entry from the Going-to-the-Sun Road and is a notable landscape feature. The lodge was designated an NHL for its architectural significance in 1987 and is the centerpiece of the district, which is one of the earliest established developments in the park (NPS 1976).

The Many Glacier, Rising Sun, and Two Medicine Campgrounds are recommended for listing in the NRHP as historic districts. All three campgrounds include rustic-style, single-story campender's cabins, which together with the campgrounds, represent developments that were established to meet the increasing trend in automobile tourism and auto camping in the 1930s and 40s (Historical Research Associates 1995d-f).

Glacier Route 2 (the Two Medicine Road) and Glacier Route 3 (the Many Glacier Road) are recommended for listing in the NRHP as historic districts. Glacier Route 2 is associated with the Two Medicine Entrance Station and has four structures (the road itself, a road remnant, and two bridges) and two buildings (the entrance station and office) that contribute to its historic significance. Glacier Route 3 has four structures (the road itself, a masonry box culvert, and two bridges) and four buildings (Sherburne Road Camp cookhouse, mess house, and outhouse, and a gaging station) that contribute to its historic significance (NPS files).

The Goat Haunt Ranger Station has not been evaluated for eligibility for listing as a historic district but, in accordance with NPS policy, is treated as eligible until it can be evaluated. The Goat Haunt Ranger Station developed site includes the Peace Park Pavilion, Snowflake viewing platform, ranger station, apartment, dormitory, utility and outbuildings and connecting paths. A barn and corral are located a quarter mile south of the ranger station. The area is significant for its history as a backcountry outpost prior to the establishment of the park, and as a stopover for horse tours and passengers on Waterton-based vessels. The development of the area in the mid-1960s has architectural ties to buildings and structures in Waterton Townsite designed to emphasize the International Peace Park connections (NPS files and Historical Research Associates 1995g).

The Two Medicine Ranger Station also has not been evaluated for eligibility for listing as a historic district but is treated as eligible in accordance with NPS policy. Pre-dating the mid-century reconstruction of the area, The Great Northern Railway developed a chalet complex at the foot of Two Medicine Lake. Chalet D and the Two Medicine General Store are the two remaining buildings from this time. The General Store, built in 1914, is the only remaining log-constructed Swiss chalet-style building in the park and was designated an NHL in 1987 (NPS files).

Impacts to buildings and structures in each of the historic districts listed above, as well as buildings or structures that are not part of a historic district but are associated with a project site, have been dismissed from detailed analysis (see discussion in Appendix D, Issues and Impact Topics Dismissed from Detailed Analysis).

Environmental Consequences

Impacts from Alternative A (Proposed Action and Preferred Alternative) to Historic Districts

Impacts from improvements to NPS telecommunications systems

At the Swiftcurrent Ranger Station Historic District (Many Glacier Ranger Station, Action No. 1, Section I) and Sherburne Ranger Station Historic District (Many Glacier Entrance Station, Action No. 1, Section I), the new towers and equipment would increase visibility of telecommunications equipment and add non-historic elements to historic settings but would not appreciably change existing conditions since telecommunications equipment is already present in both historic districts. The new tower and equipment would not be visible from most vantage points within the Swiftcurrent Ranger Station historic district due to screening from trees and because the tower would be in a new, less visible location. At the entrance station, removing 15 to 20 trees would remove screening and increase visibility of the new tower not only from the entrance station but also from the Many Glacier Road, thus impacting both the Sherburne Ranger Station Historic District and Glacier Route 3. The impact would only be detectable along the relatively short portion of road (estimated approximately 250 meters) that passes through the entrance station, and the rest of the road would be not be affected.

At the Two Medicine Entrance Station, mounting a microwave dish onto the existing equipment pole (Action No. 2, Section I) would add a non-historic element that would be visible from the Glacier Route 2 (the Two Medicine Road). As with Glacier Route 3, the impact would only be noticed from the road segment (estimated approximately 140 meters) that passes through the entrance station, leaving the remainder of the road unaffected.

Mounting two more antennas onto the existing 80-foot tower within the St. Mary Utility Area Historic District (Action No. 4, Section I) and a microwave dish and additional antenna to the tower in the East Glacier Ranger Station Historic District (Programmatic Action No. 1, Section II) would also add non-historic elements to these two historic settings. The impacts would be negligible since telecommunications infrastructure and equipment is already present in both districts. The antennas and dish may not be noticeable at St. Mary due to the size of the tower and the amount of existing equipment and, at East Glacier, visibility of the equipment would continue to be blocked by the barn and nearby trees.

The Goat Haunt Ranger Station (Action No. 9, Section I) is not listed as a historic district but is unevaluated and so must be treated as eligible in accordance with NPS policy. The proposed tower site at Goat Haunt is some distance from the ranger station (approximately 290 meters) and screening from trees would block visibility of the new tower from the ranger station. Therefore, there would be no impacts to the ranger station or its potential eligibility for listing as a historic district.

Mounting a 30-foot mast (for a radio repeater) to the roof of the comfort station at the Loop (Action No. 3, Section II) would add a visible non-historic element to the Going-to-the-Sun Road Historic District and NHL. The mast would not be expected to appreciably change existing conditions, however, since non-historic elements are already present, including the comfort station and signage. The mast would not alter any features that make the Going-to-the-Sun Road eligible for listing with the NRHP or undermine its designation as an NHL.

Similarly, if additional permanent repeaters or temporary SOA repeaters (Programmatic Actions No. 6 and 7, Section II) are placed in historic districts, they would be non-historic elements in historic settings. Impacts to historic districts from SOA repeaters would likely be negligible because the assemblies are typically self-supporting (i.e. they would not need to be affixed to any historic structures) and would be painted or otherwise disguised to blend with surroundings, and they would be temporary. Permanent repeaters would also be disguised to blend with surroundings as feasible, but impacts would be of longer duration because the repeaters would be permanent (or long term) and may need to be mounted to existing infrastructure. SOA and permanent repeaters may or may not cause appreciable changes to existing conditions, depending on their visibility and the presence of other non-historic elements, including telecommunications infrastructure and equipment.

Impacts from commercial telecommunications infrastructure

The Many Glacier Hotel, Swiftcurrent Auto Camp, Rising Sun Auto Camp, and Lake McDonald Lodge Historic Districts are associated with the four developed areas where the park would consider commercially provided cellular or Internet connectivity (at Many Glacier, Two Medicine, Rising Sun, and Lake McDonald Lodge developed areas; Programmatic Action No. 8, Section II). Other historic properties associated with these developed areas include the Many Glacier, Rising Sun, and Two Medicine Campgrounds, which are recommended for listing as historic districts on the NRHP, and the Two Medicine Ranger Station, which is unevaluated but treated as eligible in accordance with NPS policy. The area of potential effect includes three NHLs, the Many Glacier Hotel, Lake McDonald Lodge, and Two Medicine General Store (Table 5). Any installation of commercial infrastructure and equipment within or in proximity to historic districts or properties would add non-historic elements to historic settings. However, conditions and parameters established under Alternative A would minimize the visibility of commercial infrastructure and equipment through requirements on size, type, amount, and placement (Table 2). The conditions and parameters would include disguising the infrastructure and equipment to blend with surroundings, which, among other stipulations, would ensure that historic properties would retain their rustic character and appearance, and their architectural and historical significance would not be affected.

Effects to landscape qualities at historic districts are not anticipated. With the exception of tree thinning at the Many Glacier Entrance Station (Sherburne Ranger Station Historic District) and Chief Mountain POE and the possible removal of a single tree from the Two Medicine Entrance Station, landscape features would not be altered or removed from project sites. Given the forested character of the sites from which trees would be removed, tree-thinning would not substantially, or perhaps even noticeably, alter the existing visual character of associated landscapes. Screening from trees and other vegetation at each project site would continue to mask and, thus, minimize the visibility of telecommunications infrastructure and equipment, and natural and cultural features (such as mountains, lakes, and historic buildings) would continue to have visual dominance in the immediate area.

The impacts to historic districts described in this section would be small in scale and intensity because there would be no removal or alteration of historic or contributing structures, elements, or features and, except for changes in vegetative screening described above for the Sherburne Ranger Station Historic District (Many Glacier Entrance Station) and Glacier Route 3 (Many Glacier Road), existing vegetation

would continue to provide visual screening of telecommunications infrastructure and equipment. Mitigation measures and conditions and parameters would minimize the visibility of infrastructure and equipment (both NPS and commercial) by disguising it (e.g. painting) to blend with surroundings, using the least visible type of technologies, and locating infrastructure and equipment where it would be least visible. As a result, historic districts and properties that are recommended or unevaluated but eligible for listing on the NRHP would retain their overall rustic character and appearance. There would be no degradation of the architectural and historical features that contribute to the historic districts' integrity or significance, no alteration of elements that make the properties eligible (or potentially eligible) for listing with the NHRP, and no changes that would undermine NHL designations. Therefore, the park anticipates a determination of "historic properties affected, no adverse effect" under Section 106 of the National Historic Preservation Act (NHPA). Upon further design, consultation with the Montana State Historic Preservation Office (SHPO) would be initiated and any adverse impacts would be mitigated in consultation with the SHPO. In the event of a determination of "adverse effect" under Section 106, additional analysis and compliance would be completed.

Impacts from Alternative B (No Action) to Historic Districts

Without a comprehensive approach that aims to achieve widely applicable solutions with the least amount of infrastructure and equipment possible, Alternative B could miss opportunities to co-locate multiple NPS systems at single sites and to streamline or minimize the amount of equipment at each site. The park would continue to manage NPS telecommunications infrastructure in accordance with NPS policy and in a way that minimizes impacts to historic districts as much as possible. But without a plan, NPS telecommunications infrastructure and equipment could, over time, be installed at more locations, including historic districts or other historic properties (e.g. properties that are not listed but eligible) than proposed under Alternative A, and could result in more equipment at some sites. Also, because Alternative B would also not establish advance guidance on the placement, amount, size, and type of commercial telecommunications infrastructure and equipment, commercial infrastructure could, over time, be located in more historic districts than identified under Alternative A and potentially include more equipment. Actions that would not be permitted under Alternative A, such as installing towers taller than 80 feet, would have an increased chance of occurring because limitations would not be established in advance.

Cumulative Impacts to Historic Districts

Past, present, and reasonably foreseeable actions with impacts to historic districts in the park include existing NPS telecommunications infrastructure (summarized at the beginning of Chapter 2), satellite dishes in employee housing areas (for residential use), non-NPS telecommunications infrastructure (such as CenturyLink dishes on the St. Mary tower, a Glacier National Park Conservancy satellite dish under the roof eave of the Logan Pass Visitor Center, and telecommunications equipment belonging to other federal, state, and local agencies), rehabilitation of the Going-to-the-Sun Road (including utility work and installation of fiber optic cable), Many Glacier Road, and Camas Road; bridge preservation in the North Fork and Many Glacier; replacement of the upper McDonald Creek bridge; and construction on Highways 2 and 89, outside the park. Collectively, these actions have impacted and would continue to impact historic districts from the alteration or removal of features or elements of historic settings or environments and the addition of non-historic features or elements to a historic setting, but have not affected eligibility or potential eligibility for listing with the NHRP. When the impacts of Alternative A are combined with those of past, present, and reasonably foreseeable actions, the incremental impacts of Alternative A would contribute slightly to but would not substantially change impacts that area already occurring.

When the impacts of Alternative B are combined with those of past, present, and reasonably foreseeable actions, impacts to historic districts would be adverse, with other actions and Alternative B potentially contributing in equal measure. The potentially more widespread and numerous impacts from Alternative B could increase the number and degree of existing impacts.

Conclusion for Impacts to Historic Districts

Under Alternative A, the addition of telecommunications infrastructure and equipment to historic districts would add non-historic elements to historic settings. The scale and intensity of the impact would be small, however, because there would be no removal or alteration of historic or contributing structures, elements, or features; mitigation measures and conditions and parameters would be in place to minimize the visibility of infrastructure and equipment; and, except for the Sherburne Ranger Station Historic District and Glacier Route 3, existing vegetation would continue to provide visual screening. Historic districts would retain their overall rustic character and appearance, and there would be no degradation of the architectural and historical features that contribute to the historic districts' significance, no alteration of elements that make the properties eligible (or potentially eligible) for listing with the NHRP, and no changes that would undermine NHL designations. Cumulatively, Alternative A would contribute to but would not notably change the number and degree of impacts from past, present, and reasonably foreseeable actions. The park anticipates a determination of "historic properties affected, no adverse effect" under Section 106 of the National Historic Preservation Act (NHPA).

Under Alternative B, impacts to historic districts could be more widespread and of greater site-specific intensity due the potential for increases in the amount and size of visible infrastructure and equipment for both NPS improvements and commercial connectivity. Cumulatively, Alternative B could potentially increase adverse impacts from past, present, and reasonably foreseeable actions.

Recommended Wilderness

Affected Environment

In 1973, Glacier completed a wilderness study and environmental impact statement (EIS) to comply with the 1964 Wilderness Act. The Wilderness Study/EIS identified 927,550 acres in Glacier (over 90 percent of the park) for Wilderness designation (NPS 1974) and resulted in a recommendation of same by the President of the United States to both houses of Congress. Congress has not enacted legislation to formally designate Glacier's wilderness recommendation. But pursuant to NPS Management Policies (2006), Glacier manages recommended wilderness to ensure that wilderness character is preserved, and will take no action that would diminish the wilderness eligibility of any area possessing wilderness characteristics until the legislative process of wilderness designation has been completed.

The defining qualities of wilderness from the Wilderness Act [Section 2(c)] include *untrammelled*, or "affected primarily by the forces of nature"; *undeveloped*, or "without permanent improvements or human habitation"; *natural*, whereby the land is "protected and managed so as to preserve its natural condition"; *outstanding opportunities for solitude or a primitive and unconfined type of recreation*; and *other features of value*, including scientific, educational, scenic, or historical. Wilderness is managed according to these five different qualities of wilderness character.

Glacier's recommended wilderness has retained its intrinsically wild character and persists in an essentially natural condition. Park visitors are encouraged to practice principles of "Leave No Trace" outdoor ethics in order to minimize impacts to the resource. Recommended wilderness in the park is a largely untrammelled, unmanipulated landscape, but some aspects of the biophysical environment are managed to protect other park resources (management actions to protect native fish and wildlife, for

example). Glacier's recommended wilderness provides numerous, outstanding opportunities for solitude and primitive or unconfined recreation, among which hiking and backcountry camping are some of the most popular. The wilderness resource in the park also possesses geological features of value based on a 1.6 billion-year geologic history, and historical features of value from a human history that spans over 10,000 years. The park is in the early stages of identifying certain viewsheds within recommended wilderness as scenic features of value. The vast majority of Glacier's recommended wilderness is undeveloped despite the use of motorized equipment (such as chainsaws) and helicopters as necessary for administrative activities, and the presence of historic, administrative, and scientific structures and installations, including NPS radio repeaters at three locations (including the temporary radio repeater at Looking Glass Hill in the Two Medicine area).

For this telecommunications plan, action is proposed in recommended wilderness at one site (Looking Glass Hill) and potentially at one contingency site (Elk Mountain in the Autumn Creek area) (Actions No. 3 and 5, Section I). Both sites are untrammeled, both retain their natural condition, and both are in areas where recreationists may seek solitude and primitive or unconfined recreation. Neither site has yet been specifically identified a scenic feature of value. The Elk Mountain site is undeveloped but for a remnant foundation from a historic lookout. The Looking Glass Hill site is undeveloped except for a radio repeater with a job-box, 10-foot equipment mast, antenna, and two solar panels, which the park installed on a temporary basis in 2016. That infrastructure remains onsite at this time, resulting in site-specific adverse impacts to the undeveloped quality of recommended wilderness. Other locations in recommended wilderness could be identified in the future as sites for temporary scene-of-action (SOA) radio repeaters or, while not anticipated, additional permanent radio repeaters (Programmatic Actions No. 6 and 7, Section II), most likely in the Belly River, Nyack, or Two Medicine areas, or on Mt. Brown. In general, these areas are undeveloped except for historic structures and administrative facilities, for example (e.g. backcountry campgrounds, a lookout on Mt. Brown, etc.), and untrammeled, they retain their natural condition and provide opportunities for solitude and primitive recreation, and may have other features of value depending on the site.

Environmental Consequences

Impacts from Alternative A (Proposed Action and Preferred Alternative) to Recommended Wilderness

Impacts from improvements to NPS telecommunications systems

The installation of repeaters at Looking Glass Hill (Action No. 3, Section I) and Elk Mountain (Action No. 5, Section I) would adversely impact the undeveloped quality of recommended wilderness and opportunities for solitude because the repeater infrastructure would be signs of improvement and human habituation and would be visibly apparent to backcountry recreationists, depending on the vantage point. The visibility of the infrastructure would also impact scenic features of value if the sites are later identified as such.

At Looking Glass Hill, these impacts would be a continuation of impacts from existing repeater infrastructure that the park installed on a temporary basis in 2016. The upgraded infrastructure may be more evident, especially in close proximity, due to the somewhat larger size of the shelter and taller mast, but would not represent a substantial change from existing conditions. There would also not be an appreciable change in the amount of area over which impacts would be detectable since, within recommended wilderness, modeling indicates an increase in visibility of the taller mast of only about 0.2 square kilometers (inside the recommended wilderness boundary, the existing mast is visible from approximately 16.7 square kilometers and the taller mast would be visible from approximately 16.9 square kilometers; approximately 94% of the increase in visibility discussed in impacts to visual resources would occur outside the park). Viewshed modeling does not indicate a notable increase in

visibility of the taller mast from nearby park trails, including the Mt. Henry Trail, from which the existing mast is sporadically visible, and the Dry Fork Trail, which is in a tree-dominated area. Modeling suggests only a fraction of increased visibility from off-trail areas inside the park. Impacts to wilderness character at Looking Glass Hill would be temporary, ending once the repeater and associated infrastructure can be moved to a site outside the park (Programmatic Action No. 2, Section II).

At Elk Mountain, a repeater would only be installed if other actions do not sufficiently improve radio communications along the park's southern border. Viewshed modeling and vegetation data show that, if installed, the mast would be visible from about 17.4 square kilometers within recommended wilderness, including the Elk Mountain Trail near the approach to the summit and the summits of Mt. Shields (including the false summit), Little Dog Mountain, and Brave Dog Mountain, which are popular with backcountry recreationists. The mast would be less apparent from lower elevations due to screening from forested areas but would be sporadically visible along the Ole Creek and Autumn Creek Trails. Impacts from a repeater on Elk Mountain would be long-term since the infrastructure could be onsite indefinitely. Impacts would degrade wilderness character at the site and to the extent that the infrastructure is visible from a distance, but impacts would not meaningfully affect wilderness character in the park as a whole. This is because visibility of the mast from approximately 17.4 square kilometers would affect less than 0.5 percent of the more than 3,753.6 square kilometers of recommended wilderness in the park. The visibility of the shelter and mast would vary with changing atmospheric conditions and, at times, the infrastructure may not be apparent given the scale and visual dominance of the surrounding landscape. Impacts at Elk Mountain would not be irretrievable since the shelter would not require a foundation and, therefore, could be removed without lasting evidence.

