



National Park Service
U.S. Department of the Interior

Grand Teton National Park
John D. Rockefeller, Jr. Memorial Parkway

Grand Teton National Park Telecommunications Infrastructure Plan and Environmental Assessment



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Acronyms and Abbreviations

APE	Area of Potential Effect
BA	Biological Assessment
BMP	Best Management Practice
CCC	Civilian Conservation Corps
DO	Director's Order
EA	Environmental Assessment
EO	Executive Order
ESA	Endangered Species Act
FCC	Federal Communications Commission
GPS	global positioning system
HDPE	high-density polyethylene
IDT	Interdisciplinary Team
KOP	Key Observation Point
LE/EMS	Law Enforcement and Emergency Medical Services
LTE	Long-Term Evolution
NEPA	National Environmental Policy Act
NHL	National Historic Landmark
NPS	National Park Service
NRHP	National Register of Historic Places
NTIA	National Telecommunications and Information Administration
ODAS	Outdoor Distributed Antenna System
Park	Grand Teton National Park and John D. Rockefeller, Jr. Memorial Parkway
PEPC	Planning, Environment & Public Comment
PVC	polyvinyl chloride
RM	Reference Manual
SAR	Search and Rescue
SF	square feet
SHPO	State Historic Preservation Office
TIDC	Teton Interagency Dispatch Center
USBR	U.S. Bureau of Reclamation
USFWS	U.S. Fish and Wildlife Service

1 PURPOSE AND NEED

1.1 Proposal

The National Park Service (NPS) is considering the issuance of a right-of-way permit for the installation of a fiber optic cable network and wireless telecommunications facilities at strategic developed locations within Grand Teton National Park and John D. Rockefeller, Jr. Memorial Parkway (collectively the park) and connecting to Yellowstone National Park's south entrance. Because the Bureau of Reclamation (USBR) manages lands and facilities at Jackson Lake Dam within the park that may be impacted by installation of the fiber optic cable network and wireless telecommunications facilities, additional authorization is required by the USBR.

Over the past 15 years, the park has processed multiple right-of-way permit requests for installation of fiber optic cable network and wireless telecommunications facilities. In October 2013, representatives from Grand Teton and Yellowstone national parks, USBR, cellular and broadband service providers, and the NPS Intermountain Region met to discuss various telecommunications issues. At that time the park supplied providers with a summary of existing telecommunications infrastructure within the park, anticipated NPS requirements, and other information to address future park telecommunications needs. The park requested that the providers work together to develop one proposal that would meet the needs of the park, as well as the providers' requests.

In January 2014, the park issued a request for information for technically possible options for consolidating and expanding telecommunications infrastructure with the capacity to expand to the south gate of Yellowstone National Park. In March 2014, Diamond NPS LLC, itself, or its affiliate responded to the request for information. In April 2015, the park received the initial right-of-way permit request that initiated this planning process from AT&T, with Diamond NPS LLC as AT&T's agent (collectively, the applicant). After meeting with applicant representatives, the NPS requested additional information and details, and held several meetings and field trips to identify potential alternatives that would minimize impacts to park resources. The applicant also submitted a right-of-way permit request to the USBR for the portion of the proposal that would cross federal lands and facilities managed by the USBR. This document represents the latest locations and technology that were determined to have the least environmental impacts. (See Appendix A – Alternatives and Designs Considered but Dismissed for alternatives and options that were previously considered.)

The scope of this Telecommunications Infrastructure Plan (plan) is limited to addressing fiber optic and wireless telecommunications services, such as internet, voice over internet protocol, and cellular (cell) phones¹. Wireless telecommunications can include cell phones, pagers, and two-way enhanced radio systems, and relies on a combination of landlines, fiber, and an extensive network of elevated antennas, typically found on communication towers, to transmit voice and data information. This plan is narrowly tailored and does not address other

¹ Fiber optic is a medium or infrastructure used to transmit data (utility infrastructure like telephone, electricity, etc.).

Internet is a global system of interconnected computer "networks." Data is added, stored, and retrieved through "broadband" or other types of transmissions (e.g., dial-up). Broadband is usually defined as high-speed internet access delivered by any method. Broadband can be provided by DSL, cable modem, fiber, cell, etc.).

technologies, such as landline telephone, television, and radio (other than two-way radios which are used by the park and are addressed in this plan). The life of this plan is 20 years; park management has taken into consideration future needs and believes that most crucial areas would be covered over that timeframe through the infrastructure proposed.

1.2 Purpose and Need

The NPS and USBR need to consider the permit requests for updating and expanding telecommunication capabilities in developed areas of Grand Teton National Park that currently support critical park operations and/or see a high volume of park visitors. Consideration of the permit requests is required by Executive Order (EO) 13821, Streamlining and Expediting Requests to Locate Broadband Facilities in Rural America, as well as the Telecommunications Act of 1996 (P.L. 104-104, 110 Stat. 56), which authorizes, but does not mandate, a presumption that such requests be granted. In addition to responding to this request, the NPS is using this opportunity to address the park's telecommunications infrastructure comprehensively in order to enhance communication and operational efficiencies.

Telecommunications upgrades are needed to address inadequate and outdated telecommunications services required to effectively meet mission critical business operations, including safety and emergency services, resource protection, and visitor services, and to meet visitor expectations for connectivity. Park management, concessioners, and partners are increasingly relying on modern communications technology for daily operations; however, telecommunications services in developed areas in the park are currently limited or non-existent. Management of these operations requires access to internet and intranet systems to perform basic operations and visitor service functions. The park's human resources procedures, payroll, budget, procurement, and contracting are all internet-based. Some administrative functions are also regionally or nationally based, with support provided to multiple parks. Because of the current reliability issues in the park, impacts to the system can be widespread.

Infrastructure that is currently in place was piecemealed over a long period of time. Some of the existing fiber network was direct buried without conduit, leaving sections at a high risk of exposure and subsequent damage. There is also very little documentation concerning line location, leading to inadvertent damage and subsequent network outages.

The park's lack of suitable telecommunications infrastructure in developed areas affects not only park operations, but also NPS, USBR, and partner/concessioner employees. The NPS, USBR, concessioners, and partners employ approximately 1,650 people during the peak summer season and 250 during the remainder of the year. With the current infrastructure, there is a lack of reliable internet and cellular service within facilities and housing areas for use by permanent and seasonal employees and their families living in the park. Online services such as banking, social media, work and personal email, and other critical information are all things that individuals have grown accustomed to using regularly and many expect to have access to when they work in the park. These online services also include those that are necessary for employees with children that require access to school websites and other online planning tools.

The lack of reliable internet and cellular connectivity may affect the seasonal workforce more than those with permanent housing and internet connections; anecdotal evidence notes seasonal employees' concerns about digital isolation – from online services, from family, and from pursuit of off-season education and job opportunities – and this may affect workforce retention.

Park visitors are also affected by the inadequate telecommunication systems in the park. In addition to wanting to take advantage of internet-based resources that the park has developed, some visitors also would like to connect to resources outside the park. There are many developed areas of the park, including where there are overnight services provided, where this is not currently possible.

The plan would improve cellular and broadband service at strategic developments in the park that currently have significant park staff presence and/or see a high volume of visitors. Although some spillover of wireless signals may extend into backcountry/wilderness areas, it is not the intent of this plan to extend services into the backcountry and/or recommended wilderness. Nor is it the intent to provide coverage to all road sections within the park.

Specifically, the plan has the following goals:

- Improve emergency services provided by the NPS and its federal/county partners, including fire, law enforcement, health and safety, and emergency medical response (including 911 emergency system coverage).
- Expand capacity, reliability, and reach of telecommunications to support park operations, including park administration, visitor protection and services, research and education, concessioner operations, and facility maintenance.
- Provide cellular high speed wireless voice and data coverage to provide information to visitors via park-developed educational websites, interactive mobile applications, and other online tools that inform and connect visitors to the park and its resources.
- Provide cellular high speed wireless voice and data coverage to visitors while they are in the park.
- Enhance resource monitoring and research-related communications equipment (i.e., wildlife, seismic, air quality, noise, weather, streamflow, and photographic/video) that transmit data to park staff, universities, government agencies, and the public.
- Reliable internet and cellular service within the park and partner/concessioner facilities and housing areas, vital for recruiting and retaining the next generation of employees.

1.3 Applicable Laws, Regulations, and Policies

The Proposed Action considered in this EA is in part guided by section 8.6.4.3 of the NPS Management Policies (NPS 2006a). The Management Policies direct parks to consider requests to site non-NPS telecommunications facilities on NPS lands in accordance with the Telecommunications Act of 1996, 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. A summary of the telecommunications laws, regulations, and other guidance that are most applicable to this plan are presented below.

Telecommunications Act of 1996, PL 104-104, 110 STAT. 56 § 704(C) (February 8, 1996): Section 704(c) and its regulations make federal property, including park land, available for placement of telecommunications equipment by duly authorized providers absent unavoidable conflicts with the department or agency's mission, the current or planned use of the property, or access to that property.

EO 13821, Streamlining and Expediting Requests to Locate Broadband Facilities in Rural America (January 8, 2018): The President signed EO 13821 to reduce barriers to capital investment, remove obstacles to broadband services, and more efficiently employ government

resources in order to foster rural broadband infrastructure projects. The guidance states, “Federal property managing agencies shall expeditiously review and approve such requests unless an approval would negatively affect performance of the agency’s mission or otherwise not be in the best interests of the United States.”

Presidential Memorandum: Facilitating Access to Federal Property for the Siting of Mobile Services Antennas, 60 FR 42023, 40 USC 581, NOTE, 1995 (August 10, 1995): This Presidential Memorandum directs all department and agency heads to facilitate appropriate access to federal property for the purpose of siting mobile services antennas as long as such siting is in accordance with federal, state, and local laws and regulations, environmental and aesthetic concerns, preservation of historic buildings and monuments, protection of natural and cultural resources, and protection of national park and wilderness values.

36 CFR 14, Rights-of-Way: The NPS general authority to issue right-of-way permits for uses such as wireless telecommunications facilities is found in NPS regulations at 36 CFR Part 14. This section addresses the management of right-of-way permits on NPS lands and contains the applicable terms and conditions. These are revocable permits, and not leases or any other estate or interest in land.

54 USC 100902, Rights-of-Way for Public Utilities and Power and Communication Facilities: The Secretary may grant a right-of-way over, across, and on through a system unit to a citizen, association, or corporation of the United States that intends to use the right-of-way for poles and lines for communication purposes; and radio, television, and other forms of communication transmitting, relay, and receiving structures and facilities. A right-of-way under this subsection shall be allowed within or through a system unit only on the approval of the Secretary and on a finding that the right of way is not incompatible with the public interest.

NPS Director’s Order (DO)-53, “Special Park Uses” (2000): DO-53 (along with its implementing guidance in NPS Reference Manual (RM)-53, Special Park Uses) addresses procedures for permitting wireless telecommunication facilities in units of the National Park System. Such facilities are authorized with a right-of way permit and are subject to all terms and conditions associated with issuing rights-of-way in NPS units, including requirements of the National Environmental Policy Act of 1969 (NEPA), as amended (42 USC 4321 et seq.). Park staff will comply with DO-53 and its implementing guidance in RM-53, which together direct how the NPS implements the Telecommunications Act of 1996 and subsequent directives.

1.4 Issues and Impact Topics

1.4.1 Issues and Impact Topics Retained for Consideration

The following topics are carried forward for further analysis in this Environmental Assessment (EA):

- Visual Resources
- Cultural Resources
- Visitor Use and Experience

1.4.2 Issues and Impact Topics Considered but Dismissed from Further Analysis

The following were determined not to warrant more detailed analysis in this EA and were dismissed from further analysis. A brief rationale for dismissal is provided for each topic.

1.4.2.1 Health and Human Safety from Electromagnetic Frequency Fields

Human health and safety concerns associated with this plan are related to exposure to electromagnetic frequency fields. The potential adverse effects on human health from exposure to cellular antennas, and two-way radio systems are considered negligible. According to the American Cancer Society, public exposure to radio waves from cell phone tower antennas is slight for several reasons. The power levels are relatively low, the antennas are generally mounted high above ground level, and the signals are transmitted intermittently, rather than constantly (American Cancer Society 2018). At ground level near typical cellular base stations, the amount of radio frequency energy is thousands of times less than the limits for safe exposure set by the Federal Communications Commission (FCC), National Telecommunications and Information Administration (NTIA), and other regulatory authorities. It is very unlikely that a person could be exposed to radio frequency levels in excess of these limits just by being near a cell phone tower; the amount of exposure from living near a cell phone tower is typically many times lower than the exposure from using a cell phone (American Cancer Society 2018). According to the World Health Organization, considering the very low exposure levels and research results collected to date, there is no convincing scientific evidence that the weak radio frequency signals from base stations and wireless networks cause adverse health effects (WHO 2006).