Impacts from up to three additional permanent repeaters would be similar to those described for Elk Mountain. As with Elk Mountain, if additional repeaters are installed in the Belly River, Nyack, or Two Medicine areas, or on Mt. Brown, the infrastructure would adversely impact the undeveloped quality, opportunities for solitude, and potentially scenic features of value (if identified) at each site. While the actual area of impact is not known (since this is a programmatic action and the specific locations of the repeaters are not identified), based on the effects from three other repeater sites in recommended wilderness (including Looking Glass Hill), the infrastructure would likely only be apparent from a small percentage of the more than 3,753.6 square kilometers of recommended wilderness in the park. Therefore, impacts would not affect wilderness character in the park as a whole. Also, as with Elk Mountain, impacts from additional permanent repeaters would likely not be irretrievable because the installations would not be expected to require a foundation and, therefore, could be removed. As installations (i.e. signs of improvement or human habituation), SOA repeaters would also adversely impact the undeveloped quality of recommended wilderness and opportunities for solitude. But adverse impacts from SOA repeaters would be negligible because they would not be easily seen from a distance due to their small size and they would only be installed on a temporary basis (i.e. they would be removed when no longer needed).

Helicopter long-line sling load deliveries to transport equipment to repeater sites would adversely impact the undeveloped quality of recommended wilderness because helicopter use would be in conflict with the absence of mechanization that is part of the core definition of wilderness. Noise modeling indicates that noise from helicopters would attenuate to natural ambient sound levels between approximately 3.4 and 7.3 kilometers from the landing zones for both Looking Glass Hill and Elk Mountain, depending on the model of helicopter (see analysis of impacts to natural soundscapes, below). Because it would be audible to backcountry recreationists, helicopter noise would adversely impact opportunities for solitude. The noise would also adversely impact the natural condition of wilderness character because it would degrade natural soundscapes and could disturb or displace

wildlife (see analysis of impacts to natural soundscapes, grizzly bears, Canada lynx, and wolverine, and discussion for wildlife in Appendix D, Impact Topics Considered but Dismissed from Detailed Analysis). The majority of impact from helicopter noise would be punctuated and of short duration, occurring intermittently over an estimated one-day period during sling load deliveries for initial installation (with each delivery lasting for an estimated five minutes). The impact would cease once sling load operations are complete, except for infrequent adverse impacts from any subsequent flights that may be necessary to replace equipment that cannot be hiked in on foot or with livestock (possibly requiring a single helicopter flight every four or five years). Additional flights to replace equipment may not be necessary at Looking Glass Hill, depending on when the repeater infrastructure is moved outside the park.

Impacts from the upgrade at Looking Glass Hill and the periodic installation of SOA repeaters, including impacts from associated helicopter flights, would likely be the extent of impacts to recommended wilderness from improvements to NPS telecommunications systems under Alternative A, given the low likelihood of a repeater at Elk Mountain and the even lower chance that the park would need to install up to three additional permanent repeaters elsewhere. If, however, under a worst-case scenario, repeaters were also installed at Elk Mountain and/or three other sites (possibly in the Belly River, Nyack, or Two Medicine areas, or on Mt. Brown), the vast majority of recommended wilderness in the park would still retain its undeveloped character, natural condition, opportunities for solitude, and scenic value. This is because impacts would be site-specific and affect a relatively small percentage of recommended wilderness in the park, impacts would likely not be irretrievable, impacts at Looking Glass Hill and from SOA repeaters would be temporary, and impacts from helicopter flights would end once sling-load operations are complete except possibly during infrequent flights every few years to replace equipment. There would be no effects to the untrammeled quality of wilderness character because there would be no intentional manipulation of the biophysical environment.

Impacts from commercial telecommunications infrastructure

If commercial cellular and/or Internet connectivity is provided at the Many Glacier, Two Medicine, Rising Sun, and Lake McDonald Lodge developed areas (Programmatic Action No. 8, Section II), any adverse impacts would be slight because conditions and parameters established in the plan would require commercial providers to minimize signal spillover into recommended wilderness (Table 2). The chance of any appreciable amount of signal spillover would also be low because the majority of area within the identified coverage zones (Figure 8) is too far from the 1974 recommended wilderness boundary for spillover to be likely. If there is spillover, it would probably occur where coverage zones are nearest the recommended wilderness boundary. Nearest points include the west edge of the Swiftcurrent developed area, north edge of the Rising Sun developed area, northwest end of the Two Medicine developed area, and east edge of the Lake McDonald Lodge developed area, which are approximately 30, 90, 85, and 500 meters, respectively, from the recommended wilderness boundary. While any inadvertent signal spillover could adversely impact opportunities for solitude if backcountry recreationists are able to detect ringtones or other people in conversation on their phones, for example, the effects would occur over too small an area (e.g. spillover would not be expected to extend more than 50 meters beyond the boundary) to cause meaningful impacts, given the amount of recommended wilderness in the park and outside the coverage zones that would remain unaffected.

Minimum Requirements Analysis for Activities in Recommended Wilderness

Because Alternative A of the park's telecommunications plan would affect wilderness character and includes uses prohibited under Section 4(c) of the Wilderness Act (installations and helicopter landings) within recommended wilderness, a minimum requirements analysis (MRA) is required by NPS policy (NPS Management Policies, 6.3.5). Due to the programmatic nature of actions that would occur in recommended wilderness, a programmatic MRA would be prepared and, in accordance with current

NPS guidance, appended to the decision document for this EA. If review prior to project implementation identifies impacts that exceed those identified in the programmatic MRA, another MRA would be prepared. Project review would consistently look for ways to complete projects under the plan without helicopter landings or in such a way as to minimize adverse impacts to wilderness resources as much as possible.

Impacts from Alternative B (No Action) to Recommended Wilderness

Continuing to improve NPS telecommunications systems on a case-by-case basis, as would occur under Alternative B, could result in the placement of more radio repeaters in recommended wilderness than would occur under Alternative A. This is because improvements to radio systems would be made as the need arises, without overall planning and guidance. Given that the safety of NPS personnel and visitors depends heavily on radio communications, problems with radio communications may need to be addressed fairly quickly, potentially missing opportunities to achieve widely applicable solutions with the least amount of equipment in as few locations as possible. More repeaters could be placed in recommended wilderness on a temporary basis until other solutions are available, which could take years or be prolonged indefinitely, or temporary repeaters could in effect become permanent. There would also be an increased chance for other NPS telecommunications infrastructure and equipment (i.e. not specific to the radio system) to be installed in recommended wilderness. The park would continue to manage NPS telecommunications infrastructure in accordance with NPS policy and in a way that minimizes impacts to recommended wilderness as much as possible. But the absence of an overall plan that addresses telecommunications issues in advance and thoughtfully considers proposals based outside of recommended wilderness (as is proposed under Alternative A) would increase the chance that greater amounts of infrastructure would be installed in recommended wilderness over time. Alternative B would also not provide comprehensive guidance as to the placement, type, size, and amount of commercial infrastructure and equipment. As a result, commercial infrastructure could, over time, be located in more areas than those identified under Alternative A and effects such as increased signal spillover into recommended wilderness would have a greater chance of occurrence.

Cumulative Impacts to Recommended Wilderness

Past, present, and reasonably foreseeable actions with impacts to recommended wilderness include installations of NPS radio repeater infrastructure (at three sites in recommended wilderness), non-NPS telecommunications infrastructure (such as that belonging to other federal, state, and local agencies), weather stations, and scientific monitoring and resource management equipment, including remote cameras and two fish passage barriers, all of which, as installations, impact the undeveloped quality of wilderness character and, depending on visibility, can also adversely impact opportunities for solitude and scenic features of value. Other actions include motorboat use for fisheries projects and administrative purposes, Burlington Northern Santa Fe Railway avalanche mitigation (involving charges dropped from helicopters), trail and backcountry campground maintenance, historic structure repair and maintenance, and wildland fuel reduction at historic structures. The use of motorized equipment during these actions (such as chainsaws during trail maintenance) adversely impact the undeveloped quality and, because of the noise they produce, the natural condition of wilderness character (since they degrade natural soundscapes and can disturb wildlife). Depending on audibility, equipment noise can also adversely impact opportunities for solitude. NPS administrative flights, search and rescue flights, fire management flights, and commercial air tours also adversely impact the undeveloped quality and natural condition of wilderness character, and opportunities for solitude. When the impacts of Alternative A are combined with those of past, present, and reasonably foreseeable actions, impacts to recommended wilderness would continue to be adverse, with other actions contributing the majority of the impacts. Therefore, incremental impacts under Alternative A would contribute to but not meaningfully change impacts that are already occurring.

When the impacts of Alternative B are combined with those of past, present, and reasonably foreseeable actions, impacts to recommended wilderness would be adverse, with other actions and Alternative B potentially contributing in equal measure. The potentially more widespread and numerous impacts from Alternative B could increase the number and degree of existing impacts.

Conclusion for Impacts to Recommended Wilderness

The installation of repeaters at Looking Glass Hill, Elk Mountain, and possibly three other sites, as well as SOA repeaters would adversely impact the undeveloped quality of recommended wilderness and opportunities for solitude because the infrastructure would be signs of improvement and human habituation and would be visibly apparent to backcountry recreationists. Visibility of the infrastructure would also impact scenic features of value if the sites are later identified as such. At Looking Glass Hill, impacts would not represent a substantial change from existing conditions. At Elk Mountain (where a repeater would only be installed if other actions do not improve radio communications along the park's southern border), impacts would be long-term since the infrastructure could be onsite indefinitely. Visibility of the mast at Elk Mountain would affect less than 0.5 percent of the more than 3,753.6 square kilometers of recommended wilderness in the park; therefore, impacts would not meaningfully affect wilderness character in the park as a whole, and also would not be irretrievable since the repeater infrastructure would not require a foundation and, therefore, could be removed without lasting evidence. Impacts from up to three additional permanent repeaters would also likely only be apparent from a small percentage of recommended wilderness. SOA repeaters would be removed when no longer needed and would not be easily seen from a distance due to their small size. Helicopter operations, as a mechanized use, would adversely impact the undeveloped quality; noise from helicopters would impact opportunities for solitude and the natural condition since it would disrupt natural soundscapes and could disturb wildlife. The majority of impact from helicopters would be of short duration, occurring intermittently over an estimated one-day period and ending once sling load operations are complete, except for possible infrequent flights to replace equipment (estimated as possible every four or five years). Overall, the vast majority of recommended wilderness in the park would retain its wilderness character because impacts would be site-specific and affect a relatively small percentage of recommended wilderness in the park, impacts would likely not be irretrievable, impacts at Looking Glass Hill and from SOA repeaters would be temporary, and impacts from helicopter flights would end once sling-load operations are complete (except for infrequent flights, estimated every four to five years to replace equipment). The chance of signal spillover into recommended wilderness from commercial telecommunications infrastructure in four developed areas would be low since conditions and parameters would require commercial providers to minimize spillover, and due to the distance between the identified coverage zones and the 1974 recommended wilderness boundary. Cumulatively, Alternative A would contribute to but would not meaningfully increase adverse impacts from past, present, and reasonably foreseeable actions.

Under Alternative B, continuing to improve NPS telecommunications systems on a case-by-case basis could result in the placement of more radio repeaters and other NPS telecommunications infrastructure in recommended wilderness than would occur under Alternative A. Cumulatively, Alternative B could potentially increase adverse impacts from past, present, and reasonably foreseeable actions.

Natural Soundscapes

Affected Environment

An important part of the NPS mission is to preserve the natural soundscapes of national parks. Natural soundscapes are the sounds of nature, a diminishing resource in an ever-modernizing world. Natural sounds have intrinsic value, and they predominate throughout most of the park. Glacier's natural

soundscapes are characterized by quiet and stillness intermingled with natural background sounds, such as birdsong, the hum of insects, and the sound of wind, rain, and water. Soundscapes vary across the park, depending on elevation, proximity to water, vegetative cover, topography, time of year, weather, and other influences, including proximity to roads and developed areas.

Unfamiliar, artificial noise affects natural soundscapes by masking biologically important sounds and, thus, degrading habitat, and can cause behavioral and physiological changes among wildlife. Artificial noise can also interfere with visitors' experience and sense of solitude. The effects of noise typically diminish as the distance from the source of the noise increases. Artificial noise in the park varies depending on time of year and location. The park's backcountry is primarily dominated by natural sounds, while elevated noise levels are generally concentrated in visitor service zones near campgrounds, lodges, roads, and developed areas.

In visitor service or developed areas, the sound environment includes both natural sounds and sounds from human activity. The term "natural ambient" refers to natural sound conditions in a given area, measuring only natural sounds and excluding sounds that are mechanical or otherwise caused by humans (US DOT 2009). "Existing ambient" refers to the all sounds that can be heard in a certain area, including those that are natural and those originating from human activity (US DOT 2009). Depending on the degree of development, existing ambient sound in a developed area can include people talking, noise from vehicles and traffic, and maintenance activities, such as grounds keeping (e.g. lawn mowers). Depending on the location, other sources of artificial noise may include motorboats or railroad traffic. Noise from commercial, private, and military aircraft can also be heard throughout the park.

Table 6 lists project sites for the Comprehensive Telecommunications Plan where proposed actions would cause temporary noise. The table identifies natural ambient and existing ambient sound level measurements for each area. Ten project sites are in or near developed areas and two project sites, Looking Glass Hill and Elk Mountain (a contingency site where action may or may not take place), are in the park's recommended wilderness, where natural sounds dominate. However, both sites are near park boundaries where the soundscapes are likely interrupted by noise from highways adjacent to the boundary (Looking Glass Hill is just inside the park's eastern boundary, which is adjacent to Highway 49; Elk Mountain is along the park's southern boundary, which is adjacent to Highway 2). The Burlington Northern Railroad also runs alongside the park's southern boundary. Therefore, highway and railroad noise likely account for the higher existing ambient sound levels at Looking Glass Hill and Elk Mountain, compared to the natural ambient sound levels for these areas.

Table 6: Natural and existing ambient sound levels for project sites where additional artificial noise would occur during implementation of actions proposed under Glacier National Park’s Comprehensive Telecommunications Plan. Data is from Baseline Ambient Sound Levels in Glacier National Park, US Dept. of Transportation, 2009.

Project Site	Natural Ambient (dBA) *	Existing Ambient (dBA)*
Many Glacier Ranger Station	30 to <35	30 to <35
Many Glacier Entrance Station	25 to <30	30 to <35
Many Glacier Water Tanks	30 to <35	30 to <35
Chief Mountain Port of Entry	20 to <25	25 to <30
Goat Haunt Ranger Station	25 to <30	25 to <30
East Glacier Ranger Station	Unknown**	Unknown**
Two Medicine Entrance Station	20 to <25	35 to <40
Walton Ranger Station	20 to <25	50 to <60
Polebridge Ranger Station	<20	20 to <25
Apgar Mountain	25 to <30	35 to <40
Looking Glass Hill (recommended wilderness)	25 to <30	30 to <35
Elk Mountain (recommended wilderness)	25 to <30	40 to <45

*Based on US DOT Baseline Ambient Sound Levels in Glacier National Park, Sept. 2009.

**The East Glacier Ranger Station is outside the park in a town, alongside a paved road.

Environmental Consequences

Impacts from Alternative A (Proposed Action and Preferred Alternative) to Natural Soundscapes

In general, Alternative A would cause temporary adverse impacts to natural soundscapes due to noise from machinery used during tower replacements and excavation for foundations and trenches, chainsaws to remove existing equipment poles and/or during tree thinning, and helicopters during long-line sling load operations. As described in Chapter 2, Alternatives, machinery (e.g. boom lift, backhoe, track hoe, power trencher and/or similar equipment, portable concrete mixer, concrete truck and/or concrete pump) would be expected to produce noise ranging between approximately 67 and 85 dBA $LA_{eq, 1s}$. Noise levels from helicopters are highly variable depending on the type of aircraft. To provide context for these sound levels, Table 7 gives examples of common sound sources measured in dB $LA_{eq, 1s}$. (The dB $LA_{eq, 1s}$ metric is used to represent the average sound pressure level over one second in a frequency range of 25-5000 hertz. $LA_{eq, 1s}$ stands for the A-weighted (i.e. scaled to the sensitivity of the human ear) equivalent continuous time-averaged sound level. In other words, the metrics used to model noise are based on how the noise would be perceived by the human ear.)

Table 7: Sound level (dBA) of common sound sources.

Common Sound Sources	Sound Level (dB, $LA_{eq,x}$ *)
Whispering; leaves rustling	20
Crickets at five meters, or a residential area at night	40
Conversation at five meters, or a busy restaurant	60
Cruiser motorcycle at 15 meters, or curbside of busy street	80
Jackhammer at two meters, or thunder	100
Train horn at one meter, or a military jet at 100 meters above ground level	120

*The integration time x varies per sound source and is representative of the length of the event.

Noise from equipment and machinery would be loudest at the source and attenuate, or reduce in amplitude, over distance until it reaches background natural ambient sound levels. The noise would still be audible, however, since noise typically remains audible until it attenuates to 8 dB below the ambient level (64 Fed. Reg. 134 1999). Table 8 presents the distance that noise would need to travel before attenuating to natural ambient sound levels at each project site. Attenuation distances are derived from an attenuation calculator/sound modeling tool developed by the NPS Natural Sounds and Night Skies Division (NSNSD). Actual attenuation distances may be shorter than derived by modeling, since noise modeling does not account for changes in wind direction, temperature, and humidity, which influence sound. Modeling also does not factor in terrain shielding (when terrain blocks noise) or the attenuating effects of vegetation. The attenuation distances presented in Table 8 provide the best possible approximations; actual attenuation distances may be different because the exact make and model of machinery and helicopters are not known at this time and cannot be factored into the modeling. To estimate the attenuation of noise from a portable concrete mixer, the NSNSD calculator modeled a generator producing noise at 67 dBA; for noise from a portable power trencher, the calculator modeled an excavator producing noise at 76 dBA. Attenuation of noise from a boom lift could not be modeled because frequency band data for a boom lift was not available. The actual equipment that would be used under the plan may not be listed in Table 8; the equipment listed represents the general type and sound level of equipment expected to be in use and because noise data was obtainable for these models.

Table 8: Estimated approximate distances over which noise would need to travel from the source before attenuating to natural ambient sound levels, as derived from NPS NSNSD noise modeling.

Project Site	Natural Ambient (dBA)	Possible Equipment	Estimated Attenuation Distance to Natural Ambient	Estimated Duration
Many Glacier Ranger Station	30 to <35	Chainsaw	1.9 kilometers	1 to 2 days
		Boom lift*	Unknown*	
		Backhoe or track hoe**	1.7 to 1.8 kilometers	
		Portable concrete mixer***	868 meters	
Many Glacier Entrance Station	25 to <30	Chainsaw	2.7 kilometers	1 to 2 days
		Boom lift*	Unknown*	
		Backhoe or track hoe**	2.4 to 2.7 kilometers	
		Portable concrete mixer***	1.4 kilometers	
Many Glacier Water Tanks	30 to <35	Backhoe or track hoe**	1.7 to 1.8 kilometers	1 day
Chief Mountain Port of Entry	20 to <25	Chainsaw	3.6 kilometers	1 to 2 days
		Backhoe	1.7 kilometers	
		Boom lift*	Unknown*	
		Concrete mixer truck	2.4 kilometers	
		Concrete pump truck	3.1 kilometers	
Goat Haunt Ranger Station	25 to <30	Chainsaw	2.7 kilometers	2 to 3 days
		Portable concrete mixer***	1.4 kilometers	
		Portable power trencher†	2.7 kilometers	
East Glacier Ranger Station	Unknown‡	Backhoe or track hoe**	731 to 766 meters to 40 dBA or 275 to 282 meters to 50 dBA	1 to 2 days
		Portable power trencher†	766 meters 40 dBA or 282 meters to 50 dBA	
Two Medicine Entrance Station	20 to <25	Chainsaw	3.6 kilometers	4 to 6 hrs
Walton Ranger Station	20 to <25	Backhoe	3.4 kilometers	1 to 2 days
Polebridge Ranger Station	<20	Backhoe	3.4 kilometers	3 to 5 days
Apgar Mountain	25 to <30	Helicopter	3.4 to 7.3 kilometers (depending on the helicopter)	Unknown
Looking Glass Hill (recommended wilderness)	25 to <30	Helicopter	3.4 to 7.3 kilometers (depending on the helicopter)	1 day, 7 flights
Elk Mountain (recommended wilderness)	25 to <30	Helicopter	3.4 to 7.3 kilometers (depending on the helicopter)	1 day, 7 flights

*A boom lift could not be modeled because frequency band data was not available.

**A track hoe was modeled after an excavator producing noise at 76 dBA LA_{eq, 1s}.

***A portable concrete mixer was modeled after a generator producing noise at 67 dBA LA_{eq, 1s}.

†A portable power trencher was modeled after an excavator producing noise at 76 dBA LA_{eq, 1s}.

‡The East Glacier Ranger Station is outside the park in a town, alongside a paved road; attenuation to 40 and 50 dBA was modeled.

Noise modeling estimates noise from three different models of helicopter. Helicopter noise would be most audible and disruptive as the helicopter hovers at low elevation during sling-load operations. Figure 9 illustrates how sound levels from different types of helicopters increase when the aircraft hovers at lower distances above ground level. The graph is adopted from the environmental assessment prepared to rebuild the Sperry Chalet; while the type of helicopters that could be used under this plan are not known at this time, they could be similar to those shown in Figure 9. Generally, helicopter noise increases with the weight and size of the machine.

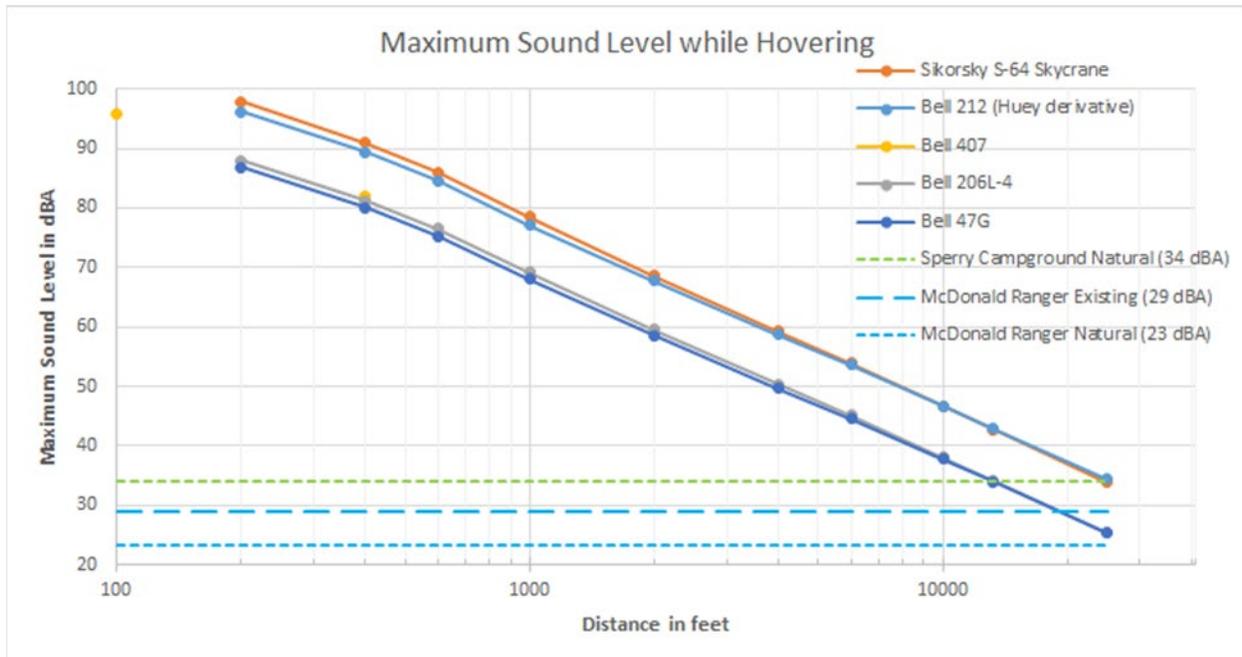


Figure 9: Helicopter noise levels while hovering (from the EA to rebuild the Sperry Chalet (NPS 2018a).

Impacts from improvements to NPS telecommunications systems

All but three of the project sites (Looking Glass Hill, Elk Mountain, and Apgar Mountain) listed in Tables 6 and 8 are in developed areas. Of these all but one, the Goat Haunt Ranger Station, are near or alongside roads, some with high levels of vehicle traffic. While project noise would be audible at these sites, with possibly detectable differences in frequency compared to vehicle noise (depending on the model of machinery used), it would not dramatically change existing conditions in terms of the presence of ongoing noise. Since sound travels over water, noise produced at project sites near lakes may be more audible than at other sites, such as at the Many Glacier and Two Medicine Entrance Stations (Actions No. 1 and 2, Section I). But since project noise would not dramatically change existing conditions, and because it would be intermittent and temporary, ending once project activities are complete, adverse impacts to soundscapes in developed areas would likely be only marginally noticeable, periodic disruptions with no lasting effects. Project noise would generally be sporadic, occurring intermittently with periods of relative quiet when equipment is not in use. Noise from heavy machinery would be temporary, ceasing when work at each project site is completed, likely after one to two days at most project sites (Table 8).

Project noise could be more noticeable at the Goat Haunt Ranger Station compared with other developed areas, since the project site is not near a road (although there is boat traffic on the adjacent Waterton Lake) and machinery could be in use for a slightly longer period (estimated two to three days; Table 8). The distance (approximately 290 meters) and forested area between the tower site where

work would occur and the ranger station complex would dampen the intensity of adverse noise impacts in the immediate vicinity of the ranger station, including visitor facilities.

Compared with project noise in developed areas, noise from helicopter long-line sling load operations at Looking Glass Hill, Elk Mountain, Apgar Mountain, and other undeveloped areas (e.g. if additional permanent repeaters are installed and require helicopter support) would be more audible and interfere more substantially with natural background sounds and the quiet and stillness that characterize natural soundscapes in these areas. Highest intensity impacts from helicopters would be temporary, ceasing once sling load operations have concluded, likely after an estimated one day for each site, followed by similar but infrequent noise impacts from any subsequent flights that may be necessary to replace equipment (possibly a single flight every four or five years). Since helicopter noise would be of short duration at undeveloped sites, it would not cause lasting effects or meaningfully change the overall character of natural soundscapes in these areas.

Environmental factors would influence the amplitude of project noise and the distance required for it to attenuate to natural ambient sound levels. Terrain shielding would reduce the audibility of noise, and weather conditions, such as wind, would have a masking effect, especially for projects on the east side of the park where conditions tend to be windy. Vegetation may minimize noise levels, although vegetation is far less influential than terrain in shielding low frequency noise (dense foliage that completely blocks the line of sight along the sound propagation path can account for only a few decibels of attenuation). At each project site, the qualities that characterize soundscapes at undeveloped sites would return to their baseline condition once project activities have concluded. Also, since noise would be limited to the geographic areas of the project sites (including the area over which noise would attenuate to natural ambient sound levels), soundscapes in the vast majority of the park would remain unaffected.

Impacts from commercial telecommunications infrastructure

If commercial cellular and/or Internet connectivity is provided at the Many Glacier, Two Medicine, Rising Sun, and Lake McDonald Lodge developed areas (Programmatic Action No. 8, Section II), natural soundscapes in these areas could be altered slightly by intermittent sounds from devices, such as ringtones, conversations on speaker, or audio from music or videos. The level of impact would be negligible because this type of noise would have relatively low audibility compared with that of vehicle traffic and other noises typical of developed areas. The noise would also be sporadic if not infrequent and would not appreciably differ from the sound of people in conversation or using devices with previously downloaded content.

Impacts from Alternative B (No Action) to Natural Soundscapes

Without a comprehensive approach that aims to achieve widely applicable solutions with the least amount of infrastructure and equipment possible, Alternative B could miss opportunities to co-locate multiple NPS systems at single sites and streamline or minimize the amount of equipment at each site. The park would continue to manage NPS telecommunications infrastructure in accordance with NPS policy and in a way that minimizes impacts to park resources, including natural soundscapes, as much as possible. But NPS telecommunications infrastructure and equipment could, over time, be installed at more locations than proposed under Alternative A. This in turn could lead to the use of noise-producing machinery in more areas, including helicopter flights in recommended wilderness, which would increase the potential for adverse impacts to natural soundscapes in more locations. Impacts would likely be temporary, ending once noise-producing equipment is no longer in use.

Cumulative Impacts to Natural Soundscapes

A number of past, present, and reasonably foreseeable actions have involved or continue to involve activities that produce noise and, therefore, cause impacts to natural soundscapes. They include

motorboat use for fisheries projects, administrative purposes and guided boat tours; Burlington Northern Santa Fe Railway avalanche mitigation (involving charges dropped from helicopters); the use of chainsaws and other noise-producing equipment (including explosives) during trail and backcountry campground maintenance, historic structure repair and maintenance, and wildland fuel reduction; and heavy equipment use during facility upgrades and repairs, including rehabilitation of the Going-to-the-Sun Road (including utility work and installation of fiber optic cable), Many Glacier Road, Camas Road; bridge preservation in the North Fork and Many Glacier; replacement of the upper McDonald Creek bridge; and construction on Highways 2 and 89. Traffic noise on park roadways, including motorcycle noise, and NPS administrative flights, search and rescue flights, fire management flights, and commercial air tours also adversely impact natural soundscapes. When the impacts of Alternative A are combined with those of past, present, and reasonably foreseeable actions, the cumulative impacts to natural soundscapes would continue to be adverse, with other actions contributing the majority of the impacts. Therefore, Alternative A would incrementally increase but would not notably change the number and degree of adverse impacts already occurring.

When the impacts of Alternative B are combined with those of past, present, and reasonably foreseeable actions, impacts to natural soundscapes would continue to be adverse, with other actions contributing the majority of the impacts. Therefore, Alternative B would incrementally increase but would not substantially change the number and degree of adverse impacts already occurring.

Conclusion

Project noise in developed areas would be audible but would not dramatically change existing conditions due to vehicle traffic and other prevalent noise. Comparatively, noise from helicopter long-line sling load operations at Looking Glass Hill, Elk Mountain, Apgar Mountain, and any other undeveloped sites would be more audible and interfere more substantially with the quiet, stillness and natural background sounds that characterize undeveloped areas. Highest intensity impacts from helicopters would be temporary, ceasing once sling load operations are over, except for infrequent noise from any subsequent flights that may be necessary to replace equipment (possibly a single flight every four or five years). Since helicopter noise would be of short duration, it would not cause lasting effects or meaningfully change the overall character of natural soundscapes at undeveloped areas, and soundscapes in the vast majority of the park would remain unaffected. Ringtones, conversations on speaker, or audio from music or videos could slightly alter natural soundscapes in developed areas where commercially provided cellular or Internet connectivity is permitted. But impacts would be negligible because this type of noise would have low audibility, would be sporadic if not infrequent, and would not appreciably differ from the sound of people in conversation or using devices with previously downloaded content. Cumulatively, Alternative A would contribute to but would not meaningfully increase adverse impacts from past, present, and reasonably foreseeable actions.

Alternative B could lead to the use of noise-producing machinery in more areas, including helicopter flights in recommended wilderness, thus increasing the potential for adverse impacts to natural soundscapes. Cumulatively, Alternative B would contribute to but would not meaningfully increase adverse impacts from past, present, and reasonably foreseeable actions.

Grizzly Bears, Canada Lynx, and Wolverine

Affected Environment

Grizzly Bears

(*Ursus arctos*) – Federally listed under the ESA as threatened; state listed species of concern

Glacier is part of the Greater Glacier Area (GGA) in the northern third of the Northern Continental Divide Ecosystem (NCDE) Grizzly Bear Recovery Zone, which includes grizzly bear habitat on both sides of the

US-Canada border. The GGA is defined from north to south by the Canadian border and the park's southern boundary, and from east to west by the Blackfeet Indian Reservation and the Whitefish Mountains (Kendall et al. 2008). Genetic analysis of hair samples collected during 1998-2000 resulted in a population estimate of 241 grizzly bears in the GGA (Kendall et al. 2008). No population estimate has been developed exclusively for Glacier. Data from the NCDE grizzly bear population trend monitoring project indicates that the ecosystem's grizzly bear population trend is increasing at one to two percent per year (data from 2004-2011; Mace and Roberts 2012; Mace et al. 2012).

Grizzly bear seasonal movements and habitat use are tied to the availability of different food sources. In spring, grizzly bears feed on dead ungulates and early greening herbaceous vegetation at lower elevations (Martinka 1972). During the summer, some bears move to higher elevations in search of glacier lilies and other roots, berries, and, in August and September, army cutworm moths. Avalanche chutes provide an important source of herbaceous forage for grizzly bears in the early summer and fall (Mace and Waller 1997). The denning season in the western portion of the NCDE usually begins in early October, and females might linger near dens until late May (Mace and Waller 1997).

Glacier National Park was placed into grizzly bear management "situations" in accordance with Interagency Grizzly Bear Committee (IGBC) guidelines (USFS 1986), and as directed by the Grizzly Bear Recovery Plan (USFWS 1993). Over one million acres of the park are established as Management Situation 1, in which management decisions favor the needs of the grizzly bear when grizzly habitat and other land-use values compete and grizzly-human conflicts are resolved in favor of grizzlies unless a bear is determined to be a nuisance (NPS 2010, NPS 2010a). The remainder of the park is developed front-country and established as Management Situation 3, where grizzly bear habitat maintenance and improvement are not the highest management considerations, grizzly bear presence is actively discouraged, and any grizzly bear involved in a grizzly-human conflict is controlled (NPS 2010, NPS 2010a). Four of the project sites for the Comprehensive Telecommunications Plan are within areas established as Management Situation 1. They include Looking Glass Hill, Elk Mountain, Apgar Mountain, and the Two Medicine communications tower site. The remaining project sites are within areas established as Management Situation 3, but which are surrounded by areas designated as Management Situation 1. Grizzly bear habitat modeling by the Cumulative Effects Model (CEM) Working Group indicates high-value grizzly bear habitat at the Looking Glass Hill and Apgar Mountain project sites during spring, summer and fall, and low to moderate habitat value at the Elk Mountain project site during spring and summer with more moderate habitat value at Elk Mountain during the fall (CEM 2004, based on findings from Mace et al., 1999).

Canada Lynx

(*Lynx canadensis*) – Federally listed under the ESA as threatened; state listed species of concern

Historically, Canada lynx were considered "more or less common" throughout the park (Bailey and Bailey 1918). Sightings declined during the 1970s and 1980s but increased in recent years (NPS files). Systematic lynx surveys by means of snow tracking in 1994 and hair-snare/DNA sampling in 1999 and 2000 detected lynx in several drainages throughout the park. The park's wildlife observation database contains numerous records of Canada lynx, including sightings and tracks in the North Fork, McDonald, Saint Mary, Many Glacier, and Two Medicine Valleys. Although no lynx den sites have been documented in the park, lynx family groups have been observed at remote camera stations, and winter tracking efforts have indicated the presence of resident lynx populations.

Canada lynx typically inhabit gentle, rolling topography (Maletzke et al. 2008, Squires et al. 2013) with dense horizontal cover, persistent snow, and moderate to high snowshoe hare densities. In the western United States, lynx are most closely associated with Engelmann spruce, subalpine fir and lodgepole pine forest types between elevations of 4,920 to 6,560 feet (McKelvey et al. 2000). Preliminary lynx habitat

modeling for Glacier defined moist conifer forest above 4,000 feet elevation as most likely to support lynx. Critical habitat for the species was designated in 2006 and revised in 2014 (USFWS 2015), and includes the vast majority of the park, excluding only lower elevation (below 4000 feet) valley bottoms on the west side of the Continental Divide. With the exception of the Polebridge Ranger Station and Lake McDonald Lodge, project sites for the Comprehensive Telecommunications Plan are within critical habitat for Canada lynx.

Few studies have examined how lynx react to human presence. Some anecdotal information suggests that lynx are quite tolerant of humans, although given differences in individuals and contexts, a variety of behavioral responses to human presence may be expected (Staples 1995, Mowat et al. 2000). Preliminary information from winter recreation studies in Colorado indicates that some recreation uses are compatible, but lynx may avoid some developed ski areas (J. Squires, personal communication 2012). Olson et al. (2011) noted that lynx dens were located in more remote areas and unlikely to be disturbed by humans.

Wolverine

(*Gulo gulo*) – state listed species of concern

The wolverine is a rarely seen resident of coniferous forests and alpine meadows, although wolverine sighting and track observations have been documented in Glacier on both sides of the Continental Divide, with observations occurring throughout the year (NPS files). Wolverines utilize a range of habitats including alpine areas, mature forests, ecotonal areas, and riparian areas. Male wolverines can cover over 150 kilometers per week with short movements between denning and foraging areas intermixed with longer movements of 10 kilometers or more (Copeland and Yates 2008). Average home ranges for wolverines in Glacier National Park are 521 square kilometers for males and 139 square kilometers for females (Copeland and Yates 2008).

Research by Copeland and Yates (2008) and Waller et al. (2014) suggests that Glacier has very high-quality wolverine habitat due to extensive alpine areas, rugged topography, remoteness, and diverse ungulate populations. A study in the park from 2002-2007 estimated the wolverine population in Glacier at between 40-50 animals (Copeland and Yates 2008). Recent population monitoring in the park (2009-2012) using non-invasive DNA sampling resulted in a park-wide density estimate of 13 wolverine per 1000 square kilometers and a model-averaged population estimate of 33 individuals (Waller et al. 2014 and Lukacs et al. 2020). The data indicated an increasing population, a result also obtained by Squires et al. (2007). Wolverine habitat exists in the project area for the Comprehensive Telecommunications Plan, especially at remote project sites at Looking Glass Hill, Elk Mountain, and Apgar Mountain. Wolverines may also be using habitat in the vicinity of developed project sites.