All telecommunications facilities would be constructed in a manner that meets the minimum requirements and standards of the Standard Building Code, the National Electrical Code, National Fire Protection Association Code, and the Standard Mechanical Code. The FCC and NTIA have established electromagnetic field safety standards and extensive domestic and international research has not determined any hazard from wireless telecommunications facilities operating at regulated power levels. No single wireless telecommunications facility or combination of wireless telecommunications facilities would be permitted that exceed the FCC standards for human exposure at the point of closest public access. Visitors and employees working around facilities and residents living near facilities would experience radio frequency exposures lower than the maximum permissible exposure. Required signage would be installed where necessary to inform the public and employees of any risks.

1.4.2.2 Soils, Vegetation, and Wetlands

Long-term ground disturbance would be approximately 26 acres, or approximately 0.01 percent of the park area (see Table 2 in Chapter 2). Impacts to soils and vegetation would be lessened because the proposed infrastructure would be built within existing rights-of-way and/or previously disturbed areas and most of the impacts would be temporary, occurring during construction. Construction of the fiber optic network and wireless telecommunications facilities is proposed to take place during the construction window for the park (typically April to October) and may take place over two seasons. Short-term effects would occur during and related to construction. Long-term effects would last beyond the construction period. The right-of-way permit would allow for long-term use for routine operations and maintenance. The

Proposed Action would use already established staging areas that are used for park, USBR, and contractor construction, storage, and staging. (See Section 2.3.4 for installation details.)

Soils. The proposed main fiber optic cable installation would create approximately 62.5 miles of temporary linear disturbance of soils along park roads from the south to the north part of the park, and the lateral lines approximately 21.4 miles of temporary linear disturbance. Disturbance from plowing to install the fiber optic cable would vary due to many factors such as terrain, subsurface conditions, and other obstacles. For the purposes of analysis, a 10-foot disturbance width was used in order to overestimate impacts and to account for larger areas of impacts where handholes would be buried, where holes would be dug to splice lines, and where boring occurs. The main fiber optic cable installation would temporarily disturb approximately 75 acres and the lateral fiber lines would temporarily disturb approximately 30 acres during construction. The soil disturbance could compact the existing topsoil and expose soils to erosion by wind and water. In the long term, access and maintenance of the line would result in possible ground disturbance and compaction, although on a smaller scale in localized areas. Where there is the potential for ground disturbance to cause erosion, disturbed areas would be revegetated following construction and maintenance work. Once soils are stabilized the potential for erosion would be minimal.

Installation of wireless telecommunications facilities would result in approximately 0.56 acres (25,800 square feet) of long-term disturbance. These facilities would permanently displace soils. The proposed telecommunication sites would be in relatively flat areas that have been previously disturbed, thus the potential for erosion by surface water runoff would be minimal. Best management practices (BMPs) would be implemented during installation and disturbed areas would be revegetated following construction and maintenance work where erosion may occur.

Vegetation. The majority of the proposed fiber optic network would be installed along existing road shoulders in previously disturbed areas with minimal native vegetation and surrounded by habitats supporting populations of more abundant plant species. Disturbances that result in bare ground, disturbed ground, or vegetation removal of any type can result in invasive plant spread in any vegetation type. Roadsides are particularly vulnerable to non-native, invasive species because of continual disturbance resulting from maintenance activities and vehicular traffic and runoff, as well as the roadway corridors acting as a vector for the spread of invasive species. The main technique of installing the conduit into the ground involves using a vibrating tooth or plow. Another vehicle, most likely a wheeled vehicle, would follow the vehicle installing the conduit. Impacts to vegetation would be avoided by installing the conduit either within the road itself or adjacent to the road, both of which are either devoid of vegetation or have vegetation common to roadside projects which can be revegetated when necessary.

Site vegetation surveys would be implemented prior to installation of any wireless telecommunications facility to identify any sensitive areas or plants, as well as invasive species. The potential for spread of invasive species would be reduced by minimizing disturbance, cleaning equipment prior to use in the park, aggressively treating and removing invasive plants before, during, and after implementation, and revegetating disturbed areas.

The locations for proposed new wireless telecommunications infrastructure are in previously disturbed areas or other areas with minimal vegetation and are surrounded by habitat supporting populations of abundant plant species. In some instances, small areas of vegetation would be disturbed in construction areas; however, the infrastructure would not be sited in areas that could

impact rare plants or other sensitive vegetation. In locations where disturbance occurs, it would be seeded or revegetated with approved native species. Implementation of BMPs would minimize and mitigate the potential for impacts to vegetation including the spread of invasive, non-native plant species.

Wetlands. The proposed fiber optic cable would cross some areas along the road where wetlands are present. Wetlands identified along the proposed route would be avoided through project design; installation of conduit would be bored under any wetlands present or avoided by going around an area. Clean Water Act permitting would be conducted if an area is found which cannot be avoided.

1.4.2.3 Soundscape Management

The developed areas considered for construction in this plan are areas where people are present and where sounds generated by construction and maintenance activities would not appreciably affect the existing soundscape. During construction, noise levels would increase due to the use of heavy equipment. Maintenance impacts would be of shorter duration and would occur in smaller, more localized areas. BMPs for noise mitigation (such as ensuring that motorized vehicles and equipment have properly functioning mufflers and construction equipment and other motor vehicles do not idle longer than is necessary) would be followed, and any additional human-caused sounds would result in a temporary impact on visitors and employees. Operational noise associated with telecommunications facilities would not appreciably increase the ambient noise of developed areas because equipment shelters would be designed to reduce noise. The shelters would be affixed with external low noise blower kits on each air conditioning unit to help reduce sound levels and dampen the sound of the compressor. Diesel generators located inside the generator shelters would also be fitted with mufflers to reduce noise. The generators are provided for back-up power and would only operate when electrical grid power has failed, and thus would not be a source of increased noise the majority of the time. In the case of a power failure the generators would be used to power the telecommunications facilities and the entire fiber optic network. The only exception is during routine maintenance and testing of the generators, which would require them to operate for approximately 10 minutes a week to ensure they function properly when needed. Routine performance testing would be performed remotely.

During the scoping period there were concerns about impacts from people talking on cell phones, especially while visiting backcountry/wilderness areas where reception may become unintentionally available. While cell phone usage in developed areas may increase, the park would implement mitigation measures such as visitor education through signage on the importance of natural soundscapes and being respectful of other visitors.

1.4.2.4 Water Resources and Fisheries

Although the Proposed Action would cause ground disturbance, the amount of erosion that could reach and impact surface waters would be expected to be negligible because installation, operation, and maintenance would occur primarily in small areas with little to no slope. In addition, infrastructure design and other mitigations would follow Wyoming Department of Environmental Quality requirements. Where there is the potential for ground disturbance to cause erosion or affect water quality, disturbed areas would be revegetated following construction and maintenance work. If the work requires a National Pollutant Discharge

Elimination System permit for stormwater discharges, then a Stormwater Pollution Prevention Plan would be required.

Fiber optic cable routes near water features would be bored below the channel beds of rivers, streams, and creeks with surface water or suspended on existing bridges; therefore, installation and operation would have no effect on surface waters. Boring under water courses or installing the conduit by suspending it on existing bridges would avoid creating impacts to these habitats including riparian areas. Furthermore, when surface water features are to be crossed using directional boring, the drilling pits would be installed outside of the bank areas. There would be no impact to channels or other dynamic elements of surface waters within the project area and no impact to fluvial geomorphic characteristics of the Snake River system and other surface waters are anticipated. The installation process is flexible and can be adjusted to the site conditions at the time of installation if a situation is encountered where an adverse impact might occur. For example, if conditions are too wet at the time of installation, the length of the necessary bore under the water feature could be lengthened or shortened as necessary or the timing of the activity could be rescheduled.

The project area includes the crossing of streams and rivers that support native fish populations. All of the fisheries in the watersheds in the project area are considered to be relatively stable. In addition to project area fisheries, Colorado River system fish species were considered because consultation under Section 7 of the Endangered Species Act (ESA) of 1973 (16 USC 153 *et seq.*), as amended, is required for projects in Wyoming that may have the potential to impact water quality in the Colorado River system. As stated in the Biological Assessment (BA) completed for this Proposed Action, the proposed wireless telecommunications system does not include any activities that would impact water quality within the Colorado River system. Proposed activities associated with the installation of the wireless telecommunications system are not anticipated to impact water resources and there would be no change in fisheries habitat conditions that would adversely affect fisheries.

1.4.2.5 Wild and Scenic Rivers

The park would ensure that proposed wireless telecommunications infrastructure would not affect the designated Snake River Headwaters Wild and Scenic River or its outstandingly remarkable values (i.e., scenic, recreational, cultural, ecological/wildlife, fish, and geologic). A Snake River Headwaters Comprehensive River Management Plan was developed in 2013 to manage these resources after its designation as a Wild and Scenic River. BMPs would be implemented to protect the nearby designated river and its values. Where construction would occur along roadways adjacent to the Snake River, no ground disturbance would be allowed to occur on the river banks to minimize the potential for erosion or sedimentation of the river channel. As noted above in Water Resources and Fisheries (Section 1.4.2.4), all installation, operation, or maintenance activities would be done so that they do not increase erosion potential or affect water quality. There would be no impact to channels or other dynamic elements of surface waters within the project area and no impact to the fluvial geomorphic characteristics of the Snake River system is anticipated. Temporary noise and visual impacts due to the presence of equipment and personnel in the project area could occur during installation or maintenance activities. The infrastructure proposed for the Moose location would be located within the existing developed area where a radio tower and other facilities are currently visible from the river. The new monopole at Moose would be visible from some locations along the river, within the backdrop of existing development. Because of the existing development in this area, the

presence of the new infrastructure would not substantially increase the visual impacts that are already present due to the existing development.

1.4.2.6 Wilderness

Approximately 122,604 acres of the park have been identified as recommended wilderness and another 20,850 acres have been identified as potential wilderness. Combined, these lands account for approximately 46% of the park. Most (91%) of John D. Rockefeller, Jr., Memorial Parkway was determined eligible for wilderness designation in November 2013 (NPS 2017). Consistent with the Wilderness Act of 1964 and NPS Management Policies, this plan would not authorize placement of any permanent wireless telecommunications facilities within any designated, proposed, potential, or recommended wilderness areas. Furthermore, it is not the purpose of the plan to try to provide cellular service to these areas.

Implementation of the Proposed Action would not affect future designation of wilderness or wilderness character in the park. While the proposed wireless telecommunications infrastructure would be constructed in developed areas and is not intended to target wilderness, improved cellular service would likely extend more into some wilderness areas, and may cover a larger area than currently exists. Use of personal hand-held electronic devices such as global positioning system (GPS) units, personal tracking or locator beacons (some with messaging or texting), avalanche transceivers, portable solar chargers, satellite phones, radios and satellite or cell phones is acceptable in wilderness and not prohibited by any regulation (NPS RM-41, Wilderness Preservation and Management).

Currently, personal electronic devices including smartphones with cameras are present and common within wilderness areas of the park. Potential impacts of existing cellular service and use of electronic devices to wilderness character includes adverse impacts to visitor's experience of solitude and opportunities for primitive and unconfined recreation. The degree of impact is subjective, depending on individual visitor preference. Evidence of impacts is anecdotal, but reported as intrusive behavior, such as people talking on phones, phone noises related to notifications, and streaming or playing of music.

While there may be an unintentional increase in cell phone usage in wilderness areas, the park would implement mitigation measures such as visitor education on the importance of natural soundscapes and being respectful of other visitors to minimize impacts. Education about the importance of wilderness and how to use (or not use) cell phones in wilderness (e.g., etiquette to improve opportunities to solitude) would occur. Courtesy signing and protocols would be developed and installed to help guide visitors in use of cell phones and other portable communications technologies. The park would work with concessioners to provide courtesy/educational signing or direction to indicate areas where, although service may be available, visitors should be respectful of other people's experiences.

1.4.2.7 Wildlife

The main vegetation types present in and near the project area are dwarf shrubland, shrubland, coniferous forest, and coniferous woodland. Riparian habitat is also present in small amounts. These vegetation types are used by birds, mammals, reptiles, and amphibians, for foraging, cover, and breeding habitat. Although these vegetation types surround the road rights-of-way and developed areas where the infrastructure would be installed, the proposed project area itself does

not generally provide good habitat because of the amount of previous disturbance and high use of the areas by park visitors.

Impacts to wildlife could occur from installation of the fiber optic network and wireless telecommunications facilities. Because the project area encompasses a number of different habitats it has the potential to impact a variety of wildlife species that may be present, including Wyoming Species of Greatest Conservation Need and migratory birds protected by the Migratory Bird Treaty Act of 1918 (16 USC 703) and EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds.

The proposed main fiber optic cable installation would create approximately 62.5 miles of temporary linear disturbance along park roads from the south to the north part of the park, and the lateral lines could create approximately 21.4 miles of temporary linear disturbance; the temporary disturbance could be up to 10-feet wide. The majority of the proposed fiber optic network would be installed along existing road shoulders in previously disturbed areas with minimal native vegetation and surrounded by habitats supporting populations of more abundant plant species. Increased noise and activity associated with installation of the network would temporarily disturb wildlife. The disturbance to wildlife would occur while equipment and personnel are in a particular area. In the long term, access and maintenance of the network would result in similar types of impacts because these actions would occur in the same poor to marginal habitat areas as the original construction and installation; however, these impacts would be of shorter duration and would occur in smaller, more localized areas. The current permit request does not identify any work in previously undisturbed areas; however, if construction results in disturbance of previously undisturbed areas, these locations would be revegetated. Because road rights-of-way and other previously disturbed areas typically provide poor to marginal habitat, impacts to wildlife would be minimal.

Nine wireless telecommunications sites are proposed. Each site would have between one and three monopoles or an Outdoor Distributed Antenna System (ODAS), as well as an equipment and generator shelter. U.S. Fish and Wildlife Service (USFWS) Recommended Best Practices for Communication Tower Design, Siting, Construction, Operation, Maintenance, and Decommissioning (2018) recommend that towers should be not more than 199 feet above ground level, without guy wires (which increase collisions) and lighting (which causes disorientation). The proposed monopoles would not exceed 85 feet, and lights and guy wires would not be used. Installation of monopoles and equipment shelters would result in approximately 0.56 acres of long-term disturbance to habitat. The locations for proposed wireless telecommunications infrastructure are in developed, previously disturbed areas with minimal vegetation and surrounded by habitat supporting populations of more abundant plant species. However, in some instances, small areas of vegetation would be disturbed in installation areas. These areas would be revegetated. Temporary disturbance impacts would be similar to those described above for installation of the fiber optic network. Noise would temporarily increase during installation. However, the increased noise would occur in an area that already has human-caused noises such as traffic and visitors talking. While this may disturb wildlife in the general area the impacts would be minor.

Temporary effects on wildlife, such as displacement, would likely occur during installation and maintenance activities but these effects would not be substantial. Impacts to wildlife would be minor because the Proposed Action would be built within existing rights-of-way and other previously disturbed areas that do not provide good habitat, are in developed areas already

experiencing high visitor and employee activity, and the impacts would be temporary. Total long-term disturbance would be approximately 26 acres, or approximately 0.01 percent of the park area. Soil disturbance can lead to the spread of non-native invasive species which can degrade wildlife habitat. The park would implement BMPs to minimize the potential for the spread of invasive, non-native plant species. Implementation of additional BMPs, such as temporal and spatial restrictions to avoid disturbance to migratory birds and other wildlife species of concern during sensitive times, would reduce potential impacts to wildlife.

1.4.2.8 Threatened and Endangered Wildlife

Section 7 of the ESA directs all federal agencies to consult with the USFWS when their activities “may affect” a listed species or designated critical habitat. The USFWS Ecological Services Office in Cheyenne, Wyoming, provided a list of threatened, endangered, proposed, and candidate species that may occur in the project area. The USFWS list included Canada lynx (*Lynx canadensis*), North American wolverine (*Gulo gulo*), and yellow-billed cuckoo (*Coccyzus americanus*). Critical habitat for Canada lynx was also identified as occurring in the area. A BA, which contains full species descriptions and habitat information along with a determination of effects regarding these federally listed species, was completed for the Proposed Action and submitted to the USFWS on April 27, 2018. The BA included a determination of a “*may affect, is not likely to adversely affect*” for Canada lynx and its critical habitat, North American wolverine, and Western yellow-billed cuckoo. Concurrence on this finding was received from the USFWS on May 14, 2018. An amended BA which addressed grizzly bear (*Ursus arctos*), was submitted to the USFWS on November 15, 2018. Concurrence on the not likely to adversely affect determination for grizzly bear was received on December 14, 2018. The effects described in the BA were similar to those identified above for general wildlife species.

1.4.2.9 Environmental Justice

Given the analysis in this EA, it was determined that none of the alternatives would have disproportionate health or environmental effects on minorities or low-income populations or communities, as defined in Final Guidance for Incorporating Environmental Justice Concerns in the Environmental Protection Agency's National Environmental Policy Act Compliance Analyses (EPA 1998).

1.4.2.10 Indian Trust Resources and Sacred Sites

The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes. The park's lands and resources related to the Proposed Action are not held in trust by the Secretary of the Interior for the benefit of American Indians. Sacred sites are those places having established religious meaning and as locales of private ceremonial activities (NPS 2006a). The park has not been made aware of any Indian sacred sites related to this action. In summary, none of the alternatives would impact Indian Trust Resources or Sacred Sites.

2 ALTERNATIVES

Two alternatives, the No Action and the Proposed Action, are carried forward for evaluation in this EA. A number of suggestions and alternate designs were also considered and dismissed throughout the planning process (see Appendix A – Alternatives and Designs Considered but Dismissed).

2.1 Project Area Description

The scope of this plan consists of actions in park areas that support the park goals described in Section 1.2. The following developed areas have been identified for potential wireless telecommunications facilities and/or routes for the fiber optic network along the Teton Park Road and spur roads into the developed areas (Figure 1): Kelly, Moose, Beaver Creek, South Jenny Lake, North Jenny Lake, Signal Mountain Lodge and Campground, Jackson Lake Lodge, Colter Bay, University of Wyoming Research Station (AMK Ranch), Lizard Creek Campground, and Flagg Ranch. The fiber optic network would also continue north of Flagg Ranch to the south entrance of Yellowstone National Park. While all 11 of these areas would have fiber optic cable installed to them, only nine of the locations would also have wireless telecommunications facilities constructed. A portion of the fiber optic network would cross lands and facilities managed by the USBR including the Jackson Lake Dam, located approximately 1.1 miles southwest of the Jackson Lake Junction.

Repeaters for the park's radio system are present at Rendezvous Mountain, Signal Mountain, and Flagg Ranch, with base station locations at Moose, Granite Entrance Station, Laurance S. Rockefeller Preserve, Jenny Lake Ranger Station, Lupine Meadows Rescue Cache, Buffalo Fork Ranger Station, Moran Entrance Station, Colter Bay Maintenance Shop, Colter Bay Ranger Station, and Colter Bay Fire Office.

2.2 No Action Alternative

2.2.1 Telecommunications Permit Request

Under the No Action Alternative, the NPS and USBR would not issue permits to the applicant. The proposed fiber optic network and wireless telecommunications facilities would not be installed in the park. Should the No Action Alternative be selected, it is likely that the NPS and USBR would still receive and need to respond to future permit requests to install telecommunications facilities (including fiber optic cables, wireless cellular facilities, and wireless internet services) within the park. Requests for telecommunications siting in all areas of the park would be reviewed in the context of the park and USBR's management documents to determine if the siting would be acceptable in the requested area of the park. Any new proposals would adhere to NPS DO-53, *Special Park Uses*, frequency coordination, and permitting by the FCC and the NTIA.

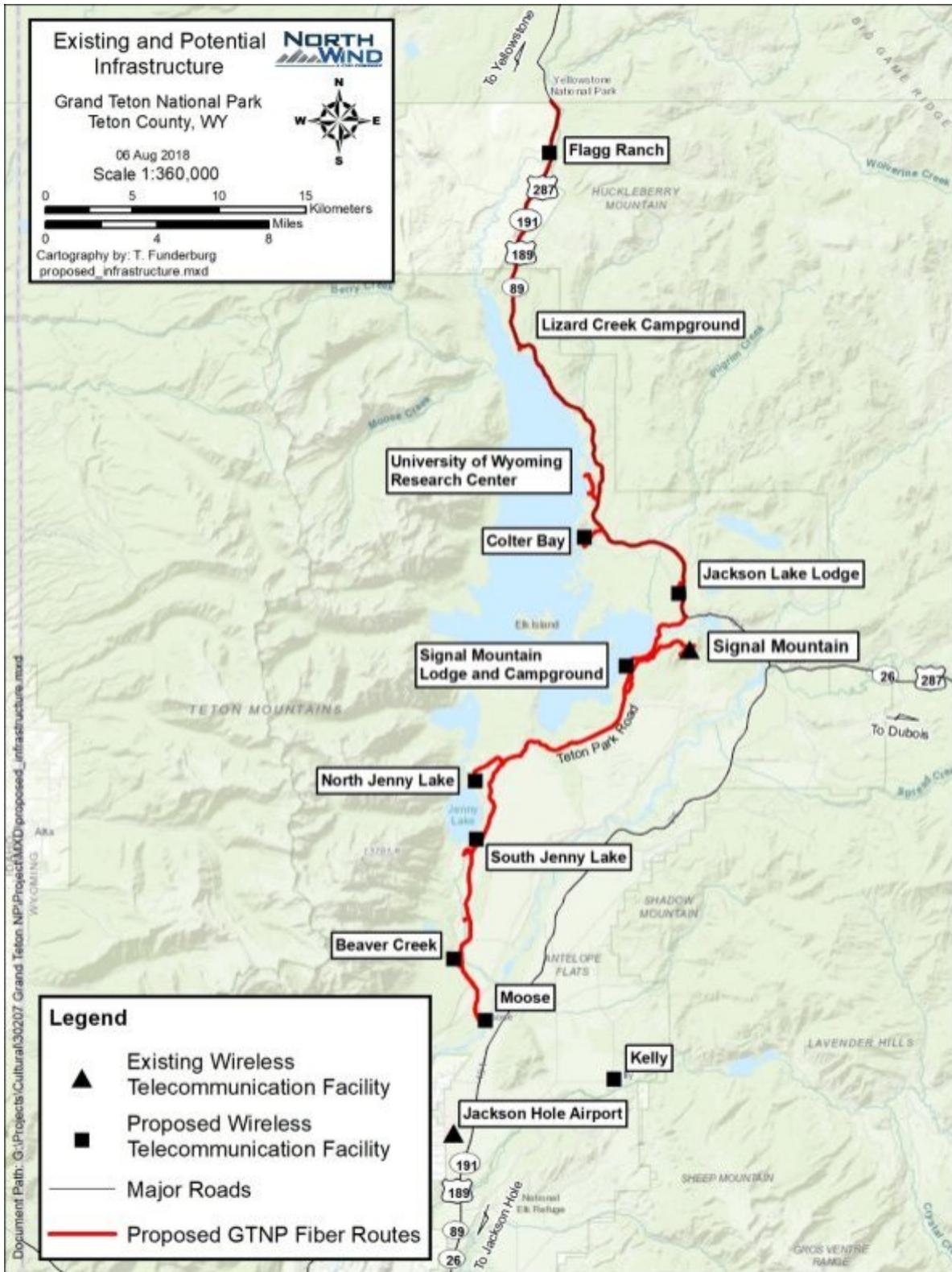


Figure 1. Project Area Showing Existing and Proposed Wireless Telecommunications Facilities and Fiber Optic Routes.

2.2.1.1 Fiber Optic

Under the No Action Alternative existing fiber optic and copper lines would continue to provide telecommunication services at Moose, Jenny Lake, Signal Mountain, Jackson Lake Lodge, Colter Bay, and Moran. This service would continue for NPS, USBR, and concessioner non-public operational networks in those areas and buildings that currently have it installed. Colter Bay would continue to have extremely limited internet service. There is no cellular service at Flagg Ranch; therefore, internet is only available to those individuals who have a satellite dish.

In 2011, the Wyoming Loop Completion Project EA analyzed the installation of a fiber optic network by Silver Star Telephone, Inc., which included 31.44 miles of line within the park following federal highways, small gravel or dirt roads, and existing utility corridors. The purpose of this project was to provide internet services to anchor institutions and to create a loop to allow for continued service throughout the state, even if a line were broken, without disruption (planned redundancy). These projects were particularly important for emergency services, national security, and law enforcement. This program was not intended for private service. It provided service to multiple locations within the park, including the Jackson Hole Airport, the Moose Headquarters complex, Granite Entrance, the Town of Kelly, and NPS facilities located at Moran and Granite Entrance. Fiber optic lines installed subsequent to the Wyoming Loop project also extend to several inholdings located in the park.

Other than those locations listed specifically above, most locations would continue to have no fiber optic internet service or limited connections. All outdated infrastructure would continue to be comprised of older technology that is in need of upgrades. Some would continue to be outside of conduit and there would continue to be no warning tape or tracer capability to locate the fiber optic lines. Upgrades could occur when failure occurs or when other permit requests are received.

2.2.1.2 Wireless Telecommunications Facilities

There are currently two existing wireless telecommunications facilities that provide cell phone coverage within the park; one is located on top of Signal Mountain and one is at the Jackson Hole Airport. Under this alternative the current telecommunication facilities in the park would remain. Signals from nearby facilities outside the park boundary such as Jackson Hole Mountain Resort and Snow King Mountain would continue to provide some coverage to limited park areas. Wireless coverage in other areas of the park would continue to be either minimal or non-existent and would not be expanded under this alternative. Additional right-of-way requests to add or enhance equipment at these two or other locations would be reviewed and analyzed on a case-by-case basis when received.

2.2.2 Park Development Area Connections

Under the No Action Alternative there would be no new connections from existing fiber optic lines to park housing and administrative areas at this time. These locations would continue to be largely without internet connections or reliable cell phone coverage, with the exception of housing in Moose and Moran, which have fiber optic lines installed. Future housing and administrative connections would be reviewed and analyzed on a case-by-case basis. For example, if existing structures are rehabilitated to provide additional housing, the park may consider running secondary lines from the existing fiber optic network infrastructure. Future connections to inholdings would similarly be reviewed and analyzed on a case-by-case basis.