Environmental Consequences

Impacts from Alternative A (Proposed Action and Preferred Alternative) to Grizzly Bears

Impacts from improvements to NPS telecommunications systems

Actions to improve NPS telecommunications at project sites in developed areas would not be expected to measurably affect grizzly bears beyond existing levels of human influence. This is due to the relatively high levels of visitor activity in these areas, several of which are along or near roads, some with heavy vehicle traffic. The Goat Haunt Ranger Station is not near a road, but is a high-use area for visitors, including boat tours on Waterton Lake. Most of the project sites in developed areas have Management Situation 3 designations, where the presence of grizzly bears is actively discouraged, but are near areas established as Management Situation 1, where grizzly bear habitat maintenance is a high priority. The existing Two Medicine communications tower is in a Management Situation 1 area. While the Goat Haunt Ranger Station complex is in a Management Situation 3 designation, the tower site where work

would occur is adjacent to habitat established as Management Situation 1. Because Management Situation 3 areas are actively managed to discourage the presence of grizzly bears, project activities would not meaningfully alter how grizzly bears use project sites and the immediate vicinities. Many bears likely avoid these areas without management intervention. At project sites where heavy machinery and chainsaws would be used (Table 8), the resulting noise would be loud enough to potentially disturb grizzly bears using surrounding habitat established as Management Situation 1. Effects of disturbance could range from physiological stress responses, such as increased heart rate, without any observable behavioral changes, to interruptions of behavior, to physical displacement. But since use of the equipment would be intermittent over short periods of time (Table 8) and would cease altogether once the work is complete (1 to 2 days anticipated at most sites, up to 3 and 5 days possible at Goat Haunt and Polebridge Ranger Stations, respectively), the potential for adverse impacts to bears would be too short in duration to cause lasting effects. Grizzly bears would likely resume use of nearby Management Situation 1 habitat once project activities have ended. Mitigation measures would require work at project sites in Many Glacier to occur before the Many Glacier Road closes to public vehicle access, and work at Goat Haunt to occur before the area closes for the season, when grizzly bear use of these areas may increase due to lower levels of human activity (see Mitigation Measures). This would reduce the potential to disturb or displace grizzly bears during the fall when bears are foraging heavily to gain adequate fat reserves for winter. Given this mitigation measure, and due to already high levels of human activity at project sites and the short duration of project activities, there would be no adverse impacts to grizzly bears from actions proposed in developed areas.

At undeveloped project sites, including Looking Glass Hill, Elk Mountain, and Apgar Mountain, noise from helicopter long-line-sling load operations could disturb or displace bears in or near these areas. Each of these sites is within habitat established as Management Situation 1. Grizzly bears could be displaced from travel routes or foraging activities when sling-load operations are underway, especially at Looking Glass Hill given the high grizzly bear habitat values and because the site is within a relatively high grizzly bear density area. The effects of the noise would dissipate as distance from the project site increases, allowing adjacent habitats to continue to provide areas free from human disturbance. The potential for disturbance or displacement would end once sling-load operations are complete (likely within a single day). Therefore, adverse impacts to grizzly bears would be temporary, with no lasting effects since the flights would end after initial installation except for infrequent subsequent flights as needed (to replace equipment, for example; estimate possibly one flight every four to five years), and bears would likely continue to use affected areas after helicopter operations are over. Impacts would occur at the individual level, with no population effects and no effects to the overall distribution of bears, since bears range throughout the park and the area of impact is small relative to the size of the species' home range (768 and 125 sq km documented for male and female bears, respectively [Mace and Waller 1997]). No grizzly bear habitat would be lost and there would be no potential for grizzly bear mortality. Similar impacts would be expected if temporary SOA repeaters and/or permanent repeaters are installed in undeveloped areas and require helicopter transport.

Impacts from commercial telecommunications infrastructure

If commercial telecommunications infrastructure is permitted in the Many Glacier, Rising Sun, Two Medicine, and Lake McDonald Lodge developed areas, no impacts to grizzly bears would be expected beyond existing levels of human influence. This is due to the relatively high levels of existing visitor activity in these areas, including vehicle traffic. The project sites are in developed areas with Management Situation 3 designations, where the presence of grizzly bears is actively discouraged. Therefore, many bears likely avoid the developments, and project activities would not meaningfully alter grizzly bear use of the areas.

The effects determination for grizzly bears under section 7 of the ESA is “may affect, not likely to adversely affect.” A biological assessment has been prepared and submitted to the USFWS; consultation is ongoing.

Impacts from Alternative A (Proposed Action and Preferred Alternative) to Canada Lynx

Impacts from improvements to NPS telecommunications systems

Actions at developed project sites would not be expected to measurably affect Canada lynx beyond existing levels of human influence due to existing high levels of human activity. Habitat values for lynx are likely fairly low in these areas, especially for those in close proximity to roads and vehicle traffic. While noise from heavy machinery and/or chainsaws could disturb lynx using nearby habitat, with effects ranging from physiological stress responses without any observable behavioral changes, to interruptions of behavior, to physical displacement, the noise would be intermittent and too short in duration to have lasting effects on how lynx use the area. Lynx would likely resume use of affected areas once project activities have ended. Mitigation measures requiring work at sites in Many Glacier to occur before the Many Glacier Road closes to public vehicle access and work at Goat Haunt to occur before the area closes for the season would minimize the potential for impacts to lynx using these areas during periods of low human activity. Given this, and due to already high levels of human activity at project sites and the short duration of project activities, there would be no adverse impacts to Canada lynx from actions proposed in developed areas.

At undeveloped project sites, including Looking Glass Hill, Elk Mountain, and Apgar mountain, noise from helicopter long-line sling load operations could disturb or displace lynx. The noise would end once sling-load operations are complete (likely within a single day) except for infrequent subsequent flights as needed (possibly one flight every four to five years, estimated). Effects of the noise would dissipate as distance from the project site increases, allowing adjacent habitats to continue to provide areas free from human disturbance. Lasting effects would not occur, since lynx would likely continue to use affected areas after helicopter operations are over. Impacts would occur at the individual level, with no population effects and no effects to overall species distribution, since any lynx inhabiting areas at or near the project sites are part of a parkwide population that utilizes habitat throughout the park and the area of impact is small relative to the size of Canada lynx home range (151 and 72 sq. km for males and females, respectively [Aubry et al. 2000]). There would be no effects to lynx prey, no loss of lynx habitat, and no potential for species mortality. Similar impacts would be expected if temporary SOA repeaters and/or permanent repeaters are installed in undeveloped areas and require helicopter transport.

Impacts from commercial telecommunications infrastructure

If commercially provided cellular or Internet connectivity is permitted in identified developed areas, no impacts to lynx would be expected beyond existing levels of human influence. This is due to the relatively high levels of existing visitor activity in these areas, including vehicle traffic.

The effects determination for Canada lynx under section 7 of the ESA is “may affect, not likely to adversely affect.” A biological assessment has been prepared and submitted to the USFWS; consultation is ongoing.

Impacts from Alternative A (Proposed Action and Preferred Alternative) to Wolverine

Impacts to wolverine would generally be as described for Canada lynx. Actions in developed areas would not be expected to measurably affect wolverines beyond existing levels of human influence due to high existing levels of human activity, impact mitigation measures at Many Glacier and Goat Haunt, and because project noise would be intermittent and too short in duration to have lasting effects on how wolverine use the areas. Noise from helicopter long-line sling load operations could disturb or displace wolverine, but the noise would end once operations are over (likely within a single day), except for

infrequent subsequent flights as needed (possibly one flight every four to five years, estimated), and effects of the noise would dissipate as distance from the project site increases, allowing adjacent habitats to continue to provide areas free from human disturbance. Wolverine would likely continue to use affected areas after helicopter activity. Impacts would occur at the individual level, with no population effects and no effects to overall species distribution, since wolverine range widely throughout the park and the area of impact is small relative the size of the species' home range (521 and 139 sq. km for male and females, respectively [Copeland and Yates 2008]). There would be no effects to wolverine prey, no loss of habitat, and no potential for species mortality. Similar impacts would be expected if temporary SOA repeaters and/or permanent repeaters are installed in undeveloped areas and require helicopter transport. If commercially provided cellular or Internet connectivity is permitted in identified developed areas, no impacts to wolverine would be expected beyond existing levels of human influence due to the relatively high levels of existing visitor activity in the project areas.

Impacts from Alternative B (No Action) to Grizzly Bears, Canada Lynx, and Wolverine

Without a comprehensive approach to achieve widely applicable solutions with the least amount of infrastructure possible, Alternative B could miss opportunities to co-locate multiple NPS telecommunications systems at single sites and to streamline or minimize the amount of infrastructure at each site. As a result, more NPS telecommunications infrastructure could, over time, be installed at more locations than proposed under Alternative A. The park would continue to manage NPS telecommunications infrastructure in accordance with NPS policy and in a way that minimizes impacts to grizzly bears, Canada lynx, and wolverine as much as possible. But the absence of a plan could lead to installations in less developed areas, where grizzly bears, Canada lynx, and wolverine may be more vulnerable to disturbance and displacement, and could also possibly result in additional helicopter flights in undeveloped areas, thus increasing the potential for impacts to the species.

Cumulative Impacts to Grizzly Bears, Canada Lynx, and Wolverine

Past, present, and reasonably foreseeable actions with impacts to grizzly bears, Canada lynx, and wolverine include motorboat use for fisheries projects, administrative purposes, and guided boat tours; Burlington Northern Santa Fe Railway avalanche mitigation (involving charges dropped from helicopters); trail and backcountry campground maintenance (including use of explosives), historic structure repair and maintenance, and wildland fuel reduction; heavy equipment use during facility upgrades and repairs, road rehabilitation, and bridge preservation; and NPS administrative flights, search and rescue flights, fire management flights, and commercial air tours. Noise and human disturbance from these actions may have impacted or have the potential to impact grizzly bears, Canada lynx, and wolverine. When the impacts of Alternative A are combined with those of past, present, and reasonably foreseeable actions, the cumulative impacts to grizzly bears, Canada lynx, and wolverine would continue to be adverse, with other actions contributing the majority of the impacts. Therefore, Alternative A would contribute to but would not appreciably change the level of adverse impacts already occurring.

When the impacts of Alternative B are combined with those of past, present, and reasonably foreseeable actions, cumulative impacts to grizzly bears, Canada lynx, and wolverine would be adverse, with other actions contributing the majority of the impacts. Therefore, Alternative B would contribute to but would not substantially change the level of adverse impacts already occurring.

Conclusion for Impacts to Grizzly Bears, Canada Lynx, and Wolverine

Actions in developed areas would not be expected to impact grizzly bears, Canada lynx, or wolverine beyond existing levels of human influence due to high existing levels of human activity, mitigation measures at Many Glacier and Goat Haunt, and because project activities would be intermittent and too short in duration to have lasting effects on how the species use the areas. Helicopter long-line sling load

operations in undeveloped areas would have comparatively more potential for impacts, but the highest intensity effects would end once operations are over (likely within a single day) except for infrequent subsequent flights as needed (possibly one flight every four to five years, estimated). Impacts would occur at the individual level, with no population effects and no effects to overall species distribution. Cumulatively, Alternative A would contribute to but would not meaningfully increase adverse impacts from past, present, and reasonably foreseeable actions.

Under Alternative B, more NPS telecommunications infrastructure could, over time, be installed at more locations than proposed under Alternative A, and could include additional helicopter flights to undeveloped areas. This would increase the potential for disturbance and displacement of grizzly bears, Canada lynx, and wolverine. Cumulatively, Alternative B would contribute to but would not meaningfully increase adverse impacts from past, present, and reasonably foreseeable actions.

Visitor Use and Experience

Affected Environment

A broad range of recreational experiences is available to visitors to Glacier National Park, including hiking, camping, boating, commercially operated tours, and stays in historic lodging facilities, among others. Visitation to the park has increased 64 percent in the last ten years, with approximately three million visitors per year since 2018 (NPS files). Visitation in the park is highest from June to September.

There are 13 front country campgrounds in the park, which visitors can access by private vehicle. Some of these are near or associated with developed areas, which may provide amenities such as dining and lodging. These areas may serve as stopover sites, staging areas for longer trips, or primary destinations where visitors may book longer stays. Developed visitor use areas in the park have generally retained their rustic character, and several tend to be highly popular, serving several thousand visitors during the summer months. Cellular coverage is generally not available at visitor service areas in the park, except for some signal spillover into Apgar and St. Mary from commercial telecommunications sites outside the park boundary, and commercial broadband service in Many Glacier that is being tested on a trial basis toward meeting contractual requirements for the concessioner to provide connectivity to guests. Recreational opportunities in the park's backcountry (including recommended wilderness) are generally primitive, without access to cellular or Internet service, although signals from outside the park can spill over into remote areas and be picked up in some areas.

For many visitors to Glacier, especially backcountry visitors, the absence of cellular or Internet connectivity presents an opportunity to disconnect from cell phones, laptop computers, and other devices. In developed areas, the lack of connectivity can present challenges to other visitors in terms of trip planning, contacting park staff, and the ability to access important park updates (such as trail and area closures due to bear activity, for example), weather forecasts, and other information.

The project area for this plan includes some of the most popular visitor use areas in the park, including the Many Glacier, Two Medicine, Rising Sun, and Lake McDonald Lodge developed areas. In 2019, the Many Glacier and Two Medicine areas logged over 330,000 and 189,000 visitors, respectively. At the Rising Sun and the Lake McDonald Lodge developed areas, there were over 13,000 and 20,000 overnight lodging stays in 2019, respectively (excluding campgrounds), in addition to high levels of day use. In recent years (2012-2014), the Rising Sun Campground has been 95% full during July and August. Depending on the area, recreational opportunities associated with these areas include camping, hiking, boating, NPS-led interpretive hikes, and concessioner-operated facilities that provide overnight accommodations, dining, boat tours, horseback tours, and guided hikes.

Both project sites in recommended wilderness, Elk Mountain and Looking Glass Hill, are associated with several popular hiking trails. The Elk Mountain trails leads to the summit of Elk Mountain while the Ole Creek, Fielding Creek, and Autumn Creek Trails traverse the foothills and surrounding drainages. The Dry Fork Trail, approximately 1.75 miles southwest of the project site on Looking Glass Hill, is part of a larger complex of trails in the Two Medicine area, including the Pitamakan Pass Trail.

Environmental Consequences

Impacts from Alternative A (Proposed Action and Preferred Alternative) to Visitor Use and Experience

Impacts from improvements to NPS telecommunication systems

Impacts to visitor use and experience under Alternative A would be primarily beneficial because proposed improvements to NPS telecommunications would support park staff in service of visitor needs for the long-term. There would be benefits to visitors at multiple visitor contact points, such as visitor centers, ranger stations, and entrance stations. Benefits to visitors would also extend to emergency situations due to improved reliability of communications systems that support NPS personnel during search and rescue or other emergencies.

There would also be a potential for adverse impacts to visitors due to noise from heavy machinery and/or chainsaws, which may disturb visitors at or near project sites. But any disturbance would be intermittent and temporary, occurring for fairly short periods of time (Table 8) and ceasing once projects are complete. Except for temporary closures of construction areas to protect visitor safety, project activities would not alter visitors' ability to use project sites and surrounding areas. Any construction-related closures would be lifted once work is complete, allowing normal public use of an area to resume. Changes to the visitor experience resulting from the visibility of NPS telecommunications equipment in developed areas would be slight because the additional equipment would not appreciably change existing conditions, since telecommunications equipment and other development is already present at most sites (Table 3) or would not be out of context with existing development.

At Looking Glass Hill, Elk Mountain, and other undeveloped areas where temporary SOA repeaters or additional permanent repeaters may be installed, visible infrastructure could disrupt opportunities for visitors to experience the undeveloped scenic qualities of the sites, and noise from helicopter sling-load operations could interfere with visitors' ability to experience a soundscape dominated by natural sounds. Visibility of infrastructure at Looking Glass Hill would be temporary until the repeater can be moved to a site outside of the park. Infrastructure at Elk Mountain (if a repeater is installed there) and other sites if additional permanent repeaters are installed would be readily visible at close proximity but may not always be discernable from a distance due to changing atmospheric conditions and the dominance of the surrounding landscape. SOA repeaters would also be visible, but the impacts would be less intrusive given the smaller size of the equipment and because SOA repeaters would be installed on a temporary basis. Disturbance to backcountry visitors from helicopter noise during long-line sling load operations would be of short duration (estimated at one day for each site), ending once operations are complete except for infrequent subsequent flights as needed (possibly one flight every four to five years, estimated). For these reasons, and because the vast majority of natural soundscapes and undeveloped scenic landscapes in the park would remain unaffected, visitor use and experience would not be meaningfully affected.

Impacts from commercial telecommunications infrastructure and connectivity

If commercially provided cellular or Internet connectivity is approved in the Many Glacier, Two Medicine, Rising Sun, and Lake McDonald developed areas, the expected effects to visitor use and experience would primarily be beneficial, but also potentially adverse for some visitors.

Commercial connectivity would have beneficial impacts to visitor use and experience because access to the Internet and/or cellular service would enable visitors to plan and update trip schedules and itineraries, stay up to date on the latest park information and advisories, such as road congestion and road, trail, and campground closures, and check weather forecasts, among other capabilities. Connectivity would also support concessioner operations that a very large proportion of park visitors use and benefit from. For example, reservations could be updated in real time without the need to contact a main office or reservation desk by phone, and financial transactions, including retail, would function properly without disruptions due to slow Internet connections (which can result in multiple charges to the customer as the system makes multiple attempts to complete a transaction). The plan would also enable concessioners that provide lodging to offer connectivity (depending on concession contract requirements), which would benefit guests and other visitors who need connectivity. There would also be an indirect benefit to visitors because, in some areas, the park would have less difficulty hiring and retaining employees who are essential to providing service to visitors but may decline a position in the park due to a lack of connectivity for their use when off duty, or for their family's use. The ability for on-duty NPS staff to use cell or Internet service would also improve their ability to respond to the needs of visitors.

Commercial connectivity would also come with the potential for adverse impacts because some visitors may find intermittent sounds from devices disruptive, such as ringtones, conversations on speaker, or audio from music, gaming, and videos. Many visitors come to Glacier to "get away from it all," including not only their own personal electronic devices but also the increasing cultural dependency on connectivity. While commercial connectivity could adversely impact visitors seeking disconnected spaces, this would only occur in the four developed areas identified under this plan (Figure 8). Most of the park would remain without connectivity, except in areas where signals from commercial sources outside the park can be picked up. The park's Backcountry Zone and recommended wilderness would remain entirely unconnected, with the exception of inadvertent spillover, which would be minimized by requirements for commercial providers to minimize signal spillover into recommended wilderness (Table 2). Signal spillover would also be unlikely due to the distance between identified coverage areas and the recommended wilderness boundary. If spillover does occur, it would not be expected to extend more than 50 meters beyond the recommended wilderness boundary. Multiple front country locations, including campgrounds, would remain disconnected. The developed areas where coverage would be considered under this plan include only three of the park's 13 front country campgrounds (Many Glacier, Two Medicine, and Rising Sun). Signals from out-of-park sources can sometimes be accessed from three other campgrounds – Fish Creek, Apgar, and St. Mary. But seven of the park's front country campgrounds would remain without connectivity.