2.2.3 NPS Radio Infrastructure

All of the park's radio system repeaters and base stations would remain under this alternative and each repeater would continue to operate independently, such that only one repeater would rebroadcast a transmission from a field unit that has been directed to it. With the existing system, two-way communications in areas within the park would remain unreliable related to topography and distance between the existing radio repeaters.

Under the No Action Alternative, the park would only upgrade and install new equipment and functions to the NPS radio system as needed to meet changing technology and federal mandates. Any new internal proposals to install additional wireless radio equipment would be reviewed on a case-by-case basis by the NPS, and would adhere to frequency coordination and permitting by the FCC and the NTIA.

Law enforcement, emergency medical services (LE/EMS) and general park operations use the Primary, Gros Ventre, and Flagg Ranch repeaters for radio traffic. Only LE/EMS use the Secondary repeater. The main repeaters would remain unavailable to general park operations use in the event of an emergency event. The LE/EMS transmissions would continue to be broadcast in analog mode. This would continue to cause concerns because it is not encrypted which means potential personal identifiable information is transmitted and can be intercepted and used inappropriately.

2.3 Proposed Action

The Proposed Action includes the following topic areas: Telecommunications Permit Request, park development area connections, and NPS radio infrastructure. Mitigation measures and BMPs have been incorporated as integral elements of the Proposed Action and would be implemented to reduce the potential for adverse effects to park resources (see Appendix B for a complete list of these measures). If additional site-specific requirements are identified as necessary during proposed activities, they would be implemented on a case-by-case basis in order to further reduce impacts to resources. It is important to note that the description of this alternative is based on preliminary designs and the best information available at the time of this writing. Details about ground disturbance used to describe the alternative are estimates and could change during final site design. If modifications during final design are consistent with the general intent and effects of the Proposed Action as described, additional compliance would not be required.

2.3.1 Telecommunications Permit Request

The NPS and USBR would issue right-of-way permits for implementation of the actions proposed in the Telecommunications Permit Request to upgrade telecommunications in the park. Specific actions for providing cellular, internet, and other telecommunications services to developed areas in the park are described below. These actions include the installation of supporting equipment and connections to existing power and fiber optic infrastructure, where available. The Telecommunications Permit Request covers 11 developed locations in the park as well as connecting roadways. Of these 11 areas, all would have fiber optic cable installed to them and nine of the locations would also have wireless telecommunications facilities installed. Each of the wireless telecommunications facility sites would have between one and three monopoles or an ODAS, as well as equipment and generator shelters.

Although park management believes that a plan this comprehensive will fulfill any large scale telecommunications infrastructure needs 20 years or more into the future, it is still likely that the NPS and USBR would receive and need to respond to future permit requests to install telecommunications facilities (including fiber optic cables, wireless cellular facilities, and wireless internet services) within the park. Requests for telecommunications siting in all areas of the park would be reviewed in the context of the park and USBR's management documents to determine if the siting would be acceptable in the requested area of the park. Any new proposals would adhere to NPS DO-53, Special Park Uses, frequency coordination, and permitting by the FCC and the NTIA.

2.3.1.1 Fiber Optic

A new fiber optic network is proposed to be installed to provide reliable high-speed internet access for use by NPS, USBR, concessioner, partner facilities, public safety entities, internet service providers, voice and data providers, and for the transport of that communication both within and outside the park. The proposed fiber optic network would include a 144 single-mode fiber optic cable, high-density polyethylene (HDPE) conduit, ducts, handholes, splice cases, locate wire, fiber optic line marker tape, and bridge attachments, as required. Installation of the main fiber optic network would include approximately 330,000 feet (62.5 miles) of conduit, including approximately 660 feet for the Jackson Lake Dam crossing, and approximately 113,000 feet (21.4 miles) for the lateral fiber optic network. It is anticipated that approximately 170 handhole boxes would be installed below grade with incidental traffic-graded lids. Splice cases would also be installed, as necessary.

The main fiber optic cable would be installed underground in conduit adjacent to existing roads or other existing disturbed areas and would have future expansion capacity built in, by way of unused fiber and additional conduit (see Figure 1 for proposed location). That portion of the main line that crosses the Jackson Lake Dam would be installed above ground, mounted low on an existing concrete barrier. A lateral fiber optic line would be connected to the main line to provide upgraded infrastructure to the USBR facilities located on the south side of the Jackson Lake Dam. Additional lateral lines would be installed to provide upgraded infrastructure to park administrative, housing, visitor, and concessioner use facilities. (See further information about lateral lines in Section 2.3.2.)

2.3.1.2 Wireless Telecommunications Facilities

The Proposed Action includes installation of wireless telecommunications facilities and associated infrastructure. The locations of the proposed wireless telecommunications installations are listed in Table 1. Maps showing the activities proposed at each of the wireless telecommunications facility locations are included in Appendix C, as are typical drawings of the proposed monopole towers and supporting prefabricated equipment buildings. Example photo simulations are also included in Appendix C.

Wireless telecommunications facilities would be constructed in a manner that is compatible with the character of surrounding structures or otherwise made unobtrusive through use of the best available technologies, screening with vegetation or existing topography, and/or other means. Of the nine sites proposed, seven of the sites would contain monopole towers, ranging in height from 75 to 85 feet. A monopole is a single straight pole with antennas on the inside of the pole. Monopoles would be painted to match the surroundings, typically NPS-approved brown to blend

with the surrounding trees and other NPS structures. Finishes or colors that would be shiny or reflective in sunlight would not be allowed. Two sites would have ODASs installed throughout the area to provide coverage to the developed area (South Jenny Lake and Jackson Lake Lodge). The ODAS sites would consist of either five or eight 26-foot tall poles distributed throughout the site (see Table 1). All of the structures proposed for the park would be designed to house multiple antennas to meet the needs of multiple carriers.

Infrastructure associated with the wireless telecommunications facilities includes the support utilities required for operation. Infrastructure would include buried electric lines to provide power to the facility and buried fiber optic cable to provide the internet service. Each site would include equipment buildings along with their contents that are necessary for the operation of the wireless telecommunications facilities. Operating equipment would be housed in specially constructed prefabricated outdoor equipment shelters. Each location would have one approximately 33 foot x 15 foot equipment shelter, designed to accommodate equipment for up to four wireless carriers (see Appendix C for drawings and photo simulations). Each carrier's equipment racks and batteries placed inside the buildings would produce heat that would be cooled via fans contained within the cabinets and by compact wall air conditioning units installed on the exterior of the equipment shelter. The shelters would be affixed with external low noise blower kits on each air conditioning unit to help reduce the sound levels and dampen the sound of the compressor. The exteriors would be designed to match and/or blend in with the surrounding environment.

Each location would be equipped with a 150 KW diesel generator located inside an approximately 11.5 foot x 15 foot generator shelter and fitted with a muffler to reduce noise. Diesel tanks would be double walled with leak detection. The generators are provided for back-up power and would only operate during utility power failures and as required for proper maintenance and testing. In the case of a power failure the generators would be used to power the telecommunication facilities and the entire fiber optic network. The only exception is during routine maintenance and testing of the generators, which would require them to operate for approximately 10 minutes each week to ensure they function properly when needed. Routine performance testing would be performed remotely. Each equipment shelter would have a light fixture with a motion detector on the exterior. Lighting would be down-shielded to keep light within the site boundaries. Any other security or safety lighting on these facilities would only be installed as necessary.

Table 1. Proposed Wireless Telecommunications Facility Locations and Details.*

Site Name	Towers	Shelters	Temporary Disturbance (Construction and Electrical Access)	Long-term Disturbance
Flagg Ranch	(3) 80' Monopoles, 48" Diameter	33' x 15' equipment shelter and 11'-6"x 15' generator shelter	1,130 square feet (SF) (0.02 acres)	4,080 SF (0.09 acres)
Colter Bay	(1) 75' Monopole (1) 80' Monopole (1) 85' Monopole 48" Diameter	33' x 15' equipment shelter and 11'-6"x 15' generator shelter at remote location	10,840 SF (0.25 acres)	3,312 SF (0.07 acres)
Jackson Lake Lodge	ODAS - (8) 26' Poles. 18" Diameter	33' x 15' equipment shelter and 11'-6"x 15' generator shelter	47,140 SF (1.08 acres)	4,428 SF (0.10 acres)
Signal Mountain	(1) 80' Monopole, 48" Diameter	33' x 15' equipment shelter and 11'-6"x 15' generator shelter	990 SF (0.02 acres)	1,763 SF (0.04 acres)
North Jenny Lake	(1) 80' Monopole, 48" Diameter	33' x 15' equipment shelter and 11'-6"x 15' generator shelter	1,190 SF (0.03 acres)	4,383 SF (0.10 acres)
South Jenny Lake	ODAS - (5) 26' Poles. 18" Diameter	33' x 15' equipment shelter and 11'-6"x 15' generator shelter	27,930 SF (0.64 acres)	3,250 SF (0.07 acres)
Beaver Creek	(1) 80' Monopole	33' x 15' equipment shelter and 11'-6"x 15' generator shelter	5,940 SF (0.13 acres)	2,390 SF (0.05 acres)
Moose	(1) 80' Monopole, 48" Diameter	33' x 15' equipment shelter and 11'-6"x 15' generator shelter	1,150 SF (0.02 acres)	1,961 SF (0.04 acres)
Kelly Pit	(3) 80' Monopoles, 48" Diameter	4 carrier-supplied equipment shelters/platforms. Surrounded by privacy fencing.	4,410 SF (0.10 acres)	221 SF (0.005 acres)
Total			100,720 SF 2.29 acres	25,799 SF 0.565 acres

*Measurements and disturbance figures are approximate.

Each wireless telecommunications facility would be capable of supporting wireless installations for up to four major broadband wireless telecommunications systems providers, to accommodate all of the major wireless providers without the need for additional infrastructure within the life of this plan.

2.3.2 Park Development Area Connections

As part of the Proposed Action, the park would extend internet service to park housing and other infrastructure (administrative buildings, visitor centers, concessioner facilities, and utility infrastructure) beyond the areas identified in the discussion of actions identified in the Telecommunications Permit Request (Section 2.3.1). Additional broadband capacity would be built in by way of dark fiber (unused fiber optic cable) and an empty conduit, into which fiber could be installed at a future date.

The lateral lines would be constructed using the same methods as the main fiber optic cable installation (see Section 2.3.4.1). The line would be installed in conduit underground within road corridors, previously disturbed areas, or other utility rights-of-way. Approximately 113,000 linear feet (21.4 miles) of lateral fiber optic cable are proposed.

2.3.3 NPS Radio Infrastructure

Under the Proposed Action the park would upgrade the NPS radio system. Repeaters would be replaced at pre-existing sites as necessary. Additional compliance would take place if they are not considered replacement in kind (i.e., if there is a change in location or design). The repeaters at Rendezvous Mountain, Signal Mountain, and Flagg Ranch would be upgraded to allow for digital transmissions to be utilized. The NPS would expand the Signal Mountain secondary repeater to include Gros Ventre and Flagg Ranch repeater locations to create LE/EMS digital transmission footprint equal to the analog system. Transmission would be encrypted to secure personal identifiable information, trusted information, and LE/EMS traffic from being intercepted or broadcast to unauthorized radios. The fiber optic network could be used to facilitate radio over internet protocol to improve NPS radio transmissions throughout the park. Any new radio infrastructure would utilize the new wireless telecommunications infrastructure (i.e., monopoles, structures, fiber optic network) to the greatest extent possible.

2.3.4 Installation

Installation of the fiber optic network and wireless telecommunications facilities is proposed to take place during the construction window for the park (typically April to October). Installation would involve multiple crews in order to complete the Proposed Action within the limited construction season available, and the actual installation schedule would be coordinated with NPS and USBR staff, partners, and concessioners. Most of the work would take place over the first two years. The timeframe would depend on when all the necessary compliance and contracting is complete and when construction can begin. Rehabilitation and revegetation may follow installation immediately and monitoring would occur post treatment.

Short-term effects would occur during and related to installation. Although the duration of installation could be spread over multiple seasons, actual fiber optic cable installation activities for a given area would last only a day or two. On average, over flat terrain approximately 2 miles of conduit can be plowed per day. Rougher terrain and other site-specific conditions could reduce that rate to 0.5 to 0.75 mile per day. Installation of the proposed telecommunications

facilities and associated structures would take approximately four to eight weeks to complete per site, depending on physical location and utility coordination; work would be intermittent over this time period. Timing mitigation measures for wildlife would be taken into account when scheduling installation for a specific area, but they are not expected to impact the ability to complete installation during the construction window. The park would coordinate installation activities to minimize disruption of normal park operations and visitor activities.

Long-term effects are those that would last beyond the installation period for both the fiber optic network and wireless telecommunications sites, such as the presence of infrastructure and increased cell phone usage and wireless connectivity. The right-of-way permit would allow for long-term use for routine operations and maintenance of the proposed infrastructure.