Intermittent noise from visitors using devices in connected areas would have relatively low audibility compared with that of vehicle traffic and other noises typical of developed areas. It also would not differ appreciably from the sound of people having conversations with each other off-line or using devices with previously downloaded content, including music, podcasts, and movies, since previously downloaded content can be played without connecting to cell or Internet service.

Commercial connectivity in the four identified developed areas would not be expected to increase distracted driving in the park in any way that changes existing, inherent risks associated with vehicle travel. This is because conditions and parameters established by this plan would require commercial providers to minimize signal spillover onto park roadways (Table 2), and the park already enforces a prohibition on using devices while operating a vehicle (36 CFR 4.22 (b)(1)) and would continue to do so under this plan, including in parking lots, roadways within coverage zones, and on any segments of road where some amount of signal spillover cannot be avoided.

For the reasons described in this analysis, adverse impacts to visitor use and experience would be negligible and would not measurably change how visitors use and experience park resources, including the ability to experience disconnected spaces.

Impacts from Alternative B (No Action) to Visitor Use and Experience

Without a comprehensive approach that aims to achieve widely applicable solutions with the least amount of infrastructure and equipment possible, Alternative B could miss opportunities to co-locate multiple NPS systems at single sites and to streamline or minimize the amount of equipment at each site. The park would continue to manage NPS telecommunications infrastructure in accordance with NPS policy and in a way that minimizes impacts to visitor use and experience as much as possible. But NPS telecommunications infrastructure and equipment could, over time, be installed at more locations than proposed under Alternative A and result in more equipment at some sites, including undeveloped sites where infrastructure and project activities (possibly including additional helicopter flights) could intrude on visitors' experience.

Alternative B would also not establish advance guidance on the placement, amount, size, and type of commercial telecommunications infrastructure and equipment, nor on the extent of coverage. As a result, the park may not be able to move forward with applications from commercial providers in an efficient manner, thereby delaying, possibly indefinitely, the benefits of connectivity to visitors. Any connectivity that is approved could be limited to concessioner operations that are contractually required to provide connectivity to guests, which would be unfair to the many other visitors that could benefit from service. The park would also continue to have difficulty hiring and retaining employees in certain areas, which could hinder the ability of staff to adequately serve visitor needs. Or, over time, commercial infrastructure could be located in more areas than identified under Alternative A and potentially include more equipment, and coverage could be approved in less appropriate places, including undeveloped areas. Actions that would not be permitted under Alternative A, such as installing towers taller than 80 feet, would have an increased chance of occurring because limitations would not be established in advance. For these reasons, the absence of an integrated plan under Alternative B could increase the potential over time for adverse impacts to visitor use and experience.

Cumulative Impacts to Visitor Use and Experience

Past, present, and reasonably foreseeable actions with potential impacts to visitor use and experience include trail and campground maintenance, wildland fuel reduction, NPS motorboat use on backcountry lakes, and heavy equipment use during facility upgrades/repairs, road rehabilitation, and bridge preservation, all of which can adversely impact visitors due to noise from chainsaws and other machinery; NPS administrative actions that require area closures at trails and campgrounds (such as bear and fire management actions) and the potential use of herbicides during future invasive plant control, which could also require closures and restrict visitor access; and telecommunications and other administrative infrastructure that may detract from a visual experience, especially in undeveloped areas (such as radio repeaters in recommended wilderness). NPS administrative flights, search and rescue flights, fire management flights, and commercial air tours can also adversely impact visitor use and experience due to noise. An expected extension of commercial fiber optic cable between park Headquarters and Apgar would likely benefit visitors because it would enable cell and Internet access for the public in the area. When the impacts of Alternative A are combined with those of past, present, and reasonably foreseeable actions, cumulative impacts to visitor use and experience would continue to be adverse, with other actions contributing the majority of the impacts. Therefore, Alternative A would contribute to but would not meaningfully increase cumulative impacts to visitor use and experience.

When the impacts of Alternative B are combined with those of past, present, and reasonably foreseeable actions, impacts to visitor use and experience would continue to be adverse, with other

actions and Alternative B potentially contributing in equal measure. The potentially more widespread and numerous impacts from Alternative B could increase the amount of existing impacts.

Conclusion for Impacts to Visitor Use and Experience

Impacts to visitor use and experience under Alternative A would be primarily beneficial because improvements to NPS telecommunications would support park staff in service of visitor needs. Noise from heavy machinery and/or chainsaws may disturb visitors at or near project sites, but noise would not occur for more than one to two days at most sites (Table 8) and would end once the project is complete. Except for temporary closures of construction areas, project activities would not alter visitors' ability to use project sites. In developed areas, any impacts from changes in the visibility of NPS telecommunications equipment would be slight because the additional equipment would not appreciably change existing conditions or be out of context with existing development. At undeveloped areas (Looking Glass Hill, Elk Mountain, and other undeveloped areas where SOA repeaters or additional permanent repeaters may be installed), infrastructure and noise from helicopter flights could disrupt visitors' experience. But since impacts from helicopter noise, SOA repeaters, and infrastructure at Looking Glass Hill would be temporary, and because the vast majority of undeveloped areas in the park would remain unaffected, the visitor experience would not be meaningfully affected. If approved in the Many Glacier, Two Medicine, Rising Sun, and Lake McDonald developed areas, commercially provided connectivity would be primarily beneficial because visitors would be able to plan trip schedules and stay up to date on important park and weather information; connectivity would support concessioner operations that benefit visitors; and NPS staff would be able to better meet visitor needs. Connectivity could adversely impact visitors seeking disconnected spaces, but most of the park would remain without connectivity and, in areas where connectivity is available, intermittent noise from the use of devices would not differ appreciably from the sound of offline conversations or people using devices with previously downloaded content. Cumulatively, Alternative A would contribute to but would not meaningfully increase adverse impacts from past, present, and reasonably foreseeable actions.

The absence of an integrated plan under Alternative B could increase the potential for adverse impacts to visitor use and experience because NPS telecommunications infrastructure and equipment could, over time, be installed at more locations with more equipment at some sites. This could include undeveloped sites, where infrastructure and project activities (possibly including additional helicopter flights) could intrude on visitors' experience. Alternative B could also result in potentially indefinite delays in approving connectivity in appropriate developed areas, or connectivity that is limited to concessioner guests only. Visitor experience could also be adversely impacted because commercial infrastructure could be installed in more areas and coverage extended to less appropriate places. Cumulatively, Alternative B would contribute in equal measure to adverse impacts from past, present, and reasonably foreseeable actions.

Lists of Agencies and Persons Consulted

The following agencies and tribes were contacted early in the planning process; consultation is ongoing.

- US Fish and Wildlife Service
- Montana Fish, Wildlife and Parks
- Montana State Historic Preservation Office
- Blackfeet Nation
- Confederated Salish and Kootenai Tribes
- Bureau of Indian Affairs
- US General Services Administration

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Name/Title	Contribution
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Brad Blickhan, Wilderness and Wild and Scenic River Coordinator, Glacier National Park	Provided technical support on recommended wilderness.
Lisa S. Bruno, Attorney-Advisor, Office of the Solicitor, DOI Rocky Mountain Field Region	Reviewed EA for legal sufficiency.
Karan Dunnigan, Field Solicitor, DOI Rocky Mountain Region	Reviewed EA for legal sufficiency.
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Richard Menicke, Geographer, Glacier National Park	Conducted GIS-based viewshed modeling.
Kathryn Neussly, Ecologist, Natural Sounds Night Skies Division, National Park Service	Provided technical support on natural soundscapes.
Mary Riddle, Chief of Planning and Compliance, Glacier National Park	Provided oversight, reviewed and edited EA.
Amy Secrest, Environmental Protection Specialist/Natural Resources Specialist, Glacier National Park	Prepared EA in cooperation with subject matter experts; coordinated EA schedule, agency consultation, and internal review.
John Waller, Wildlife Biologist, Glacier National Park	Provided technical support on grizzly bears and Canada lynx.



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. May 2021.

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Appendix B: Alternatives and Alternative Elements Considered but Dismissed from Detailed Analysis

Seek a permit with the US Forest Service (USFS) to install a National Park Service (NPS) repeater on Mt. Hefty.

The public scoping brochure for the telecommunications plan included the possibility of an NPS radio repeater on Mt. Hefty, on USFS land. After further consideration, the park determined that this is not necessary to meet the purpose and need of the plan because radio coverage in the North Fork District is adequate without the addition of the repeater; this alternative element has therefore been dismissed because it would unnecessarily duplicate less environmentally damaging measures.

Use satellite communication devices to support NPS field communications in remote areas.

The park uses its radio system to provide daily status information to multiple personnel stationed in different, geographically separated areas. These “all call” messages are necessary to issue important parkwide updates and are also used when requesting assistance for an emergency or when multiple responders in different locations need to hear communications traffic associated with an incident that is underway. Use of a Land Mobile Radio (LMR) system, including radio repeaters, allows single transmissions to reach multiple personnel at one time to provide needed, sometimes critical, information as quickly and efficiently as possible. Satellite technology, on the other hand, does not provide the capability of communicating with multiple receivers at one time. Therefore, this action has been dismissed because it would not meet the purpose and need for this plan.

Instead of installing an NPS radio repeater on Elk Mountain, use satellite communication systems to check in/check out from Highway 2 and other areas along the south side of the park.

The option to install an NPS radio repeater on Elk Mountain is included in the proposed plan as a contingency action, to be implemented only if radio coverage on the south side of the park is not sufficiently improved by other actions under the plan and use of a radio channel that is owned by an outside agency but currently shared with Glacier law enforcement (LE) staff. Therefore, to install a permanent repeater on Elk Mountain would duplicate other, less environmentally damaging alternatives unless, as noted, it’s determined in the future that those alternatives do not sufficiently improve radio coverage on the south side of the park. A satellite communications-based check in/check out system would not be adequate in this area because park LE staff often respond to incidents such as traffic accidents, railcar derailments, and avalanches. Reliable radio communications are necessary not only to track and monitor personnel, but to safely and effectively respond to such incidents and, as described above, receive and respond to “all call” messages, including those associated with an emergency or incident for which multiple personnel need to monitor communications traffic. Therefore, relying on a satellite communications-based system of checking in/out has been dismissed because it would not meet the purpose and need of the plan.

Suggestions based on comments from public scoping that have been considered but dismissed from detailed analysis:

Implement improvements to NPS telecommunications systems but do not allow cellular or data connectivity for the public; establish in the plan that applications for commercial telecommunication services will be considered and denied.

This suggestion has been dismissed because it would not meet the purpose and need of the plan to enable cellular and/or Internet service in appropriate developed areas and would not be in accordance with NPS Management Policies (2006), Section 8.6.4.3, which require park units to consider requests to site non-governmental infrastructure on park lands.

Deny any commercial telecommunication proposals on the basis of Glacier’s designation as part of an International Peace Park and the characterization of the park’s peacefulness and tranquility as part of that designation, and because of solitude and tranquility as part of the park’s wilderness recommendation.

This option has been dismissed because the underlying assumption is incorrect, and because it would not meet the purpose and need of the plan to enable commercially provided cellular and/or Internet service in appropriate developed areas. Under the plan, the vast majority of Glacier National Park would remain without commercial connectivity, the park would retain the qualities that contribute to its designation as an International Peace Park, and the designation would still apply. Commercial telecommunications infrastructure, equipment, and coverage would not be permitted in the park’s recommended wilderness, with the exception of inadvertent spillover from identified developed areas (conditions and parameters established under the plan would require that commercial providers minimize inadvertent signal spillover as much as technologically feasible).

Do not install commercial telecommunication infrastructure in the Two Medicine developed area; with no restaurants or hotels, this primitive, minimally developed area is not appropriate for telecommunications facilities.

The Two Medicine area has been identified as an area where connectivity is most needed for both employees and visitors. The park has had difficulty hiring and keeping staff at Two Medicine due to the lack of connectivity. And, while primitive, the Two Medicine developed area has high levels of visitor use and is a popular stopover in the park, with concessioner services and access to food (sandwiches, soups, pastries, etc. at the Two Medicine Camp Store). Therefore, this suggestion has been dismissed because it would not meet the purpose and need of the plan to enable commercially provided connectivity in appropriate developed areas.

If NPS communications deficiencies are linked to increased volume of visitors, implement a lottery system or vehicle limit per day instead of adding telecommunications infrastructure.

The need to improve NPS telecommunications is not simply connected to increasing visitor use, but to overall NPS operations, including administrative activities, visitor services in remote locations, law enforcement, resource protection and management, and facility maintenance, among others, and to visitor and employee safety. This suggestion is dismissed because managing entry would not meet the purpose and need to improve NPS telecommunications systems or enable commercially provided cellular and Internet connectivity in select developed areas.

Remove the NPS telecommunications infrastructure on Porcupine Mountain.

The repeater on Porcupine Mountain provides essential radio coverage for field-to-field and field-to-dispatch radio communications in the Goat Haunt area. This suggestion has been dismissed because removing the repeater on Porcupine Mountain would not meet plan purpose and need to improve NPS telecommunications systems.

Instead of installing additional telecommunications equipment on mountains, install antennas on existing lookouts only.

Due to where lookouts are located, antennas on lookouts alone would not provide sufficient radio coverage in the park. This suggestion, therefore, has been dismissed because it would not sufficiently meet the plan’s purpose and need to improve NPS telecommunications. It is also not always technically feasible to mount an antenna at an appropriate height above the lookout (high enough for 360-degree signal coverage and to minimize radio frequency exposure to lookout inhabitants) if masts/poles are not tall enough to clear the roof (especially for two-story lookouts), and because securing the mast against high winds could require a substantial amount of infrastructure.

Install NPS telecommunications equipment and infrastructure in developed areas only, with no new telecommunications equipment or infrastructure in recommended wilderness, including on Elk Mountain.

While the park would continue to look for every opportunity to avoid installing additional telecommunications infrastructure in recommended wilderness, including on Elk Mountain, the option to do so (as described in Chapter 2 of the EA) must be kept open in case other actions do not adequately improve the park radio system. Therefore, this suggestion has been dismissed because a blanket prohibition on additional radio repeaters in recommended wilderness would not meet the purpose and need of the plan to improve NPS telecommunications.

Return the park's radio system back to analog technology rather than digital.

The current federal mandate requires Land Mobile Radio systems to be digital narrowband, with encryption where needed for security purposes (encryption requires digital communications) (Dept. Manual 377, Radio Handbook, Section 2.2.B). To achieve sufficient signal coverage, the digital system requires more infrastructure than the previous analog system did. This suggestion has been dismissed because it would not meet the current federal mandate.

Make Internet available for visitors at hotels only.

The need for connectivity applies to many visitors besides those who stay at hotels. Allowing cell and Internet service for visitors at hotels only would be unfair to visitors who would equally benefit from the ability to plan trips and stay up to date on current park information. Off-duty employees also require connectivity in order to meet daily needs that depend on Internet access. This suggestion has been dismissed because it would not meet the purpose and need to enable commercial cellular or Internet connectivity in appropriate developed areas where it is most needed.

Keep commercial telecommunications to the minimum requirements necessary to meet the needs of park staff and concessioner personnel only, without making it available to the general public.

This suggestion has been dismissed because it would not meet purpose and need of the plan to enable commercial connectivity for the public in appropriate developed areas.

Enable text messaging or alerts to multiple residents at once in an emergency situation, such as the Howe Ridge Fire in 2018.

This suggestion has been dismissed because it addresses issues beyond the scope of this EA; that is, the purpose and need for this plan does not include providing connectivity for everyone in the park.

Instead of enabling cell service, establish emergency phone service throughout the park or in the Many Glacier, Two Medicine, Rising Sun, and Lake McDonald developed areas, with satellite phones or VOIP.

Cell and Internet connectivity is being considered for reasons other than safety. This suggestion has been dismissed because it would not meet the purpose and need of the plan to enable commercial connectivity in appropriate developed areas.

Provide cellular service for emergency use only.

This suggestion has been dismissed because cellular service for emergency use only is not technologically feasible and would not meet the purpose and need of the plan to enable commercial connectivity in appropriate developed areas.

Cell service needs to be extended to the North Fork for safety.

Extending cell or Internet coverage to the North Fork District would not be in accordance with the management philosophy from the park's 1999 General Management Plan for the North Fork geographic area, which is to manage resources to preserve the wild character of the area and does not permit commercial development. Such an expansion also would not be appropriate in recommended

wilderness because it would result in too great of an environmental impact to wilderness character from the installation of infrastructure. Therefore, this suggestion has been dismissed.

Establish an Internet network that all NPS, park partners and concessioners could utilize in the developed areas to increase efficiencies and possibly control cost for all involved, rather than having multiple individual plans that will likely be more expensive and less cohesive.

The NPS is required to have secure network connectivity using a DOI network, separate from non-governmental operations (OMB Circular A-130). This suggestion has been dismissed because it would conflict with requirements under DOI and NPS policy.

Install repeaters to enhance radio communication along horse concessions trail systems to improve the concessioner's ability to respond to potential accidents and tap into a park-wide network to more quickly communicate with rangers in the event of an emergency.

The purpose of NPS radio repeaters in the park is to support NPS radio communications. Improving radio communications for any concessions operation is outside the responsibility of the NPS and the scope of the park's telecommunications plan. The park's contract with the horse concessioner requires two-way radio communications between each ticket office and wranglers conducting trail rides, and wranglers must carry and be trained in the use of a satellite phone or emergency beacon. As stated above, the NPS cannot share a network with non-governmental operations, in accordance with DOI and NPS policy. Therefore, this suggestion has been dismissed because it is outside the scope of the NEPA review and would not be in accordance with DOI and NPS policy.

Provide connectivity for the public at Logan Pass, along the Going-to-the-Sun Road and other important travel routes, and associated points of interest.

The park is actively working to reduce visitor and parking congestion at Logan Pass (e.g. the recently adopted Going-to-the-Sun Road Corridor Management Plan), and providing connectivity would attract more visitors and longer stays at the site. Providing coverage on the Going-to-the-Sun Road would create too much of a hazard from distracted driving, and the amount of infrastructure that would likely be required (such as microwave dishes, solar panels, possible communications towers, equipment shelters, etc. at multiple sites) would be too impactful to visual resources and the historic character of the road. Providing connectivity along the road and associated points of interest is also not necessary to meet the purpose and need of the plan. Places where connectivity would be approved under the telecommunications plan are established stopover sites, where people reserve space for lodging or camping, or where they already congregate for dining. The four developed areas identified for coverage in the telecommunications plan would meet the purpose and need adequately. Therefore, these suggestions are dismissed because they are not necessary to meet the purpose and need of the plan and would conflict with an existing park plan (the Corridor Management Plan), increase safety hazards, and cause too great of an environmental impact.