2.3.4.1 Fiber Optic Cable Installation Techniques

Fiber optic cable installation would be accomplished using standard construction equipment such as cable plows, small backhoes/excavators, boring equipment, trucks hauling conduit and fiber optic cable, and fuel trucks (no fuel tanks would be stored along the route or at staging areas). Walk-behind and tractor-mounted trenching equipment would make a cut in the ground approximately 4 inches wide to a depth of 18 inches. In some cases, an offset plow tooth may be used to place the conduit near the road shoulder, minimizing off-road travel. That portion of the main line that crosses the Jackson Lake Dam would be installed above ground, mounted low on an existing concrete barrier. A lateral fiber optic line would be connected to the main line to provide upgraded infrastructure to the USBR facilities located on the south side of Jackson Lake Dam.

Each segment would consist of burying two, 1-1/4-inch HDPE conduits with one carrying a 144 single-mode fiber optic cable (about 0.69-inch in diameter) inserted by air compression after the conduit is buried. The extra conduit would provide for future expansion as needed.

Boring under the road would occur in order to change from one side of the road to the other. The borings would require that a bore pit approximately 3-feet wide, 4-feet long, and 2- to 3-feet deep be dug at the beginning and ending of the section being bored. Directional boring equipment would be used that installs the conduit approximately 3-feet or more under the bed of the road. Also, in areas with narrow, sharp turns, boring or trenching would be used to facilitate installation in order to minimize the need to disturb the pavement. This installation method would only change if a different approach was determined to be less intrusive. Use of a method other than plowing or use of wheeled vehicles would be very minimal (<1% of the entire line).

In addition to avoiding undisturbed areas by staying in existing transportation or utility rights-of-way, several construction techniques would be implemented to minimize environmental impacts. For example, crossing rivers, streams, and creeks would involve attaching a 4-inch polyvinyl chloride (PVC) conduit on the underside of existing bridges, and wetlands would be traversed by boring under the wetland without the need to create a trench. Directional boring equipment would be used that installs the conduit approximately 3 feet or more under the bed of the water course. Bore pits would be installed outside of the bank and floodplain areas. If a situation arises where boring is not an option, appropriate Clean Water Act permitting would take place prior to ground disturbance.

Small handhole boxes needed to join sections of the line and provide opportunities for services would be buried below grade. These handholes would be installed at not more than 3,000-foot

intervals or as needed. None of the handholes would be in traffic (vehicle, pedestrian, or bicycle) areas or environmentally sensitive sites. The exact number of handholes would be determined in the field pending site-specific conditions. It is anticipated that about 170 handholes may be required. No markers for conduit or handholes would be placed above ground; handhole locations would be noted using GPS coordinates on the as-built drawings. In addition to buried handhole boxes, the HDPE conduit would have to be spliced at intervals of 500 to 700 feet (depending on the horizontal drill used). In these locations, a small hole would have to be dug to allow the HDPE conduit to be spliced.

For the Jackson Lake Dam crossing, the northern portion would cross an area (approximately 20-foot) with geogrid, which would be repaired and/or new geogrid installed after installation of the conduit. Also located on the northern side of the dam is an area of compacted concrete road (approximately 20-feet in length) where a trench would be cleared with a concrete saw. Both 1.25-inch conduits would be installed within a 4-inch galvanized rigid conduit a minimum of 1-foot below the surface. The trench would be backfilled with 5,000 psi concrete. The 4-inch conduit would then be installed above ground, along the west side of the dam, mounted low on the existing concrete barrier to the south side of the dam (approximately 625 feet). Appropriate enclosures mounted to the concrete barrier with 0.5 inch seismic rated hilti wedge anchors would be used to where the conduit would transition from underground to above ground on each side of the dam. Ground penetrating radar would be used to evaluate the area located on the south side of the dam, as well as to locate an existing access tunnel under the sidewalk and portion of the Teton Park Road. If the evaluation allows, core drilling would be used to install the conduit from the concrete barrier to the access tunnel. If ground penetrating radar results do not show there is sufficient space to core drill, then the sidewalk would be cut in order for the conduits to be installed.

2.3.4.2 Wireless Telecommunications Facilities Installation Techniques

Installation of wireless telecommunications facilities includes all associated infrastructure (equipment structures, antennas, poles, supports, power, conduit, and other components). Access to wireless telecommunications facilities would be by motorized vehicles on existing roads and trails. Each wireless telecommunications facility would result in temporary disturbance related to the presence of equipment and materials during installation (see Table 1 for disturbance estimates at each location).

Monopoles would be designed to have a drilled pier foundation to minimize disturbance (this would be approximately 4 to 5 feet wide and 30 feet deep). The typical equipment shelter would be 33 feet by 15 feet and the generator shelter would be 11.5 feet by 15 feet. A drill and excavator would be used to construct the foundations and a crane would be used to set the shelters and the monopoles. Assuming a drilled pier foundation for the monopoles, the drill rig would be onsite one to two days for sites with one 80-foot monopole. For the sites with three monopoles, the drill rig would be onsite two to three days. For the ODAS sites with 26 foot poles, the drill rig would be at each pole location for approximately two hours.

Equipment buildings would have exterior treatments fabricated to match the existing appearance of the surrounding environment. Exterior panels would be designed to match the existing color and texture of the surroundings. An excavator (likely a backhoe) would be used to excavate the foundation at each equipment and generator shelter. The excavator would be at each shelter for

about one week (active excavation would likely only be two days but the excavator would be used to periodically move other construction materials).

2.3.4.3 Staging Areas

The Proposed Action would use already established staging areas that are used for USBR, park, and contractor construction, storage, and staging. Potential existing staging areas are located in the following locations:

- Approximately 1.5 miles south of Flagg Ranch, west of John D. Rockefeller Parkway;
- Approximately 0.5 miles northeast of Lizard Creek Campground;
- Approximately 1 mile east of Colter Bay;
- Approximately 2 miles south of Signal Mountain, east of Teton Park Road;
- At the proposed Beaver Creek wireless telecommunications facility site;
- Approximately 1 mile east of the Jackson Hole Airport (east of U.S. Highway 89); and
- Within the Kelly Pit.

These staging areas are already used to store park equipment and/or materials are located away from visitor areas. The equipment that would be found at the staging areas could include standard construction equipment such as cable plows, small backhoes/excavators, boring equipment, trucks hauling conduit and fiber optic cable, pickup trucks, cars (daily transport use for workers), and rock sawing equipment. In addition, materials such as rolls of conduit, fiber optic cable, and supplies needed for handholes and marking the line could be found at the staging areas. At any given staging area any, all, multiples of all, or none of the above equipment could be found at the site depending on what stage of installation is going on and how many crews are working along a given stretch of the fiber optic network. Fuel would not be stored at staging and construction areas or along the fiber optic network routes. Fuel would be delivered by approved fuel handling services.

2.3.5 Disturbance

Fiber Optic. The Proposed Action would create a linear disturbance along park roads from the south to the north part of the park. Fiber optic network installation would result in temporary disturbance to a width of up to 10 feet (the construction corridor) but would be much narrower for the majority of the network because of the installation techniques being implemented. The width of actual soil disturbance would be approximately 12-inches or less in good soils with no large buried rocks. Nearly all of the proposed fiber optic network would be built within existing road corridors, utility rights-of-way, and/or other previously disturbed areas. For the purposes of analysis, a 10-foot disturbance area was used in order to over-estimate impacts and to account for larger areas of impacts, such as where handholes are buried, where holes are dug to splice lines, and for boring under roads, wetlands, and streams (Table 2). Long-term disturbance related to installation of the fiber optic network is associated with the presence of conduit and other subsurface infrastructure that may require future maintenance or repair.

Wireless Telecommunication Sites. Disturbance estimates for the wireless telecommunications sites (poles and shelters) are shown in Tables 1 and 2. Temporary disturbance for wireless telecommunication sites would be approximately 2.29 acres and long-term disturbance would be approximately 0.56 acres. Disturbance from fiber optic cable installation to each wireless telecommunications site was discussed in the previous section.

Table 2. Disturbance Estimates

Feature	Estimated Temporary Disturbance	Total Long-term Disturbance
Main Fiber Optic Cable Line	330,000 linear feet (62.5 miles) x 10 feet wide* (75 acres)	330,000 linear feet (62.5 miles) x 3 inches wide (18.75 acres)
Lateral Fiber Optic Cable Line	113,000 linear feet (21.4 miles) x 10 feet wide* (30 acres)	113,000 linear feet (21.4 miles) x 3 inches wide (6.5 acres)
Wireless Telecommunications Sites and Equipment Shelters**	100,720 SF (2.29 acres)	25,799 SF (0.56 acres)
Total Disturbance	107.29 acres	25.81 acres
* Includes construction disturbance areas for conduit, fiber optic cable, and maintenance hole placement. ** Includes construction disturbance related to access, electrical, and fiber installation.		

The initial disturbance estimates are based on preliminary information and past experience with fiber optic cable installation in the park. Ground disturbance would be limited to the smallest area possible to reduce disturbance to soil and native plants and reduce the potential for the introduction and/or spread of non-native, invasive plant species.

2.3.6 Maintenance Activities

Because this would be a buried line with the fiber optic cable protected in conduit, revisiting a site for repair or malfunction of the fiber optic network would be rare. However, if a site had to be revisited, remote electronic equipment located in the equipment structures or along the line can pinpoint the problem site within inches of its location. The issue would then be addressed on a case-by-case basis, with appropriate compliance. The wireless telecommunications facilities would be visited by a technician one to two times per month to check operations and to perform routine maintenance. There would be no new ground disturbance associated with this maintenance as technicians would drive on existing roads to access the facilities.

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter discloses the affected environment and environmental consequences of implementation of the Telecommunications Infrastructure Plan (Proposed Action).

3.1 Overview of Cumulative Impact Analysis

Direct, indirect, and cumulative impacts of the No Action Alternative and the Proposed Action are discussed in this chapter. To assess cumulative impacts a buffer of ¼ mile on each side of the fiber optic installation area and wireless telecommunications facility locations was applied and defined as the cumulative impacts analysis area. The temporal scope for the analysis is based on the duration of the effects of the alternatives. For most of the resources considered in this analysis, impacts from the fiber optic network would primarily occur during installation – therefore a shorter timeframe for cumulative impacts to some resources was considered for this portion of the Proposed Action compared to the wireless telecommunications facilities portion of the action. For example, the fiber optic network installation would not impact visual resources after the installation phase is completed and revegetation/rehabilitation occurs; therefore, a shorter timeframe for cumulative effects was considered for part of the action on that resource. However, the wireless telecommunications facilities have the potential to impact visual resources as long as they are in place; therefore, a longer timeframe was used for that portion of the cumulative impacts analysis. The fiber optic network has the potential to impact visitor experience beyond the construction/installation period, therefore a longer timeframe was used for that topic.

In order to complete the cumulative impacts analysis it was necessary to identify other past, present, or reasonably foreseeable future projects occurring within the park. Based on the geographic and temporal scope, the past, present, and reasonably foreseeable future actions with the potential to impact the same resources as the Proposed Action are listed below.

Past: Improved cellular coverage in specific locations (Signal Mountain and Jackson Hole Airport and several locations outside of the park); Silverstar fiber optic network installation and installation of secondary lines; NPS fiber optic line installation; routine maintenance of trails, facilities, and roads, including paving; multi-use pathway system construction from south boundary to South Jenny Lake (NPS 2006b); Gros Ventre roundabout construction and safety improvements (NPS 2016); Gros Ventre Campground improvements; Moose campus improvement projects (headquarters, warehouse, water/wastewater, housing, radio tower); Beaver Creek (new housing); Jenny Lake renewal project (NPS 2014); Jenny Lake historic comfort station rehabilitation; Signal Mountain Lodge and Campground (campground improvements, concession staff housing improvements, lodge parking area improvements, marina dock replacements); Flagg Ranch (water system and campground improvements); and Moose Water/Wastewater project (NPS 2012).

Present: Managing and maintaining existing facilities at each location where the fiber optic network would pass through and where wireless telecommunications facilities are being proposed.

Reasonably foreseeable future: Moose (relocate headquarters fueling operations); Boat Launch improvement project (launch ramp and concessioner and public use of the river launch facilities); Colter Bay (implementation of visitor services plan); University of Wyoming Research Center (water and wastewater systems improvements, new dormitory construction, lakeshore erosion corrections, other historic facility improvements); Flagg Ranch (waterline replacement from tank to campground and campground water and sewer line replacements); and the completion of the nationwide first responder network, FirstNet², that would improve emergency communications.

3.2 Visual Resources

3.2.1 Affected Environment

The park's scenic resources are a primary reason for the park's popularity as a tourist destination, with viewing and photographing the Teton Range and viewing wildlife comprising the primary summer attractions. In a survey completed in 1998, the most frequently mentioned reasons for visiting the park included sightseeing, wildlife viewing, and experiencing the wilderness and open space (Littlejohn 1998). Ninety-eight percent of visitors reported sightseeing in the park during their visit; 88 percent reported viewing wildlife; 71 percent took pleasure drives; and 59 percent viewed roadside or interpretive exhibits. The most popular places to visit, at the time of this survey, were South Jenny Lake (72 percent of visitors), Colter Bay (57 percent), and Jackson Lake Lodge (42 percent). Approximately 96 percent of visitors reported that scenic views were "very or extremely important" to their park experience.

The majority of the park's landscape is undeveloped and facilities are predominantly grouped along the Teton Park Road and within a handful of small park communities, leaving substantial acreage in its natural condition. The characteristic landscape is represented by the natural vegetative patterns, landforms, rock formations, and water features that are in view. Visitors expect to see facilities grouped together and close to the roads instead of seeing utility corridors and manmade structures out in the landscape. By grouping these built features in small areas, the park has protected the scenic resources and ensured that the landscape is not degraded by inharmonious features. Past management activities remain visually subordinate to the characteristic landscape being viewed. Foreground views include the immediate surroundings of an area, for instance the developed area at South Jenny Lake or the Moose Headquarters area, or a relatively enclosed setting such as the Lizard Creek or Colter Bay Campground, where dense vegetation obscures middle-ground and background views. The main landscape forms are the mountains and the valley floors and the existing structures in the developed areas. The texture of the landscape is represented by the variations and density of vegetation types such as the shrublands and the dense trees in the forested areas as well as the developed areas, and the dimensions of those surface variations (e.g., tall trees, short grasses, and existing buildings). The landscape colors are primarily greys, greens, and browns represented by the existing structures, vegetation, soil, and rock.

Infrastructure relating to wireless communications is already present in the park; these range from small antennas to large towers with multiple attachments and associated buildings and

² FirstNet supports unified and advanced emergency communications and the network integrates with existing Long-Term Evolution (LTE) and developing cellular standards. This new network would require up to date telecommunications infrastructure to operate to its full potential. <https://firstnet.gov/>

roads. Most of the park remains natural, because existing development has been managed to protect scenic values in the park. Because the primary viewsheds are natural, built structures often present a contrast to the natural scenery. The majority of the existing infrastructure is located in developed areas, such as the radio antenna at Moose, but some facilities also exist in more remote locations, such as the cell tower on top of Signal Mountain. Given the multiple locations and types of equipment, there are varying degrees of visibility and visual intrusion.

3.2.1.1 Visual Impact Study

A visual impact study for the Proposed Action was conducted by the NPS's interdisciplinary team (IDT), North Wind Resource Consulting, Enertech Resources, and the applicant, from May 21-25, 2018. The visual impact study was conducted as part of the Class III cultural resources inventory described in detail in Section 3.3. The analysis area for visual resources was established through a combination of field reconnaissance and consideration of NPS concerns including the scenic quality of the project area. The visual resources analysis area is generally within an area that is 3 miles around the wireless telecommunications locations. This distance was selected because beyond this, the infrastructure components may technically be visible, but due to distance and other visibility factors such as vegetation screening and topography, they may be so small or faint that they are not actually seen by viewers and cause negligible or no visual contrast; therefore, having no visual impacts.

For locations where one or more monopoles are proposed (i.e., Flagg Ranch, Colter Bay, Signal Mountain, North Jenny Lake Lodge, Beaver Creek, Moose, and the Kelly Pit), a crane was elevated to 80 feet and left in place for two hours so that photographs could be taken from surrounding viewpoints. At Jackson Lake Lodge and South Jenny Lake, a 26-foot-high PVC pipe was held in the identified locations, with slight adjustments made when necessary to be acceptable. In general, photographs from historic properties situated both within and adjacent to the wireless telecommunications facility locations were taken by Enertech, while NPS staff took pictures from popular visitor areas to assess potential visual impacts from non-historic age resources, such as hiking trails, parking areas, roads, and lodging facilities commonly utilized by park visitors. While the photographs from historic properties are discussed below in the Cultural Resources section, there is some overlap in locations because of potential visual concerns from those locations as well.

For the visual impact study, the visual contrasts and visual impacts of the proposed infrastructure were assessed from selected Key Observation Points (KOPs). The KOPs were identified by the NPS IDT, and were chosen to be generally representative of visually sensitive areas where it can be assumed that viewers may be affected by a change in the landscape setting from the Proposed Action. The primary types of viewers considered at the selected KOPs are park visitors and NPS, USBR, and concession employees. The inventory of KOPs included identification and photographic documentation of the KOPs and viewing areas. Photographs were taken to document existing conditions at each potential KOP and were used to evaluate visual conditions and potential visibility, as well as to assess the level of contrast and impacts that would result from the introduction of the infrastructure elements. Appendix C contains example photographic simulations from the visual impact study.

3.2.2 Environmental Consequences of the No Action Alternative

Under this alternative, no additional infrastructure would be constructed; therefore, there would be no new impacts to visual resources.

Cumulative Effects. There are no direct or indirect effects on visual resources from the No Action Alternative; therefore, there can be no contribution to cumulative effects to this resource. If future permit requests are submitted, they would be reviewed and approved on a case-by-case basis.

3.2.3 Environmental Consequences of the Proposed Action

As described in the Affected Environment section, a visual study of the wireless telecommunications facility infrastructure locations was conducted as part of the inventory for cultural resources and non-historic visual resources. Members of the IDT took pictures from mostly non-historic areas with the potential of seeing the crane, to assess visual impacts other than those associated with historic properties, such as overlooks and other viewing areas. Over 400 photographs were taken by the NPS throughout the three days. The photographs are included in the project file.

On June 30, 2018, the members of the IDT met to discuss photos taken by the team and reach consensus on the visual impacts for each location. Following fieldwork, the photographs were rated using the following criteria developed by the NPS:

- Not visible;
- Visible, but not distinguishable (you need to know what you are looking for);
- Visible, but not conspicuous (may be visible, but did not overshadow everything); and
- Visible and conspicuous (may be considered intrusive by some).

These ratings were then used to identify potential visual impacts that would occur during the installation and operational phases of the Proposed Action, taking into account mitigation measures that were developed throughout the process to reduce potential adverse visual impacts from development.

The goal was to apply a level of objectivity and consistency to the process and to reduce the subjectivity associated with assessing landscape visual quality. Contrast analysis was used to describe any visual impacts. This process analyzes the degree to which a project or activity affects scenic quality or visual resources based on the visual contrasts created or imposed by a project on the existing landscape. For the Proposed Action, visual analysis involves determining the degree of visual change between the existing landscape and the contrasts to the landscape that would be imposed on that landscape by the proposed infrastructure. Visual impacts are defined as changes to the scenic attributes of the landscape brought about by the introduction of visual contrasts and the associated changes in the human visual experience of the landscape. Photographic simulations were used to assess the visual contrasts created by the Proposed Action and to analyze impacts on the scenic views from certain areas. In this case the simulations were used to assess the nature and extent of visual contrasts the Proposed Action would introduce into the existing landscape. The visual impacts were assessed from lands with views of the project area. Example photographic simulations are shown in Appendix C.

Three types of screening were identified within the analysis area: 1) vegetative screening such as stands of lodgepole pine; 2) development screening such as adjacent buildings or structures; and

3) topographic screening, which varies throughout the visual analysis area from very dramatic to rolling hills. The presence of vegetative, structure, or topographic screening effectively lowers the level of impact from surrounding areas.

Careful consideration was taken in infrastructure siting to ensure that facilities and their components are sited to avoid or reduce impacts on visually sensitive areas such as siting facilities away from prominent viewsheds or features and placing facilities in previously disturbed landscapes. Careful consideration was also taken in structure design and materials selection; structures were designed and selected to blend with the existing landscape setting. This involved designing elements to repeat the form, line, color, and texture of the existing landscape, for example through selection of appropriate colors, surface treatments, and use of non-reflective coatings for structures to reduce color contrast with the surrounding environment. The selected mitigation measures ensure that the proposed activities repeat the form, line, color, and texture of the surrounding landscape to the maximum extent possible in order to reduce potential impacts. For example, monopoles would be an NPS-approved brown color to blend with the existing tree cover and the equipment shelters would be constructed to match the surrounding environment.

The areas that would experience most of the impacts from installation are those areas that concentrate the majority of park visitors and NPS, USBR, and concession employees because they are adjacent to the main park travel routes or within popular park destinations. A general description of impacts from proposed activities is provided first, followed by site-specific analysis of each wireless telecommunications facility location. This section is organized to present the potential impacts from installation first, followed by potential operation impacts.

Installation. The Proposed Action would result in visual impacts to the immediate foreground along roadways and other installation areas from construction of the fiber optic network during the installation and vegetation regrowth phases. Installation would result in visual intrusion of construction vehicles, equipment, materials, and a work force along the new fiber optic network route and at staging areas. During installation, crews would be working along the route with equipment such as cable plows, small backhoes, boring equipment, trucks hauling conduit and fiber optic cable, and rock sawing equipment. These elements would introduce new contrasts in color and form compared to the existing landscape. However, disturbance from installation activities would be transient and of short duration as activities progress along the fiber optic network route. Speed limits on most of the main route would limit the visual exposure of the site disturbance for those traveling past the ongoing installation activities in motor vehicles or on motorcycles. Bicyclists and pedestrians would have more exposure because they would be traveling at lower speeds. Visual impacts from installation of the fiber optic network would be virtually eliminated upon completion and regrowth. Affected viewers would be aware of the temporary nature of construction activities, which would decrease their sensitivity to the impact. In addition, because these activities would be in developed areas and along roadways where development and activity is already occurring, these impacts would not be out of character with the landscape. The current permit request does not identify any work in previously undisturbed areas; the line would follow existing road corridors and utility rights-of-way where feasible, resulting in minimal disturbance in previously undisturbed areas. Using previously impacted surfaces allows the line to avoid undisturbed areas thus minimizing potential for new impacts.

The Proposed Action would also result in visual impacts at the wireless telecommunications facility locations. Installation would result in visual intrusion of construction vehicles, equipment, materials, and a work force in staging areas, along access roads, and at wireless

telecommunication facility locations. These elements would introduce new contrasts in color and form compared to the existing landscape. However, disturbance from installation activities would be transient and of short duration as activities move from one wireless telecommunications facility location to another and affected viewers would be aware of the temporary nature of construction activities. In addition, because these activities would be in developed areas and along roadways where development and activity is already occurring these impacts would not be out of character with the landscape.

Operations. Operation of the fiber optic network would not result in new visual contrasts once installed. Because the infrastructure would be buried, including the handhole boxes that would be installed below grade at various intervals, it would not create a visible contrast to those traveling along the route.

Operation of the wireless telecommunications infrastructure would result in impacts to visual resources by introducing visual contrasts. There would be increased visual contrast from the presence of monopoles, ODAS, and equipment shelters in developed areas. The most visible impact would result from the presence of the poles due to their vertical structure that would introduce visual contrast by causing unnatural vertical lines. By locating the equipment shelters and monopoles in developed areas, they would be in the vicinity of other man-made structures such as buildings, marinas, telephone poles, and transmission lines. Because wireless telecommunications facilities would be located in areas with existing infrastructure, their presence would be compatible with the surrounding areas. However, in some locations the poles would be readily apparent due to their height, and thus would create a visual contrast that does not presently exist.

To minimize the visual impact of the telecommunications infrastructure, only monopoles are planned, and structures would be painted an appropriate color to help them blend with the surrounding landscape and to minimize light reflection. Introduction of something new may affect the perception of the landscape as a natural-appearing setting. Instead it may be perceived as a landscape strongly influenced by human activities and dominated by the vertical elements of the monopoles. Some viewers may feel that the monopoles add visual clutter or interfere with the view of mountains they enjoy, or that it introduces an industrial-appearing element into a natural-appearing landscape where they feel it does not belong. Introduction of the new form and line would create a visual contrast. Because the new infrastructure would be installed in developed areas it would not change the overall landscape character. The new infrastructure would repeat the form, line, and color of existing development within the landscape. With the required mitigation the Proposed Action would be in compliance with NPS guidance for protection of scenic resources.

Monopoles would be visible to visitors and employees in some locations of the developed areas. Where visible they would be viewed for the duration of time that an individual is looking toward the monopole. From other locations in the developed areas the poles would not be visible, nor would they be visible when individuals are looking in directions away from the monopole site. Developed areas that receive more visitors, such as South Jenny Lake and Jackson Lake Lodge, have the potential for greater impacts because the number of potential viewers would be greater. Because the majority of visitors and employees are present at the developed areas during the summer months, the potential for impacts is greatest during this time. Spring and fall seasons receive fewer visitors and winter is the least busy time of year so impacts during these times would be proportionately less. People who are visiting a scenic overlook specifically to enjoy the

view may spend more time looking closely at the landscape and may also be more sensitive to changes in the visible landscape than persons engaged in an active recreational activity. Individuals traveling along roads in the park would generally have short views of a particular area as they pass by. Visual contrast levels would be low to moderate due to numerous human-made alterations within the landscape; however, the introduction of new structures within these views could draw the attention of a casual observer. Numerous other structures in the immediate vicinity of most of the developed areas would provide low visual contrast levels.

Equipment shelters would be installed at all of the monopole locations. These are depicted on the figures in Appendix C. These structures would be located in built areas that already have structures or development of some type. Although the equipment shelters proposed are sited among similar structures, they would still be an additional structure in the viewshed of visitors and NPS, USBR, and concession employees. They would create a contrast in line and form.

During operation, monopoles and equipment shelters would be accessed by maintenance crews and vehicles for inspection and maintenance activities, as would locations along the fiber optic network. Visual impacts would result from inspection and maintenance activities producing traffic on access roads; however, these impacts would be temporary and not out of character for the areas where they would occur.