Dress telecommunications towers up to look like trees.

Faux pine trees are most effective at disguising telecommunications infrastructure from a distance. From nearby vantage points, they can sometimes look larger than a lattice frame tower and be more visible. The EA for the telecommunications plan includes conditions and parameters as well as mitigation measures that would require towers to be painted to blend with surroundings and reduce reflectivity. This suggestion is dismissed because it would duplicate other, less environmentally damaging alternatives already under consideration.

For commercial service, use fixed wireless technology to provide broadband Internet access to a single location through radio waves, eliminating the need for phone or cable lines and avoiding issues that affect cable, satellite, and fiber.

This suggestion may be considered when the park is reviewing ROW permit applications from commercial telecommunications providers, but it is outside the scope of this EA to identify a specific type of technology for commercially provided services.

Once priority coverage areas are identified for commercial service, identify locations where equipment should be placed to best meet coverage objectives.

This suggestion has been dismissed because identifying specific locations for equipment within coverage areas is outside the scope of this EA and would instead be considered on a site-specific, case by case basis when the park is reviewing ROW permit applications from commercial telecommunications providers.

Instead of providing cell service in the park, wait until commercial satellite connectivity is globally available.

This suggestion has been dismissed because it is not known when such technology will be available or successful, and delaying action would not resolve the purpose and need of the plan in a timely manner.

Appendix C: Consultation

The National Park Service (NPS) must consult, coordinate, and cooperate with other federal, state, local, and tribal governments and other bureaus and federal agencies whenever possible concerning actions and environmental impacts within the jurisdictions of, or of interest to those entities (DOI NEPA regulations, 43 CFR, section 46.155).

Section 106 of the National Historic Preservation Act (NHPA)

Section 106 of the NHPA requires federal agencies to provide state historic preservation officers, tribal historic preservation officers, and, as necessary, the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to review and comment on the effects of agency actions. In February of 2020, the park sent hard copies of the scoping brochure for the Comprehensive Telecommunications Plan EA to the Montana State Historic Preservation Office (SHPO) and the Tribal Historic Preservation Officers (THPOs) for the Blackfoot Nation and the Confederated Salish and Kootenai Tribes. The EA has been transmitted to the SHPO and the THPOs for review concurrent with public review. Consultation with the Montana SHPO would be initiated for each action under the plan upon further design. Neither the Blackfoot Tribe or the Confederated Salish and Kootenai Tribes raised concerns about the proposed actions during initial consultation meetings for the project in 2020. Ongoing consultation would continue with the Blackfoot Nation and Confederated Salish Kootenai Tribes as site-specific treatments are identified. The park anticipates a determination of “historic properties affected, no adverse effect” under Section 106 of the National Historic Preservation Act (NHPA). Upon further design, consultation with the Montana SHPO would be initiated and any adverse impacts would be mitigated in consultation with the SHPO.

Section 7 of the Endangered Species Act (ESA)

Section 7 of the ESA requires federal agencies to consult with the US Fish and Wildlife Service (USFWS) when taking action that may affect federally listed and proposed threatened or endangered species or designated critical habitat. On February 24, 2020, the park notified the USFWS via email that public scoping was underway for the Comprehensive Telecommunications Plan and EA, and included a link to the NPS Planning, Environment and Public Comment (PEPC) website where the scoping document is available. The park has prepared and submitted a biological assessment to the USFWS for review along with the EA.

Cooperating Agencies

Under Council on Environmental Quality (CEQ) NEPA regulations (40 CFR 1501.6) and DOI NEPA regulations (43 CFR, section 46.225), an agency is eligible to become a cooperating agency during the development of an EA if it has jurisdiction by law over actions included in an NPS proposal, or special expertise regarding related environmental issues.

Blackfoot Nation

In 2016, the park installed a temporary repeater on Looking Glass Hill in Glacier’s Two Medicine District to address severely limited (frequently impossible) radio communications in the area. Because Looking Glass Hill is within recommended wilderness, the repeater was originally installed on a temporary basis with the intention of identifying a permanent location outside the recommended wilderness boundary. Glacier National Park and the Blackfoot Tribal Business Council have been in informal discussion about relocating the repeater to a location outside the park on the Blackfoot Reservation. This is included in Chapter 2, Section II of the EA, Programmatic Action No. 2. The park and the tribe began the process of establishing the Blackfoot Tribe as a cooperating agency for this plan/EA, however the Covid-19 pandemic

interrupted that process and it was not completed in time for public release of this EA. The park anticipates comments from the Blackfoot Tribe on this plan and EA and the relocation of the Looking Glass repeater. Depending on the outcome of further discussions and ultimately a decision document, the Tribe and Park could pursue development of a formal agreement to relocate the Looking Glass Repeater.

Bureau of Indian Affairs

The site under consideration for the relocation of the Looking Glass Hill repeater is owned by the United States in trust for the Blackfoot Nation. Therefore, the Bureau of Indian Affairs (BIA) would likely be involved with any related right-of-way agreements or easements. Glacier National Park began the process of inviting the BIA to also be a cooperating agency, but similar to the situation with the Blackfoot Tribe, the process has not been completed.

US General Services Administration

Glacier National Park's Comprehensive Telecommunications Plan proposes replacing a telecommunications tower at the Chief Mountain Port of Entry (POE) (Action No. 8, Section I in Chapter 2 of the EA). The land is under NPS ownership, but buildings at the POE are managed by the General Services Administration (GSA). On February 24, 2020, Glacier National Park notified the Historic Preservation Specialist for GSA Rocky Mountain Region 1 via email that public scoping was underway for the Comprehensive Telecommunications Plan and EA. The email included a link to the NPS PEPC website where the scoping document is available. In a letter dated March 9, 2020, to the Regional GSA Commissioner, Glacier National Park invited the GSA to be a cooperating agency in the preparation of the Plan/EA. The GSA did not respond.

Appendix D: Impact Topics Dismissed from Detailed Analysis

The following impact topics have not been analyzed in detail because the issues associated with these resources are not pivotal or central to the proposal, a detailed analysis of impacts to these resources is not necessary to make a reasoned choice between alternatives, these topics are not contentious among the public or other agencies, and/or there would be no potentially significant impacts to these resources.

Archeological Resources

The Comprehensive Telecommunications Plan is not expected to impact archeological resources because excavation activities would be confined to previously disturbed areas, except possibly at the Logan Pass Visitor Center developed area. Project sites would be surveyed and, if necessary, inventoried prior to ground disturbing activities, and infrastructure would be designed to avoid known resources. Archeologists would monitor ground disturbing activity within historic districts or near prehistoric sites according to NPS policy (e.g. monitoring would be conducted in consultation with the park's Cultural Resources Specialist). In the event that archeological resources are identified during ground disturbing activities, excavation in that area would stop and treatment would occur in accordance with federal legislation and regulations and NPS policy. As a result, there would be limited (e.g. possible re-disturbance of non-intact resources), if any, potential for impacts to archeological resources. This topic, therefore, is dismissed from detailed analysis.

Historic Structures

Historic structures are present in developed areas where project activities would occur. Section I actions proposed under the Alternative A (Chapter 2 of the EA) would not impact historic structures because no telecommunications infrastructure and equipment would be affixed to buildings or structures and any new cabling between buildings and telecommunications equipment would be installed through existing holes and/or conduit.

While it is unknown whether programmatic actions (Section II) would affix new or additional telecommunications equipment or components to a historic structure, such elements would likely be concealed or otherwise mitigated, similar to the way in which existing telecommunications equipment has been placed on or in proximity to historic structures without impacting those structures in any way that changes their architectural or historic significance, or their eligibility for listing in the NRHP. For this reason, impacts from programmatic actions would not be expected to noticeably change existing conditions or affect characteristics that make a structure eligible for listing in the National Register of Historic Places (NRHP). Therefore, since impacts would not affect the architectural and historical significance of historic structures, nor their eligibility for listing in the NRHP, and would not noticeably alter structural characteristics or appearances, this topic has been dismissed from detailed analysis.

Cultural Landscapes

The project area for the Comprehensive Telecommunications Plan includes one identified cultural landscape, comprised of the entirety of the Going to the Sun Road. The project site at the Loop, therefore, is part of the Going-to-the-Sun Road Cultural Landscape. Action proposed at the Loop (Programmatic Action No. 3, Section II in Chapter 2 of the EA) would not alter or remove any features that contribute to the Going-to-the-Sun Road's status as a cultural landscape and, as discussed in the analysis of impacts to visual resources and historic districts (Chapter 3 of the EA), existing visual conditions at the Loop would not change in any appreciable way since several non-historic elements are already present. Therefore, impacts to the Going-to-the-Sun Road Cultural Landscape would not change its overall rustic character and appearance, and this topic is dismissed from detailed analysis.

Ethnographic Resources

Ethnographic resources are defined by the National Park Service as “the cultural and natural features of a park that are of traditional significance to traditionally associated peoples” (NPS Management Policies, 2006). The Blackfeet Nation has informed the park of ethnographic resources within the project area. Ongoing consultation would continue with the Blackfeet Nation and Confederated Salish Kootenai Tribes during the design and development of proposed actions under the Plan, and actions would be taken to avoid and/or minimize impacts to ethnographic resources. Neither the Blackfeet Tribe or the Confederated Salish and Kootenai Tribes raised concerns about the proposed actions during initial consultation meetings for the project in 2020. Because potential impacts to ethnographic resources would be avoided/minimized through consultation with the Tribe, and no other ethnographic resources have been identified which correlate with actions proposed under the plan, ethnographic resources are dismissed from further analysis. However, Glacier National Park recognizes that the tribes hold a body of knowledge that may result in the future identification of ethnographic resources within proximity of proposed actions. Under this plan, consultation with the tribes would continue as site-specific treatments are identified.

Wildlife (excluding species that have been carried forward)

Project activities, including noise from heavy machinery, chainsaws, and helicopter sling load operations, could disturb or displace wildlife in the vicinities of the project sites. Effects could range from physiological responses (e.g. increased heart rate) with no observable physical displacement, to disruptions of behaviors such as foraging, to the observable physical displacement of one or more individuals. The extent and duration of displacement would vary depending on the species and individual animals. Smaller animals may find undisturbed habitat only a short distance away (e.g. a few feet or meters), while larger animals may need to travel further to achieve a comfortable distance from the source of disturbance. Disturbances would be short in duration, with heavy machinery in operation for only an estimated one to two days at most project sites, except at the Goat Haunt and Polebridge Ranger Stations where it could be in use for an estimated two to three days and three to five days, respectively. Project activities in developed areas would not appreciably change the existing potential for disturbance to wildlife, given already high levels of human activity and vehicle noise. Mitigation measures to delay the use of heavy machinery in areas where migratory birds and bats are present (based on surveys before work begins) would ensure that impacts are avoided during critical reproductive periods. Helicopter sling load operations would have a greater potential to disturb or displace wildlife since this activity would occur in undeveloped areas where wildlife are less accustomed to human activity (including Looking Glass Hill, Elk Mountain, Apgar Mountain, and sites where temporary SOA repeaters or possible permanent repeaters may be installed). Sling load deliveries are typically short in duration (estimated at about five minutes at a time) and would likely occur over the course of a single day at a given project site. Highest intensity impacts would be temporary, ending once sling-load operations are complete, except for infrequent subsequent flights as necessary (estimate possibly one flight every four to five years). Lasting effects to wildlife would not be expected at any of the project sites, both developed and undeveloped, since individual animals would likely resume use of affected areas once project activity is over. Some individuals may continue to use project sites while work activities are underway.

Tree-thinning at the Many Glacier Entrance Station and Chief Mountain Port of Entry (POE) and the possible removal of a single tree from the Two Medicine Entrance Station would cause microhabitat changes in shade, cover, and moisture that could displace smaller species of wildlife, such as small mammals, birds, reptiles, and amphibians. Only 15-20 trees taller than 40 feet would be removed from the Many Glacier Entrance Station, from a mixed age stand of subalpine fir, Engelman spruce, and aspen. Because these tree species are well-represented in immediately adjacent areas and since trees

less than 40 feet tall would be left undisturbed within the thinning area, along with brush and other vegetation, enough adjacent habitat would remain available to provide security for smaller wildlife species and support essential activities, such as foraging, nesting, denning, and travel. While the area that would be thinned at Chief Mountain is larger (0.25 to 1.0 acre) and trees of lesser height would be removed (trees taller than 15 feet), impacts to wildlife would be mitigated by delaying thinning until late summer/early fall (after the critical denning and nesting period) if surveys document the presence of bats or nesting birds. Impacts would also be mitigated through consultation with park resources staff in identifying trees that need to be left standing for purposes of preserving nest cavities, hibernacula, and other important habitat characteristics. Due to these measures, the small size of the affected area relative to most species home ranges, and undisturbed trees and vegetation within the thinned area, changes in the localized distribution of smaller wildlife species following tree thinning at Chief Mountain POE would be at a small scale, with no effects to species populations or abundance. Large and mid-sized wildlife species would not be affected because the thinned areas would be too small relative to species home ranges and the amount of unaffected adjacent and surrounding habitat to have measurable impacts on their distribution.

Other mitigation measures identified to minimize impacts to wildlife include requiring project activities at Many Glacier and Goat Haunt to occur during the visitor use period in order to protect wildlife security when these areas are closed and human activity is low, requiring work to occur during daytime (no night work), and selecting machinery that produces the least audible noise possible. Therefore, wildlife have been dismissed from detailed analysis because impacts would be temporary as described above or, in the case of tree thinning at the Chief Mountain POE, small in scale, with no effects to species populations, abundance, or overall distribution, and because impacts would be minimized by mitigation measures as described.

Species of Concern

Except for the grizzly bear, Canada lynx, and wolverine (which have been carried forward in the EA for detailed analysis; see Chapter 3), state listed animal species of concern have been dismissed from detailed analysis. A brief discussion of species occurrence in the project area and reasons for dismissal is provided in Appendix E, Federally and State Listed Species Dismissed from Detailed Analysis.

Migratory Birds (protected under the Migratory Bird Treaty Act)

There could be some increased potential for migratory birds in flight to collide with proposed NPS telecommunications towers (the plan proposes replacing three existing equipment poles with 40-foot lattice frame towers and extending one existing 40-foot tower to 80 feet). But the towers would replace existing vertical infrastructure and, therefore, while taller in height, would not dramatically change existing conditions in terms of vertical infrastructure that could present a risk of collision for birds. Also, the tower sites are located in forested areas, where birds are not likely to be flying at a rate of speed that would prevent them from detecting and avoiding the taller towers. The potential for impacts to migratory birds from any commercial vertical infrastructure would be evaluated during project-level review and appropriate mitigation measures would be implemented as needed. Mitigation measures for the telecommunications plan include a requirement that project sites be surveyed for migratory birds before beginning work and, if migratory birds are present, delaying any tree thinning or other vegetation removal and the use of heavy machinery, including chainsaws, until late summer/early fall, after the critical breeding and nesting period (April 15-August 15, possibly later in the summer depending on survey results). With this requirement in place, there would be no impacts to nesting migratory birds and, therefore, no impacts to species reproduction or to populations and

abundance. For these reasons, migratory birds are dismissed from detailed analysis. Appendix E, Federally and State Listed Species Dismissed from Detailed Analysis, includes migratory birds that are state listed species of concern that are known to occur at project sites or for which habitat is predicted to be moderate or optimal at project sites.

Vegetation and Soils

Excavation for foundations and trenches would take place in previously disturbed ground. The exception could be the approximately 50-foot trench at the Logan Pass project site; the trench would be dug in ground previously disturbed from an old power installation if possible (if the former trench path can be identified and using it does not interfere with existing underground infrastructure, such as utilities). Trench paths at all project sites would be selected in consultation with the park's Science and Resources Management Staff, including the Vegetation Management Specialist, in order to identify routes that would have the least impact on vegetation and soils (e.g. least amount of disturbance and compaction to vegetation and soils, avoidance of sensitive species, etc.). All project sites would be surveyed for sensitive plant species. If found, sensitive plants would be marked and avoided during project activities. Areas of ground disturbance would be restored by hand with native vegetation. Equipment that causes the least ground disturbance possible would be used whenever feasible, such as tracked machinery instead of wheeled vehicles.

At the Many Glacier Entrance Station, the 15-20 trees (40 feet or taller) that would be thinned from the area adjacent to the road would come from a mixed age, mixed species stand composed primarily of fir and spruce (estimated 50-80 years old) and young aspen (estimated 25-30 years old). These species are well-represented in the area. Therefore, there would be no appreciable change to the abundance and composition of removed tree species due to thinning. Removing a single tree, a cottonwood estimated at 50-75 years old, from the Two Medicine Entrance Station would not change species composition at the site because there are several other cottonwood trees in the area. Trees thinned from 0.25 to 1.0 acre at the Chief Mountain POE would come from a mixed age, mixed spruce/fir stand. Targeting trees that are 15 feet or taller for removal would remove a representative age class and change microhabitat (e.g. shade) for ground vegetation species. Over all adverse impacts would be slight, however, because there would be no change in the overall abundance and composition of tree or other plant species in the area since these species are abundant and fairly widespread adjacent to the proposed thinning area. Park resources staff (including the Vegetation Management Specialists) would assist with selecting trees for removal in order to ensure healthy species compositions and representative age classes are left intact and to identify sensitive species and wildlife habitat trees (e.g. for cavity nesting birds and bats) that must remain standing.

Therefore, adverse impacts to vegetation and soils would be of low intensity due to the mitigation measures described here, among others (see also Mitigation Measures in Chapter 2 of the EA), and because changes to vegetation communities would be meaningful at only one project site, the Chief Mountain POE (due to tree thinning) but would be localized to the project site (0.25 to 1.0 acre) with no widespread effects to species abundance or composition. For these reasons, vegetation and soils are dismissed from detailed analysis.

Species of Concern

State listed plant species of concern have been dismissed from detailed analysis. A brief discussion of species occurrence in the project area and reasons for dismissal is provided in Appendix E, Federally and State Listed Species Dismissed from Detailed Analysis.

Water Resources, including Floodplains, Wetlands, and Fisheries

No project activities under the plan would take place within waterways or water bodies, and none would create erosion, sedimentation, or other effects to nearby waterways and water bodies. None of

the actions would affect floodplain function or value, nor present a risk to life/safety or capital investment. None of the project sites contain wetland habitat. Therefore, there would be no impacts to water resources, including floodplains, wetlands, and fisheries, and these topics are dismissed from detailed analysis.

Wild and Scenic Rivers

The North Fork and Middle Fork of the Flathead River along Glacier National Park's western boundary are both designated Wild and Scenic Rivers. None of the actions proposed under the park's telecommunications plan would alter the rivers' physical and scenic characteristics, disturb any historic or ethnographic sites, measurably increase the potential for disturbance to wildlife in the river corridors, or cause sediment releases. Therefore, because there would be no adverse impacts to the North Fork and Middle Fork of the Flathead River or to the ORVs that led to their designation as a Wild and Scenic River, this topic is dismissed from detailed analysis.