Analysis of each proposed site is included below.

Kelly. Kelly is a census-designated place located along the Gros Ventre River on the eastern side of the Jackson Hole Valley within the eastern boundary of the park. The proposed monopole location is situated toward the southern end of a large gravel pit, commonly referred to as the Kelly Pit. Proposed activities consist of the installation of three 80-foot-high monopoles as well as underground electric cables, equipment shelters, and privacy fencing. The Kelly Pit location was subject to a visual impact study on May 25, 2018. The boom of the crane was raised 80 feet to mimic the height of the proposed monopoles. NPS staff conducted visual inspections and made recommendations in multiple locations. Generally speaking, the crane was visible, but not conspicuous from all locations. In this location it was farther away from the Town of Kelly, the Kelly Elementary School, and the homes on the west hillside than a previously considered location.

The Kelly Pit is in a relatively open area, but the background is either the Town of Kelly or the mountains where the brown monopoles would blend in. The pit is currently used by the park for storage of gravel and equipment, so the area is already an industrial setting. There are other telephone poles and infrastructure present that creates similar contrasts in the viewshed. From the road the monopoles would occasionally be visible, but not conspicuous because of the setting and the backdrop which the brown monopoles would blend with. From the primary entrance to Kelly the monopoles would blend in or be camouflaged by the tree line and/or blend into the mountains in the background. Although the monopoles would be visible from some locations, because of their location in the pit, viewers are already used to this industrial type setting in the area. Therefore, when viewed with the numerous other structures in the immediate vicinity the monopoles would provide low visual contrast levels.

Moose. Activities proposed at the Moose Headquarters developed area include the installation of an 80-foot-high monopole, underground electric cables, and equipment shelters. A visual impact study of the location was conducted on May 23, 2018. The crane was set up to the north of the

Moose Wash Bay. NPS staff conducted visual inspections and made recommendations in multiple locations.

The Moose area is a large developed area with an existing radio tower and other tall infrastructure (e.g., two story headquarters building). The monopole would be visible from many locations within the Moose area. The findings of the visual impact study indicate that where it is visible it would often be surrounded by trees or visible through a patch of trees. From higher viewpoints such as the Inner Park Road at Windy Point or the Outer Highway (U.S. Highway 191) it is visible but there is other infrastructure in the area that makes it blend into the background and the setting. From the Snake River it is visible in some locations, but it is not conspicuous because of the background and the industrial setting of the area. Visitors in this area would be looking up and the backdrop of the trees reduces the amount of contrast created. From the Craig Thomas Discovery Visitor's Center, the monopole would not be visible from most locations and either not distinguishable or not conspicuous from the locations where it is visible. Because the new infrastructure would be viewed along with numerous other structures in the immediate vicinity, visual contrast levels would be low. From within most of the housing areas the monopole would be visible but not conspicuous to employees living or working in the area. Because the new infrastructure would be viewed along with numerous other structures in the immediate vicinity visual contrast levels would be low.

Beaver Creek. At the Beaver Creek administrative and housing area the Proposed Action includes installation of one 80-foot-high monopole to the southeast of an existing storage building and yard, underground fiber optic cables and electric cables, and equipment shelters. The visual impact study for this site was conducted on May 23, 2018. The crane was set up near the shade house, located in a NPS storage area to the northwest of the historic district. NPS staff conducted visual inspections and made recommendations in multiple locations.

Beaver Creek is an NPS administrative and housing area that is not open to the public. It is used for park operations. Throughout the majority of the Beaver Creek area the monopole would blend into the background or be hidden by trees, while in other locations it is more visible, but not conspicuous. From within most of the housing areas the monopole would be visible but not conspicuous to employees living or working in the area. It would be visible and conspicuous, from the J.Y. Cabins, which serve as summer seasonal housing for NPS employees. The monopole would be the most visible from the access road; however, even where it is visible because it is located in an industrial setting near a greenhouse and a storage area that is currently used for materials and heavy equipment, the monopole would not be conspicuous. Because the new infrastructure would be viewed along with numerous other structures in the immediate vicinity, visual contrast levels would be low.

South Jenny Lake. Activities proposed at South Jenny Lake include the installation of an ODAS consisting of five 26-foot-high poles, underground electric cables, and equipment shelters. The visual impact study was undertaken at this location on May 24, 2018. A 26-foot-high PVC pipe was held at each of the five locations to simulate the height of the poles. NPS staff conducted visual inspections from numerous locations to ensure that the poles were appropriately screened by existing vegetation or were minimally visible but not distinguishable or conspicuous. In many instances the pole location was changed slightly by the IDT to ensure they selected the locations with the best screening or where the poles would blend in to the background to the greatest degree to minimize potential visual impacts. The 26-foot-tall poles would be predominantly below the tree line and/or screened by trees and they would not all be

visible from one place; therefore, many of the poles would be visible, but not conspicuous. Overall the visual contrast levels would be low.

Jenny Lake Lodge. Activities proposed at Jenny Lake Lodge include the installation of an 80-foot-high monopole, underground electric cables, and equipment shelters. The visual impact study at this location was conducted on May 24, 2018. The crane was set up in the center of a forested area east of the complex, adjacent to a water tower. The location is accessed on an administrative road behind the Jenny Lake Lodge that is not open to the public. NPS staff conducted visual inspections and made recommendations in multiple locations. Because it would be viewed against a dense background of trees and/or through a stand of trees, it would not be conspicuous from the locations where it is visible. It would primarily be visible at the corrals and from the concessioner employee housing area. Overall the visual contrast levels would be low.

Signal Mountain. Activities proposed at the Signal Mountain developed area include the installation of an 80-foot-high monopole, underground electric cables, and equipment shelters in the concessioner employee housing area. The visual impact study of the location was conducted on May 22, 2018. The crane was installed at the west end of the employee housing area near the basketball court. This monopole would be visible to concession employees in the housing area. From outlying areas it is generally not visible because the area is below the level of the monopole and it is screened by trees and shrubbery. Because the new infrastructure would be viewed with other existing infrastructure in the developed administrative area the visual contrast level would be low.

Jackson Lake Lodge. Proposed activities at Jackson Lake Lodge include installation of an ODAS comprised of eight 26-foot-high poles, underground electric cables, and two equipment shelters. The poles would be located throughout the developed area of the property. Additional work includes the installation of a fiber optic network extending from a directional bore at the eastern shoulder of the North Park Road (U.S. Highway 89/191/287) along the western edge of the employee housing area and northern guest cottages to the northeast corner of the lodge building. From the lodge building, the alignment turns to the southeast, where it crosses the parking area and terminates at a new wireless equipment and generator area, to be located northeast of the existing swimming pool complex. A cable conduit would be installed between the poles and equipment and generator area.

The visual impact study at Jackson Lake Lodge was conducted on May 24, 2018. A 26-foot-high PVC pipe was held up in eight different locations that were previously selected in consultation with the NPS prior to the study. NPS staff conducted visual inspections and made recommendations in multiple locations to ensure that the poles were appropriately screened by existing vegetation, or were minimally visible but not distinguishable or conspicuous. In many instances the pole location was changed slightly because the IDT wanted to ensure the poles would be installed in locations with the best screening or to blend in with the surrounding landscape to minimize potential visual impacts.

The 26-foot-tall poles are predominantly screened by trees and/or below treeline, and not all of the poles are visible from one place; therefore, many of the poles are visible, but not conspicuous. The poles would be located in the parking lot or between buildings in the concession housing area. In this location the poles would be visible to employees and visitors in these area but they would blend with the developed setting. In addition, the equipment shelters and one of the poles would be visible by park visitors and employees driving on the highway as

they approach Colter Bay from the north. From this location there is a short open stretch where the new infrastructure would be visible on the edge of the concessioner housing. While the new infrastructure would be visible for a brief period of time to people traveling on the North Park Road (U.S. Highway 191) right before the turn off to Jackson Lake Lodge, it would be viewed against the backdrop of the other buildings and development. Overall the visual contrast levels would be low because of the existing developed setting and screening by vegetation.

Colter Bay. A 75-foot-high monopole, 80-foot-high monopole, 85-foot-high monopole, and underground electric cables would be installed near an existing restroom facility in Loop F of the Colter Bay Campground. The Colter Bay Campground has 335 sites, 160 of which are tent sites with tent pads. The selected location in Loop F was chosen because it is the highest point in the campground. The infrastructure would be tied into the proposed fiber optic network along Colter Bay Campground Road. The equipment shelters would be installed at a remote location next to the road that enters the campground.

The visual impact study was conducted in this location on May 24, 2018. The crane was set up in Loop F adjacent to a restroom building. NPS staff conducted visual inspections and made recommendations in multiple locations, including inspections by boat from Jackson Lake (one location was along the shoreline of Jackson Lake to the north of the village near Leek's Marina, and one was within the boundaries of AMK Ranch).

As stated above, Loop F was selected because it is one of the highest points in the Colter Bay area. From outlying areas such as Colter Bay Store, Swim Beach, and the Marina the poles would not be visible because those areas are below the level of the monopoles and they would be screened by trees and shrubbery. South of the campground are housing and guest accommodations; the poles would be visible to a limited extent from some of these locations however they would be screened to a large degree because of shrubs and trees that provide camouflage. The location was visible and conspicuous from most of Loop F because of the proximity to these campsites. It was not visible from other nearby sites except for one site in Loop G. The equipment shelters would be located next to the road that enters the campground, but there are other buildings in this area, so they would be viewed with existing development. Additionally, the shelters would be constructed to match the surrounding buildings which would reduce the potential contrasts. Overall because of vegetation screening and existing development the level of contrast would be low, except at campsites directly adjacent to the site where there is little to no screening and the monopoles would be directly visible in the foreground.

Flagg Ranch. The proposed new infrastructure at Flagg Ranch includes the installation of three 80-foot-high monopoles, underground electric cables, and equipment shelters to be located near the sewage treatment pond. The visual impact study of the location was conducted on May 22, 2018. The crane was set up near the sewage treatment ponds. NPS staff conducted visual inspections and made recommendations in multiple locations. For most of the locations analyzed, the infrastructure would not be visible outside the immediate area. In the administrative area the monopoles would create a visual contrast against the skyline from near the sewage treatment facility and other administrative areas such as the access road to permanent and seasonal housing. Because the new infrastructure would be viewed with numerous other structures in the immediate vicinity the visual contrast would be low.

Cumulative Impacts. Past, present, and reasonably foreseeable future actions that have impacted visual resources include those listed in Section 3.1. Collectively, past actions would

continue to have adverse cumulative impacts on visual resources due to presence of developments and infrastructure (including radio towers and other antenna) currently in the park and their operation and maintenance. In combination with the Proposed Action the impacts would continue to result in adverse impacts but would not substantially change the impacts that are already occurring due to measures taken during design to place monopoles and other infrastructure in locations that result in low visual contrast (refer to Appendix C for details). The incremental impact of the infrastructure installation would contribute slightly to, but would not substantially change the impacts that already occur.

3.3 Cultural Resources

3.3.1 Affected Environment

A Class III cultural resources inventory of the project area was completed from October 6-12, 2016 and June 11-15, 2018 to identify whether any National Register of Historic Places (NRHP)-listed or -eligible cultural resources are present that could be affected by proposed activities (North Wind Resource Consulting 2018). A visual impact study was also undertaken to assess potential visual impacts to historic properties located within or adjacent to the project area resulting from the proposed activities (see Section 3.2 for information about how this study was conducted). Both of these efforts are summarized below.

3.3.1.1 Project Area Cultural Resources

The Area of Potential Effects (APE) for the Proposed Action encompasses 612 acres and includes a 50-foot-wide right-of-way along the east and west sides of Teton Park Road and North Park Road in addition to the nine wireless telecommunications facility locations. A Class III cultural resources inventory report was completed and contains information on the identification and NRHP analysis of cultural resources, as well and a finding of effect from the Proposed Action on those cultural resources listed or eligible for listing in the NRHP in compliance with the National Historic Preservation Act (North Wind Resource Consulting 2018). This report was submitted to the Wyoming State Historic Preservation Office (SHPO) for concurrence with the findings summarized below.

Before the field surveys were conducted, a file and literature search for previously recorded cultural resources and previous cultural resource surveys was requested from the Wyoming SHPO Cultural Records Office. The National Register Information System database and Government Land Office maps and title plats were also reviewed. At the request of NPS, the parameters of the record search included the project area and a surrounding one-mile radius.

Twenty-three previously recorded sites intersect the APE and an additional 110 previously recorded sites are within a one-mile radius of the APE. The sites intersecting the APE are primarily roads, ditches, and structures. Other site types include lithic scatters, prehistoric habitation sites/base camps, historic trash, and others. All observed cultural resources were evaluated for NRHP eligibility based on their integrity and significance under the four criteria outlined in 36 CFR 60 and per guidelines presented in National Register Bulletin 15, How to Apply the National Register Criteria for Evaluation.

Twenty-one cultural resources were recorded, 19 of which were previously recorded. Of the 21 cultural resources recorded during the inventory, 19 are historic in age and two are prehistoric

lithic scatters. Three sites that had been previously recorded and identified during the background research effort were not located within the survey area. In addition to the sites, one isolated occurrence consisting of a small historic trash scatter was recorded.