Air Quality

While the use of gas-powered equipment (e.g. helicopters, heavy machinery, chainsaws, etc.) would produce emissions, the amount would be barely detectable, especially compared to those produced in developed areas and along park roads, and would make a non-measurable contribution to the park's overall emissions profile and air quality metrics. Emissions associated with the project would not undermine or cancel the benefits of ongoing efforts to reduce emissions parkwide, or interfere with mandates to protect the park's Class I airshed. For these reasons, impacts to air quality are dismissed from detailed analysis.

Night Skies

There would be no impacts to night skies since lights would not be allowed on any telecommunications towers and work activities to implement actions under the plan would only occur during the daytime (i.e. there would be no night work). Night skies, therefore, is dismissed from detailed analysis.

Socioeconomics

Glacier's telecommunications plan would not adversely impact socioeconomics because there would be no potential for actions proposed under the plan to decrease visitation, spending, income, or employment in the local or regional economy. Rather, the plan could indirectly benefit socioeconomics through benefits to visitor use and experience (as described in the analysis of impacts to Visitor Use and Experience in Chapter 3 of the EA), including an improved ability for NPS staff to serve visitors due to improvements to NPS telecommunications, and benefits to visitors from increased availability of commercially provided cellular and Internet connectivity. Improved connectivity would also benefit park concessioners and the ability of both the park and concessioners to retain employees. Since employees, including seasonal employees, live, shop, and recreate locally, they have a positive effect on local economies. Therefore, since there would be no adverse impacts to socioeconomics and likely several beneficial effects, this topic is dismissed from detailed analysis.

Appendix E: Federally and State Listed Species Dismissed from Detailed Analysis

Appendix E discusses state and federally listed species that could occur at project sites for Glacier National Park's Telecommunications Plan, but which have been dismissed from detailed analysis in the EA because of little or no potential for impacts. Federally listed species refers to those listed as threatened, endangered, proposed, or as candidate species under the Endangered Species Act (ESA). Species lists were obtained from the US Fish and Wildlife Service (USFWS) Montana Ecological Service Field Office website and the Montana Natural Heritage Program (MNHP) online species of concern reports. Species lists were reviewed to identify which species or habitats could be present at project sites and which species could be affected.

Species lists from MNHP were only obtained for specific project sites named in the plan. Species lists were not obtained for sites where Programmatic Actions No. 5, 6, and 7 could occur (Section II, Chapter 2 of the EA) because those sites are not yet known. Species lists were also not obtained for the Many Glacier, Two Medicine, Rising Sun, and Lake McDonald Lodge developed areas, where commercial connectivity would be considered under Programmatic Action No. 8. This is because connectivity alone would have no potential to impact state and federally listed species; the installation of commercial telecommunications infrastructure and/or excavation could impact state and federally listed species, but it is not yet known where, specifically, such actions would occur. Before such actions can be taken, and once specific project sites are identified, impacts to state and federally listed species will be considered during project-level review and analysis. A species list from MNHP was also not obtained for the St. Mary Ranger Station project site (Action No. 4, Section I, Chapter 2 of the EA) because proposed activities would have no potential whatsoever to impact state and federally listed species (additional antennas would be mounted on an existing tower, with no changes to existing habitats).

Wildlife. Table E-1 includes state and federally listed wildlife species, the project sites where each species could be present, and the rationale for why each is dismissed from detailed analysis. The table includes only those species known to occur or for which predicted habitat suitability is moderate or optimal at or near one or more of the project sites according to species reports from the MNHP. Species unlikely to be present at any of the project sites or for which habitat is present or of low suitability are not discussed.

Plants. Table E-2 includes state and federally listed plant species and the project sites where each species could be present. The table does not include the rationale for dismissing plant species from detailed analysis because the rationale is the same for each. There would be no impacts to state or federally listed plant species of concern from proposed activities because, prior to any structural installation or ground disturbance, each project site would be surveyed for listed plant species, and any specimens found would be marked and avoided during project activities (see Mitigation Measures under Chapter 2 of the EA). Table E-2 lists only those species known to occur or for which predicted habitat suitability is moderate or optimal at or near one or more of the project sites according to species reports from the MNHP. Species unlikely to be present at any of the project sites or for which habitat is present but of low suitability are not included in Table E-2.

Fisheries. Glacier's Telecommunications Plan would not impact any state or federally listed species of fish, including bull trout (*Salvelinus confluentus*), listed as threatened under the ESA. There would be no impacts because no project activities would take place in water or cause erosion, sedimentation, or other effects to nearby waterways and water bodies. For these reasons, state and federally listed fisheries species are not discussed further in this appendix.

Terrestrial and Aquatic Insects. There would be no impacts to state or federally listed species of terrestrial or aquatic insects, including the meltwater lednian stonefly (*Lednia tumana*) and western glacier stonefly (*Zapada glacier*), both of which are listed as threatened under the ESA. None of the proposed project activities would occur in aquatic habitats where aquatic insects could be present. Project activities would either not alter terrestrial insect habitat, or any alterations would be too small or localized to have measurable effects to species populations or distribution. For these reasons, state and federally listed aquatic and terrestrial insect species are not discussed further in this appendix.

Table E-1: State and federally listed **wildlife species** that could be present at one or more project sites and/or for which habitat at one or more project sites is native or at a level of moderate or optimal suitability.

Special Listing Status Codes: **SOC** = State listed species of concern; **MBTA** = protected under the Migratory Bird Treaty Act; **BGEPA** = protected under the Bald and Golden Eagle Protection Act.

Species and Special Listing Status	Species occurrence at project site(s) based on Montana Natural Heritage Program species reports (MNHP 2020) and/or species detections.	Impacts and rationale for dismissing from detailed analysis
Little brown bat (<i>Myotis lucifugas</i>) SOC	Little brown bats have been detected in the vicinity of two project sites, the Many Glacier Entrance Station and near the Many Glacier water tanks site , although habitat suitability at both sites is considered low (MNHP 2020). Detections of the species in these areas generally involve bats using structures for roosting, such as the Many Glacier Hotel and entrance station residence. Park staff have also detected the species at the Goat Haunt Ranger Station.	Thinning trees at the entrance station could remove natural bat roosting habitat; therefore, the area of tree removal would first be surveyed for signs of bat activity and trees with cavities or hibernacula (where bats could roost) would be left standing. If there is evidence of bats using the area, project activities would not occur until late summer/early fall, when maternity roosts are no longer active and bats have migrated out of the area. For these reasons, there would be no impacts to the little brown bat and the species is dismissed from detailed analysis.
Hoary bat (<i>Lasiurus cinereus</i>) SOC	Habitat suitability is moderate at one project site, the Goat Haunt Ranger Station (MNHP 2020).	None of the project activities would affect natural bat roosting areas or hibernacula in the area, i.e. there would be no removal of trees or other alterations to bat habitat. Therefore, there would be no impacts to the hoary bat and the species is dismissed from detailed analysis.
Eastern red bat (<i>Lasiurus borealis</i>) SOC	Habitat suitability for the eastern red bat is moderate to optimal at the Goat Haunt Ranger Station project site (MNHP 2020).	Same as above for the hoary bat.

Species and Special Listing Status	Species occurrence at project site(s) based on Montana Natural Heritage Program species reports (MNHP 2020) and/or species detections.	Impacts and rationale for dismissing from detailed analysis
<p>Western toad (<i>Anaxyrus boreas</i>) SOC</p>	<p>Habitat suitability for the western toad is considered moderate in the broad vicinity of three project sites: the Two Medicine Entrance Station, the East Glacier Ranger Station, and the Many Glacier water tanks site (MNHP 2020). Park staff have also detected the species at the Goat Haunt Ranger Station.</p>	<p>Western toads would not likely be present at the East Glacier Ranger Station or Many Glacier water tanks project sites because these areas are graveled or sparsely vegetated sites and lack the appropriate amount of vegetation and moisture for toads. MNHP records for these sites are from wet areas approximately 0.3 mile away (and in the case of East Glacier, across the highway and north of the town). Toads may be present at the Two Medicine Entrance Station, which is adjacent to the Two Medicine Lake shoreline. The possible removal of a tree would cause microhabitat changes in shade and moisture levels. Given the generally well-vegetated nature of the surrounding area, however, the removal of the tree would not measurably change toad habitat nor the species' distribution or abundance at the site. Therefore, there would be no notable or meaningful biological impacts to the western toad, and the species is dismissed from detailed analysis.</p>
<p>Common loon (<i>Gavia immer</i>) SOC MBTA</p>	<p>MNHP habitat modeling identifies suitable native habitat for the common loon in the vicinity of three project sites: the Many Glacier Entrance Station, Many Glacier Ranger Station, and Two Medicine Entrance Station (MNHP 2020). Park staff also frequently observe loons on Waterton Lake near the Goat Haunt Ranger Station project site.</p>	<p>MNHP habitat modeling likely identifies the Many Glacier Entrance Station as suitable habitat because it is adjacent to Lake Sherburne. But common loons are not known to nest on Lake Sherburne, given the fluctuation water levels of the reservoir, high amount of wave action, and high levels of human activity. Noise from heavy equipment at the Many Glacier Ranger Station would be unlikely to disturb loons given the distance (approx. 1/3 mile) to Swiftcurrent Lake, the nearest water body where loons could be nesting. Loons are not known to nest at Two Medicine Lake, adjacent to the Two Medicine Entrance Station, but do forage at the lake. Project activities proposed at the Two Medicine Entrance Station would not differ measurably from existing human activity, and the potential to disturb foraging loons would not change in any measurable way. For these reasons, the species is dismissed from detailed analysis.</p>
<p>Harlequin duck (<i>Histrionicus histrionicus</i>) SOC MBTA</p>	<p>MNHP reports identify suitable native stream habitat for harlequin ducks in the vicinity of four project sites: the Many Glacier Entrance Station, Many Glacier Ranger Station, Polebridge Ranger Station, and Walton Ranger Station (MNHP 2020).</p>	<p>Potential stream habitat for harlequin ducks is at too great a distance from the project sites for project activities to disturb or displace any harlequin ducks that may be present. For these reasons, harlequin ducks would not be impacted and are dismissed from detailed analysis.</p>

Species and Special Listing Status	Species occurrence at project site(s) based on Montana Natural Heritage Program species reports (MNHP 2020) and/or species detections.	Impacts and rationale for dismissing from detailed analysis
Black-backed woodpecker <i>(Picoides arcticus)</i> SOC MBTA	Habitat suitability for the black-backed woodpecker is moderate in the vicinities of two project sites: Apgar Mountain and The Loop on the Going -to-the-Sun Road (MNHP 2020). Black-backed woodpeckers have been observed in areas surrounding the Polebridge Ranger Station , although habitat suitability at the site is considered low (MNHP 2020).	At Apgar Mountain, evidence of breeding has been documented at lower elevations; the species would not likely be present at the summit where work activities would occur. Black-backed woodpeckers are also unlikely to be nesting in proximity to the Loop, given the existing high levels of vehicle traffic and human activity at the site. Project sites under the plan would be surveyed for the presence of migratory birds, including the black-backed woodpecker. If the species is present (at the Polebridge Ranger Station or other sites), vegetation removal, tree-thinning, and excavation with heavy machinery would not occur until after the critical breeding and nesting period to avoid impacts to species reproduction. For these reasons, there would be no biologically meaningful effects to the black-backed woodpecker and no impacts to species populations and distribution. Therefore, the species is dismissed from detailed analysis.

Species and Special Listing Status	Species occurrence at project site(s) based on Montana Natural Heritage Program species reports (MNHP 2020) and/or species detections.	Impacts and rationale for dismissing from detailed analysis
<p>Bald eagle (<i>Haliaeetus leucocephalus</i>)</p> <p>SOC MBTA BGEPA</p>	<p>Habitat suitability for bald eagles is moderate in the vicinity of two project sites, the Goat Haunt Ranger Station and the Polebridge Ranger Station (MNHP 2020).</p>	<p>Bald eagles have been documented foraging at the head of Upper Waterton Lake, adjacent to the Goat Haunt Ranger Station; nesting was last documented at the lake in 2020, approx. 2.5 kilometers from the ranger station (Glacier NP files). There are no known bald eagle nests in the immediate vicinity of the Polebridge Ranger Station, but bald eagles forage along the adjacent North Fork of the Flathead River and are often observed in the area (Glacier NP files).</p> <p>Noise from heavy equipment could potentially disturb bald eagles that may be nesting nearby (e.g. within approximately one kilometer) and could also displace foraging eagles. As a mitigation measure, heavy equipment would not be in use at Goat Haunt until late summer or early fall, after the critical breeding and nesting period. The Polebridge Ranger Station project area would be surveyed for nesting bald eagles; if bald eagles are documented nesting in the area, heavy equipment use would not occur until after the nesting season at this site as well. Post-nesting season, noise from heavy equipment could temporarily displace eagles from foraging in proximity to the immediate work site. But the equipment use would be too short in duration (estimated 3-5 days at Polebridge and 2-3 days at Goat Haunt) to have a lasting effect on foraging, both lakes are large enough to support foraging in alternate locations, and eagles would be expected to resume use of lake area near the project sites once project activities are over. Therefore, since project activities would not affect bald eagle reproduction, populations, or overall species distribution, there would be no potential for biologically meaningful or long-term impacts, and the species is dismissed from detailed analysis.</p>

Species and Special Listing Status	Species occurrence at project site(s) based on Montana Natural Heritage Program species reports (MNHP 2020) and/or species detections.	Impacts and rationale for dismissing from detailed analysis
<p>Clark's nutcracker (<i>Nucifraga columbiana</i>) SOC MBTA</p>	<p>Habitat suitability for the Clark's nutcracker is considered moderate in the vicinities of two project sites: Looking Glass Hill and the Two Medicine Entrance Station (MNHP 2020). The species has also been documented in the vicinity of Logan Pass, Two Medicine Communications Tower, and Polebridge Ranger Station, although habitat suitability at these sites is considered low (MNHP 2020). The Elk Mountain project site is also considered optimal habitat for the species.</p>	<p>Helicopter sling load deliveries to Looking Glass Hill (or other locations for temporary SOA repeaters or additional permanent radio repeaters where the species is present) could disturb Clark's nutcrackers. But the potential for disturbance would be temporary (estimated at one day), sling load deliveries are typically short in duration (estimated at about five minutes), and displaced individuals would be expected to resume use of the area once the helicopter departs and/or sling load operations are over. Other project sites under the plan would be surveyed for the presence of migratory birds, including Clark's nutcrackers. If the species is present, any vegetation removal, tree-thinning, or excavation with heavy machinery would not occur until after the critical breeding and nesting period to avoid impacts to species reproduction. For these reasons, there would be no long-term or biologically meaningful effects to the Clark's nutcracker and no impacts to species populations and distribution. Therefore, the species is dismissed from detailed analysis.</p>
<p>Brown creeper (<i>Certhia americana</i>) SOC MBTA</p>	<p>Habitat suitability for the brown creeper is considered moderate in the vicinities of six project sites: Looking Glass Hill, Apgar Mountain, Chief Mountain POE, the Two Medicine Entrance Station, Walton Ranger Station, and the Loop on the Going-to-the-Sun Road (MNHP 2020).</p>	<p>At Apgar Mountain, brown creepers have been documented at lower elevations but would not likely be present at the summit and the project site. Brown creepers are also unlikely to be nesting in proximity to the Loop, given the existing high levels of vehicle traffic and human activity at the site. Helicopter sling load deliveries to Looking Glass Hill or Apgar Mountain (or other locations for temporary SOA repeaters or additional permanent radio repeaters where the species is present) could disturb brown creepers. But the potential for disturbance would be temporary (estimated at one day), sling load deliveries are typically short in duration (estimated at about five minutes), and displaced individuals would be expected to resume use of the area once the helicopter departs and/or sling load operations are over. Other project sites would be surveyed for the presence of migratory birds, including brown creepers. If the species is present, any vegetation removal, tree-thinning, or excavation with heavy machinery would not occur until after the critical breeding and nesting period to avoid impacts to species reproduction. For these reasons, there would be no long-term or biologically meaningful effects to the brown creeper and no impacts to species populations and distribution. Therefore, the brown creeper is dismissed from detailed analysis.</p>

Species and Special Listing Status	Species occurrence at project site(s) based on Montana Natural Heritage Program species reports (MNHP 2020) and/or species detections.	Impacts and rationale for dismissing from detailed analysis
<p>Varied thrush (<i>Ixoreus naevius</i>) SOC MBTA</p>	<p>Habitat suitability for the varied thrush is considered moderate in the vicinities of five project sites: Looking Glass Hill, Apgar Mountain, the Two Medicine Entrance Station, Walton Ranger Station, and the Loop on the Going-to-the-Sun Road (MNHP 2020). The species has also been documented in the vicinity of Logan Pass, although habitat suitability at the site is considered low (MNHP 2020).</p>	<p>Helicopter sling load deliveries at Looking Glass Hill and Apgar Mountain (or other locations for temporary SOA repeaters or additional permanent radio repeaters where the species is present) could disturb the varied thrush. But the potential for disturbance would be temporary (estimated at one day), sling load deliveries are typically short in duration (estimated at about five minutes), and displaced individuals would be expected to resume use of the area once the helicopter departs and/or sling load operations are over. Other project sites would be surveyed for the presence of migratory birds, including the varied thrush. If migratory birds are present, any removal of trees or other vegetation and any excavation with heavy machinery would not occur until after the critical breeding and nesting period to avoid impacts to species reproduction. For these reasons, there would be no long-term or biologically meaningful effects to the varied thrush and no impacts to species populations and distribution. Therefore, the species is dismissed from detailed analysis.</p>
<p>Pileated woodpecker (<i>Dryocopus pileatus</i>) SOC MBTA</p>	<p>Habitat suitability for the pileated woodpecker is considered moderate in the vicinity of three project sites: Apgar Mountain, Walton Ranger Station, and Two Medicine Entrance Station (MNHP 2020). Indirect evidence of breeding has been documented within one mile of the Goat Haunt Ranger Station, although habitat suitability in the area is considered low (MNHP 2020).</p>	<p>Helicopters sling-load operations at Apgar Mountain (or other locations for temporary SOA repeaters or additional permanent radio repeaters where the species is present), could disturb pileated woodpeckers. But the potential for disturbance would be temporary (estimated at one day), sling load deliveries are typically short in duration (estimated at about five minutes), and displaced individuals would be expected to resume use of the area once the helicopter departs and/or sling load operations are over. Project sites would be surveyed for the presence of migratory birds, including pileated woodpeckers. If the species is present, any removal of trees or other vegetation and any excavation with heavy machinery would not occur until after the critical breeding and nesting period to avoid impacting species reproduction. For these reasons, there would be no long-term or biologically meaningful effects to pileated woodpeckers and no impacts to species populations and distribution. Therefore, the pileated woodpecker is dismissed from detailed analysis.</p>

Species and Special Listing Status	Species occurrence at project site(s) based on Montana Natural Heritage Program species reports (MNHP 2020) and/or species detections.	Impacts and rationale for dismissing from detailed analysis
Cassin's finch <i>(Haemorhous cassinii)</i> SOC MBTA	Habitat suitability for the Cassin's finch is considered moderate in the vicinity of two project sites: Apgar Mountain and the East Glacier Ranger Station (MNHP 2020).	Helicopters sling-load operations at Apgar Mountain (or other locations for temporary SOA repeaters or additional permanent radio repeaters where the species is present), could disturb Cassin's finches. But the potential for disturbance would be temporary (estimated at one day), sling load deliveries are typically short in duration (estimated at about five minutes), and displaced individuals would be expected to resume use of the area once the helicopter departs and/or sling load operations are over. Other project sites would be surveyed for the presence of migratory birds, including the Cassin's finch. If the species is present, any vegetation removal or excavation with heavy machinery would not occur until after the critical breeding and nesting period to avoid impacts to species reproduction. Therefore, there would be no long-term or biologically meaningful effects to the Cassin's finch and no impacts to species populations and distribution. Therefore, the species is dismissed from detailed analysis.
Veery (<i>Catharus fuscescens</i>) SOC MBTA	Habitat suitability for the veery is considered moderate at one project site, the East Glacier Ranger Station (MNHP 2020).	Project sites, including the East Glacier Ranger Station, would be surveyed for the presence of migratory birds, including the veery. If the species is present, any vegetation removal or excavation with heavy machinery would not occur until after the critical breeding and nesting period to avoid impacts to species reproduction. Therefore, there would be no biologically meaningful effects to the veery and no impacts to species populations and distribution. Therefore, the veery is dismissed from detailed analysis.

Species and Special Listing Status	Species occurrence at project site(s) based on Montana Natural Heritage Program species reports (MNHP 2020) and/or species detections.	Impacts and rationale for dismissing from detailed analysis
Black Swift (<i>Cypseloides niger</i>) SOC MBTA	According to MNHP species reports (2020), habitat suitability for the black swift is moderate at four project sites: Goat Haunt Ranger Station, Logan Pass, the Loop on the Going-to-the-Sun Road, and the Polebridge Ranger Station .	There is no suitable black swift nesting habitat at or near any of these sites given the absence of waterfalls, but black swifts may use foraging habitat along streams or rivers in the broad vicinity. None of the project activities at Logan Pass Visitor Center or the Loop would affect black swift foraging habitat. At the Goat Haunt Ranger Station, heavy equipment would not be in use until after the critical migratory bird breeding and nesting period to avoid impacts to bird reproduction. The Polebridge Ranger Station and other project sites would be surveyed for the presence of migratory birds. If black swifts are present, vegetation removal and excavation with heavy machinery would not occur until after the critical breeding and nesting period to avoid impacts to species reproduction. There would be no effects to species distribution or population and abundance, project activities would not directly or permanently change black swift habitat, and there would be no potential for biologically meaningful or long-term impacts. Therefore, the black swift is dismissed from detailed analysis.
Evening grosbeak (<i>Coccothraustes vespertinus</i>) SOC MBTA	Habitat suitability for the evening grosbeak is considered moderate in the vicinities of five project sites: Looking Glass Hill, Apgar Mountain, the Two Medicine Entrance Station, Walton Ranger Station, and the East Glacier Ranger Station (MNHP 2020). The species has also been documented in the vicinity of The Loop on the Going-to-the-Sun Road, although habitat suitability at the site is considered low (MNHP 2020).	Helicopter sling load deliveries to Looking Glass Hill and Apgar Mountain (or other locations for temporary SOA repeaters or additional permanent radio repeaters where the species is present) could disturb evening grosbeaks. But the potential for disturbance would be temporary (estimated at one day), sling load deliveries are typically short in duration (estimated at about five minutes), and displaced individuals would be expected to resume use of the area once the helicopter departs and/or sling load operations are over. Other project sites would be surveyed for the presence of migratory birds, including the evening grosbeak. If the species is present, any removal of trees or other vegetation and any excavation with heavy machinery would not occur until after the critical breeding and nesting period to avoid impacts to species reproduction. For these reasons, there would be no long-term or biologically meaningful effects to the evening grosbeak and no impacts to species populations and distribution. The species is, therefore, dismissed from detailed analysis.

Species and Special Listing Status	Species occurrence at project site(s) based on Montana Natural Heritage Program species reports (MNHP 2020) and/or species detections.	Impacts and rationale for dismissing from detailed analysis
Northern Hawk owl (<i>Surnia ulula</i>) SOC MBTA	Habitat suitability for the northern hawk owl is considered moderate at one project site, the Polebridge Ranger Station (MNHP 2020).	Project sites, including the Polebridge Ranger Station, would be surveyed for the presence of migratory birds. If northern hawk owls are present, vegetation removal and excavation with heavy machinery would not occur until after the critical breeding and nesting period to avoid impacts to species reproduction. For these reasons, there would be no biologically meaningful effects to the northern hawk owl, and no impacts to species populations and distribution. Therefore, the northern hawk owl is dismissed from detailed analysis.
Lewis's woodpecker (<i>Melanerpes lewis</i>) SOC MBTA	Habitat suitability for the Lewis' woodpecker is considered moderate at one project site, the Polebridge Ranger Station (MNHP 2020).	Project sites, including the Polebridge Ranger Station, would be surveyed for the presence of migratory birds. If Lewis' woodpecker is present, vegetation removal and excavation with heavy machinery would not occur until after the critical breeding and nesting period to avoid impacts to species reproduction. Therefore, there would be no biologically meaningful effects, and no impacts to species populations and distribution, and the species is dismissed from detailed analysis.
Great blue heron (<i>Ardea herodias</i>) SOC MBTA	Habitat suitability for the great blue heron is considered moderate at one project site, the Polebridge Ranger Station (MNHP 2020).	While habitat suitability in the area surrounding the Polebridge Ranger Station is considered moderate, it would be extremely unlikely for great blue herons to be at or near the ranger station project site. Project sites, including the Polebridge Ranger Station, would be surveyed for the presence of migratory birds. If the great blue heron is present, excavation with heavy machinery would not occur until after the critical breeding and nesting period. Therefore, there would be no biologically meaningful effects to great blue herons, and no impacts to species populations and distribution. Therefore, this species is dismissed from detailed analysis.
Horned grebe (<i>Podiceps auritus</i>) SOC MBTA	Habitat suitability for the great blue heron is considered moderate at one project site, the Polebridge Ranger Station (MNHP 2020).	Suitable habitat for horned grebes is not present at the Polebridge Ranger Station project site. The species may be present at small lakes or ponds in the broad vicinity, all of which are too distant from the ranger station for project activities to cause impacts. Because there would be no impacts to the horned grebe, the species is dismissed from detailed analysis.

Species and Special Listing Status	Species occurrence at project site(s) based on Montana Natural Heritage Program species reports (MNHP 2020) and/or species detections.	Impacts and rationale for dismissing from detailed analysis
Gray-crowned rosy finch (<i>Leucosticte tephrocotis</i>) SOC MBTA	Habitat suitability for the gray-crowned rosy finch is considered optimal at Logan Pass and moderate at Elk Mountain , the Many Glacier water tanks , and Two Medicine communications tower (MNHP 2020).	Helicopter sling load deliveries to Elk Mountain (or other locations for temporary SOA repeaters or additional permanent radio repeaters where the species is present) could disturb the species. But the potential for disturbance would be temporary (estimated at one day), sling load deliveries are typically short in duration (estimated at about five minutes), and displaced individuals would be expected to resume use of the area once the helicopter departs and/or sling load operations are over. Other project sites would be surveyed for the presence of migratory birds, including the gray-crowned rosy finch. If the species is present, any excavation with heavy machinery would not occur until after the critical breeding and nesting period to avoid impacts to species reproduction. Therefore, there would be no long-term or biologically meaningful effects to the gray-crowned rosy finch and no impacts to species populations and distribution, and the species is dismissed from detailed analysis.
White-tailed ptarmigan (<i>Lagopus leucura</i>) SOC	Habitat suitability for the white-tailed ptarmigan is considered moderate at one project site: Logan Pass .	The excavation (hand-dug) of an approximately 50-foot trench could temporarily alter associated foraging habitat for ptarmigans in the immediate area of the trench. Given the vast amount of undisturbed habitat in the Logan Pass area, however, and because any ground disturbance would be restored with native vegetation, the effect would be too slight to cause biologically meaningful or lasting impacts. Therefore, the white-tailed ptarmigan would not be impacted, and is dismissed from detailed analysis.

Species and Special Listing Status	Species occurrence at project site(s) based on Montana Natural Heritage Program species reports (MNHP 2020) and/or species detections.	Impacts and rationale for dismissing from detailed analysis
Boreal chickadee <i>(Poecile hudsonicus)</i> SOC MBTA	Habitat suitability for the boreal chickadee is considered moderate at two project sites: Looking Glass Hill and the Two Medicine Entrance Station (MNHP 2020). Park staff have also detected the species in the vicinity of the Many Glacier Entrance Station.	Helicopter sling load deliveries to Looking Glass Hill (or other locations for temporary SOA repeaters or additional permanent radio repeaters where the species is present) could disturb boreal chickadees, if present. But the potential for disturbance would be temporary (estimated at one day), sling load deliveries are typically short in duration (estimated at about five minutes), and displaced individuals would be expected to resume use of the area once the helicopter departs and/or sling load operations are over. The Two Medicine Entrance Station and other project sites would be surveyed for the presence of migratory birds, including boreal chickadees. If the species is present, the removal of trees or other vegetation would not occur until after the critical breeding and nesting period to avoid impacts to species reproduction. Therefore, there would be no long-term or biologically meaningful effects to the boreal chickadee and no impacts to species populations and distribution, and the species is dismissed from detailed analysis.
Pacific Wren <i>(Troglodytes pacificus)</i> SOC MBTA	Habitat suitability for the Pacific wren is considered moderate in the vicinities of three project sites: the Two Medicine Entrance Station, Walton Ranger Station, and the Loop on the Going-to-the-Sun Road (MNHP 2020). The species has also been documented, including indirect evidence of breeding, in the vicinity of the Many Glacier Entrance Station , although habitat suitability at the site is considered low (MNHP 2020).	Project sites would be surveyed for the presence of migratory birds, including the Pacific wren. If the species is present, vegetation removal, tree-thinning, and any excavation with heavy machinery would not occur until after the critical breeding and nesting period to avoid impacts to species reproduction. Therefore, there would be no biologically meaningful effects to the Pacific wren and no impacts to species populations and distribution, and the species is dismissed from detailed analysis.

Table E-2: State and federally listed **plant species** that could be present at one or more project sites and/or for which habitat at one or more project sites is at a level of moderate or optimal suitability. The table does not include the rationale for dismissing each plant species from detailed analysis because the rationale is the same for each. There would be no impacts to the plant species listed in Table E-2 because, prior to work beginning, each project site would be surveyed for listed plant species and any specimens found would be marked and avoided during project activities (see Mitigation Measures under Chapter 2 of the EA).

Special Listing Status Codes: **SOC** = State listed species of concern; **ESA threatened** = federally listed as threatened under the Endangered Species Act; **ESA proposed** = proposed for listing under the Endangered Species Act.

Species and Special Listing Status	Project site(s) with native, moderate, or optimal habitat suitability according to Montana Natural Heritage Program species reports (MNHP 2020)
Water howellia (<i>Howellia aquatilis</i>) ESA threatened SOC	Not documented as present according to MNHP nor likely to be present at any project sites. Water howellia is a wetland species that has been documented in northwest Montana. However, there are no known locations of the species within the park, despite multiple survey efforts over the years.
Spalding's catchfly (<i>Silene spaldingii</i>) ESA threatened SOS	Not documented as present according to MNHP nor likely to be present at any project sites. Spalding's campion is an open grassland species that has been documented in northwest Montana. However, there are no known locations of the species within the park, despite multiple survey efforts over the years.
Whitebark pine (<i>Pinus albicaulis</i>) ESA proposed threatened SOC	Elk Mountain Logan Pass Visitor Center area Looking Glass Hill
Round-leaved orchis (<i>Amerorchis rotundifolia</i>) SOC	Chief Mountain POE
Arctic sweet coltsfoot (<i>Petasites frigidus</i> var. <i>frigidus</i>) SOC	Chief Mountain POE Polebridge Ranger Station
Macount's gentian (<i>Gentianopsis macounii</i>) SOC	Chief Mountain POE
Sparrow's egg Lady's slipper (<i>Cypripedium passerinum</i>) SOC	Chief Mountain POE
Pale corydalis (<i>Corydalis sempervirens</i>) SOC	Apgar Mtn. Goat Haunt Ranger Station Many Glacier water tanks site

Species and Special Listing Status	Project site(s) with native, moderate, or optimal habitat suitability according to Montana Natural Heritage Program species reports (MNHP 2020)
Moonworts (<i>Botrychium spp.</i>) SOC	Apgar Mountain Many Glacier water tanks site Chief Mountain POE Logan Pass Visitor Center area Many Glacier Entrance Station Two Medicine Entrance Station Two Medicine Communications Tower
Upward-lobed moonwort (<i>Botrychium ascendens</i>) SOC	Chief Mountain POE Many Glacier Entrance Station Many Glacier water tanks Site Two Medicine Entrance Station
Hudson's Bay bulrush (<i>Trichophorum alpinum</i>) SOC	Many Glacier water tanks site
Tilesius wormwood (<i>Artemisia tilesii</i>) SOC	Many Glacier water tanks site
Michigan moonwort (<i>Botrychium michiganense</i>) SOC	Many Glacier water tanks site
Wavy moonwort (<i>Botrychium crenulatum</i>) SOC	Many Glacier water tanks site
Peculiar moonwort (<i>Botrychium paradoxum</i>) SOC	Many Glacier water tanks site Polebridge Ranger Station
Yakutat moonwort (<i>Botrychium yaaxudakeit</i>) SOC	Many Glacier water tanks site
Linearleaf moonwort (<i>Botrychium lineare</i>) SOC	Chief Mountain POE Many Glacier water tanks site

Species and Special Listing Status	Project site(s) with native, moderate, or optimal habitat suitability according to Montana Natural Heritage Program species reports (MNHP 2020)
Prairie moonwort (<i>Botrychium campestre</i>) SOC	Chief Mountain POE Many Glacier water tanks site
Western Moonwort (<i>Botrychium hesperium</i>) SOC	Many Glacier water tanks site Two Medicine Communications Tower Polebridge Ranger Station
Clasping groundsel (<i>Senecio amplexans</i>) SOC	Two Medicine Entrance Station Two Medicine Communications Tower
Bractless hedge hyssop (<i>Gratiola ebracteate</i>) SOC	Two Medicine Entrance Station Looking Glass Hill
Schreber's dicranella moss (<i>Dicranella schreberiana</i>) SOC	Walton Ranger Station
Dwarf onion (<i>Allium simillimum</i>) SOC	Walton Ranger Station
Pale moonwort (<i>Botrychium pallidum</i>) SOC	Polebridge Ranger Station
Least moonwort (<i>Botrychium simplex</i>) SOC	Polebridge Ranger Station
Tufted club-rush (<i>Trichophorum cespitosum</i>) SOC	Logan Pass Visitor Center area
Goose-grass sedge (<i>Carex plectocarpa</i>) SOC	Logan Pass Visitor Center area
Northern fescue (<i>Festuca viviparoidea</i>) SOC	Logan Pass Visitor Center area

Species and Special Listing Status	Project site(s) with native, moderate, or optimal habitat suitability according to Montana Natural Heritage Program species reports (MNHP 2020)
Dense-leaf draba (<i>Draba densifolia</i>) SOC	Logan Pass Visitor Center area Many Glacier water tanks site
Macoun's draba (<i>Draba macounii</i>) SOC	Logan Pass Visitor Center area
Alpine glacier poppy (<i>Papaver pygmaeum</i>) SOC	Logan Pass Visitor Center area Many Glacier water tanks site Two Medicine Communications Tower
Arctic eyebright (<i>Euphrasia subarctica</i>) SOC	Logan Pass Visitor Center area
Small tofieldia (<i>Tofieldia pusilla</i>) SOC	Logan Pass Visitor Center area
Three-flowered rush (<i>Juncus triglumis</i> var. <i>albescens</i>) SOC	Logan Pass Visitor Center area
Simple kobresia (<i>Kobresia simpliciuscula</i>) SOC	Logan Pass Visitor Center area
Banff bluegrass (<i>Poa laxa</i> spp. <i>banffiana</i>) SOC	Logan Pass Visitor Center area
Marsh horsetail (<i>Equisetum palustre</i>) SOC	Logan Pass Visitor Center area
Stalk-leaved monkeyflower (<i>Mimulus ampliatus</i>) SOC	Logan Pass Visitor Center area
Stiff matt moss (<i>Brachythecium turgidum</i>) SOC	Logan Pass Visitor Center area The Loop

Species and Special Listing Status	Project site(s) with native, moderate, or optimal habitat suitability according to Montana Natural Heritage Program species reports (MNHP 2020)
Richardson's Calliargon Moss (<i>Calliargon richardsonii</i>) PSOC	Logan Pass Visitor Center area
A Dicranum Moss (<i>Dicranum spadiceum</i>) PSOC	Logan Pass Visitor Center area
Meesia Moss (<i>Meesia uliginosa</i>) SOC	Logan Pass Visitor Center area
Angled Paludella Moss (<i>Paludella squarrosa</i>) SOC	Logan Pass Visitor Center area
A Windblown Moss (<i>Paraleucobryum enerve</i>) SOC	Logan Pass Visitor Center area
Blunt Water Moss (<i>Pseudocalliargon trifarium</i>) PSOC	Logan Pass Visitor Center area
A Pseudocalliargon Moss (<i>Pseudocalliargon turgescens</i>) PSOC	Logan Pass Visitor Center area
Schleicher's Ptychostomum Moss (<i>Ptychostomum schleicheri</i>) SOC	Logan Pass Visitor Center area
Warnstorfia Moss (<i>Sarmentypnum exannulatum</i>) SOC	Logan Pass Visitor Center area Walton Ranger Station
A Sarmenthypnum Moss (<i>Sarmentypnum sarmentosum</i>) PSOC	Logan Pass Visitor Center area
Limprichtia Moss (<i>Scorpidium revolvens</i>) SOC	Logan Pass Visitor Center area

Species and Special Listing Status	Project site(s) with native, moderate, or optimal habitat suitability according to Montana Natural Heritage Program species reports (MNHP 2020)
Lanceleaf moonwort (<i>Botrychium lanceolatum</i>) SOC	Logan Pass Visitor Center area
Northern moonwort (<i>Botrychium pinnatum</i>) SOC	Logan Pass Visitor Center area The Loop

Reference

Montana Natural Heritage Program (MNHP). 2020. Environmental summary exports for project sites.