Historic Properties Affected Environment

Kelly. Kelly is a small community within the eastern boundary of the park. It is located along the Gros Ventre River on the eastern side of the Jackson Hole Valley within the eastern boundary of the park. The area was first settled by prospector and taxidermist Albert Nelson, who established a small ranch in the vicinity of Kelly in 1897 (Daugherty 1999). Today, the area has evolved into a residential community of year-round and seasonal homes. Due to a 1927 flood and a 1971 fire, few, if any, historic buildings and structures remain within Kelly; thus, the community as a whole has not been evaluated for listing in the NRHP. The Mormon Row Historic District and Kelly Warm Spring are located near the community of Kelly.

Moose. The Moose Headquarters developed area is situated approximately 12 miles north of Jackson on the western side of the Snake River. The NPS Western Office of Design and Construction drafted site plans for the area in 1955 as part of the park's Mission 66 prospectus, with the first buildings constructed at the site in 1956 (Longfield 2009). Development continued and by 1963, the site had grown to include 33 new buildings, as well as miles of newly-constructed roads (Longfield 2009). In 2010 the district was recommended not eligible for listing in the NRHP (Longfield 2009). That same year, an EA for the area was completed, which resulted in numerous changes to the layout of the site, as well as the existing buildings and structures located within it (NPS 2010). Today, the site consists of more than 35 buildings and structures situated in the housing, maintenance yard, and visitor services areas.

Adjacent NRHP-eligible or -listed properties include the Chapel of Transfiguration, Menor's Ferry Historic District, and Lazy F Dude Ranch. The chapel complex consists of the log chapel building and two ancillary structures, all of which were built by local craftsmen in 1925 to serve the employees and guests of outlying dude ranches within Jackson Hole (Fraser 1980). The Menor's Ferry Historic District is located to the south of the chapel parking area and 4 Lazy F Road. This 31-acre property, which encompasses the homesteads of early Jackson Hole settlers Maude Noble and brothers Bill and Holiday Menor, was listed in the NRHP in 2011 under Criteria A, C, and D (Mardorf et. al 2011). According to the 1990 National Register nomination, the Lazy F Dude Ranch district is significant under Criterion A as it "exemplifies the later period and evolution of dude ranches as vacation spots" within the Jackson Hole area (Mehls 1990). The Murie Ranch Historic District, located 0.5 mile southwest of the Moose Headquarters building, is significant for its association with the Murie family, who resided on the ranch from 1945 until 2003. The property was designated a National Historic Landmark (NHL) on February 17, 2006 (Cassidy 2003).

Beaver Creek. The 16-acre Beaver Creek/Old Administrative Area Historic District is located at the base of the foothills of the Teton Range, approximately 2.5 miles north of Moose along Teton Park Road. Following the creation of the park in 1929, the property was transferred to NPS and it became the first administrative, residential, and utility area for the park. The Old Administrative Area Historic District was listed in the NRHP in 2009 under Criteria C. A 2011 Cultural Landscapes Inventory found that the site was also eligible for listing under Criterion A. The district currently consists of 44 buildings and structures, of which 15 are considered contributing.

South Jenny Lake. Three NRHP-listed properties are located within the South Jenny Lake area: the Jenny Lake Civilian Conservation Corps (CCC) Camp #NP-4; Jenny Lake Boat Concession Facilities; and Jenny Lake Ranger Station Historic District. The Jenny Lake CCC Camp property consists of two buildings, the CCC Camp Mess Hall Building (#69) and the CCC Camp Bathhouse Building (#70), located on the west side of Cottonwood Creek, south of Jenny Lake, that were both constructed in 1935. The 0.35 acre boundary was drawn to encompass the two buildings only which were listed in the NRHP in 1998 under the property type “building” under Criterion A in the areas of government, conservation, and social history (Caywood et.al. 1997a).

The Jenny Lake Boat Concession property also consists of two buildings classified under the property type “building.” They are the Reimer Cabin, constructed in 1937, and Jenny Lake Boathouse, constructed in 1930. The property is located on a peninsula of land that extends into Jenny Lake, east of Cottonwood Creek. The property was listed in the NRHP in 1998 under Criterion A in the area of recreation and culture and under Criterion C in the area of architecture, as the buildings are significant examples of NPS rustic architecture (Caywood et al. 1997b).

The Jenny Lake Ranger Station Historic District consists of five buildings, four of which are contributing and include a store, two comfort stations, and a ranger station (both the ranger station and store have been relocated). The 9-acre, triangular-shaped historic district is located on the southeastern end of Jenny Lake. The district was listed in the NRHP in 1990 under Criterion A in the area of conservation and under Criterion C in the area of architecture for its collection of NPS-rustic architecture buildings with this original configuration of buildings (Mehls 1988).

Jenny Lake Lodge. The Jenny Lake Lodge site encompasses 16.8 acres located to the east of Jenny Lake and to the west of North Park Road. The property consists of 49 buildings, including the main lodge, corrals, employee housing, and guest cabins. The historic district was listed in the NRHP in 2009 as part of the Grand Teton National Park Multiple Properties Documentation Form under Criterion A in the area of Culture and Recreation and under Criterion C in the area of Architecture (Humstone et al. 2009). Jenny Lake Lodge is currently operated by concessioner Grand Teton Lodge Company.

Jackson Lake Lodge. Jackson Lake Lodge consists of a 144-acre visitor complex designed by Former Supervising Architect of the U.S., Gilbert Stanley Underwood, and completed in 1955. The site was designated a NHL in July of 2003 (Reed and Wallace 2002). Although not yet 50 years old at the time of its designation, the property was considered to possess “exceptional national significance” and “extraordinary national importance” under NHL Criteria 1 and 4 as the design precursor for the NPS Mission 66 program. At the time of its designation, the site consisted of 61 buildings and structures, of which 38 were identified as contributing. Today, the site remains largely unchanged and consists of 39 contributing resources, including the main lodge building, a concessioner employee recreation center and employee lounge/bar, 21 multi-unit guest cottages, six employee residences, a stable/corral, medical clinic, and a service station. The district also includes one contributing site, which is defined in the NHL nomination as “all hiking trails, walkways, driveways, landscaped parking areas, wood and concrete benches, and native plant species” developed at the site by NPS in 1995 (Reed and Wallace 2002).

Signal Mountain Developed Area. The Signal Mountain developed area encompasses 7.2 acres on the eastern shore of Jackson Lake, west of North Park Road. The concessioner-operated Signal Mountain Lodge includes cabins, restaurants, gift shops, gas station, campground, marina, and concessioner employee housing area. There is also a boat ramp and parking area managed by

the park. A total of 53 resources are located within the district, the majority of which were constructed between 1964 and 1972 as part of the NPS's Mission 66 program. The property was determined not eligible for listing as a historic district by the Wyoming SHPO in 2012 because the property failed to meet the criteria outlined by NPS's draft Multiple Properties Documentation Form for nominating Mission 66 districts (Carr et al. 2006; Engle 2011). The Jackson Lake Dam site, which has been determined eligible under Criterion A, is near this area.

Colter Bay Village. Colter Bay Village is situated on the eastern shore of Jackson Lake, approximately 5 miles north of Jackson Lake Lodge. The 712-acre site was developed as part of the Mission 66 program to centralize visitor services in the northern portion of the park and host visitor and administrative activities. It was determined eligible for listing as a historic district by the Wyoming SHPO in 2013 under Criteria A and C within the context of Mission 66 development, architecture, landscape architecture, and planning, as identified in the draft Mission 66 Multiple Properties Documentation Form (Carr et al. 2006). The site consists of 269 resources, of which 200 are considered contributing. Contributing resources include 188 buildings and structures, as well as numerous landscape features. Leek's Marina, the former location of an NRHP-listed lodge building (Leek's Lodge site), and the AMK Ranch site, an NRHP-listed historic district, are near this site.

Flagg Ranch. Flagg Ranch is the oldest continually operating resort in the upper Jackson Hole Valley. In 1981, the original lodge was destroyed by fire; a new lodge building, the Headwaters Lodge, was built as its replacement in 1995 and remains at the site today. The facilities at Flagg Ranch, including the ranger station and campgrounds, were constructed after the 1981 fire. Currently, the property contains a visitor contact station, guest cabins, gas stations, restaurant, park and concessioner housing area, campground, and RV accommodations. The site is currently operated by the Grand Teton Lodge Company as the Headwaters Lodge and Cabins at Flagg Ranch. Due to the documented recent age of the facilities on the property, Flagg Ranch has not been evaluated for NRHP eligibility. The NRHP-listed Snake River Bridge #2 is near this site.

3.3.2 Environmental Consequences of the No Action Alternative

Under this alternative, no additional telecommunications infrastructure would be constructed; therefore, there would be no new direct or indirect impacts to cultural resources. Any future telecommunications projects would require compliance and would be reviewed on case-by-case basis.

Cumulative Effects. There are no direct or indirect effects to cultural resources from the No Action Alternative; therefore, there can be no cumulative effects to this resource.

3.3.3 Environmental Consequences of the Proposed Action

The Class III inventory included the road shoulder where fiber optic network installation is proposed along the entire length of Teton Park Road and the John D. Rockefeller Memorial Parkway between Moose and the border with Yellowstone National Park and potential wireless telecommunication facility locations. The entire 612 acres, which included proposed fiber optic network installation, equipment shelters, and monopole locations, were surveyed.

Twenty-one cultural resource sites and one isolated occurrence were recorded within the APE. Nineteen of the sites are previously recorded and two are newly recorded. With the exception of two of the sites, which consist of small prehistoric lithic scatters, all of the sites are historic in

age and include seven NPS administrative and housing units, six visitor facilities, three roads, an entrance station, a dam, and two irrigation ditches. The newly recorded sites are Teton Park Road and the Newbold/Sebastian Ditch, both of which are recommended not eligible for listing in the NRHP.

Based on the survey of the previously recorded sites, there is no evidence to suggest that the eligibility determinations be changed. Project activities within the historic properties consist of installing wireless telecommunications equipment and fiber optic cable. Based on the analysis of the effects of these activities, there would be no adverse effect to historic properties, and no avoidance or further work is necessary.

Visual Impact Analysis of Historic Districts

In addition to the Class III inventory, a visual impact study was undertaken by Enertech Resources, along with staff from North Wind Resource Consulting, the applicant, and the NPS, to assess potential visual impacts to historic properties located within or adjacent to the project area resulting from the vertical components associated with the Proposed Action. Nine wireless telecommunications facility locations were included in the visual study. More information about the analysis is provided above in Section 3.2, Visual Resources. For the six locations where one or more monopoles are proposed (e.g., Flagg Ranch, Colter Bay, Signal Mountain, North Jenny Lake Lodge, Beaver Creek, Moose, and the Kelly Pit), a crane was elevated to 80 feet and left in place for two hours so that photographs could be taken from surrounding viewpoints. At Jackson Lake Lodge and South Jenny Lake, locations of proposed ODAS infrastructure, a 26-foot-high PVC pipe was held by staff in the identified locations, with slight adjustments as necessary. In general, photographs from historic properties situated both within and adjacent to the wireless telecommunications facility locations were taken by Enertech. Following fieldwork, photographs were rated based on visibility from all photo-points. These ratings were used to identify potential visual impacts that would occur during the installation and operational phases of the Proposed Action. Each of the nine wireless telecommunications facility locations are discussed below.

Kelly Findings: For the visual impact study in Kelly, the Kelly Pit location was subject to a visual impact study on May 25, 2018 after it was decided by NPS following the initial study that the original location was not suitable for construction. A total of nine photos were taken at the Kelly Pit location, including one photograph from the Mormon Row Historic District and one photo at Kelly Warm Spring. The monopole location was not visible from the Mormon Row Historic District or Kelly Warm Spring. Based on these findings there would be no adverse effect to the historic district.

Moose Findings: For the visual impact study in Moose, the crane was set up to the north of the Moose Wash Bay. Photographs were taken from 15 locations, five of which were located within the district boundaries. Seven of the photographs were taken from adjacent NRHP-eligible or -listed properties. Of the 15 photos taken by Enertech, four were taken from within the Moose Headquarters District. Of these, all were visible and conspicuous. Of the remaining 11 photos, eight were taken from four NRHP-listed historic sites and one NHL site, including the Murie Ranch NHL, Menor's Ferry Historic District, Lazy F Dude Ranch, and the Chapel of the Transfiguration. Of these, five were not visible; one was visible, but not distinguishable; one was visible, but not conspicuous; and one was visible and conspicuous. Based on these findings there would be no adverse effect to the designated historic sites.

Beaver Creek Findings: For the visual impact study in Beaver Creek, the crane was set up near the shade house to the northwest of the historic district, with photographs taken from 12 locations. Of the 12 photos taken by Enertech, four were taken from within the district. Of these, three were not visible and one was visible, but not distinguishable. Of the remaining eight taken from outside the district, three were taken from NRHP-listed properties, including Highlands Housing Historic District, Manges Cabin, and Double Diamond Dude Ranch Dining Hall. The crane was not visible from the three historic sites. Of the remaining five photo locations, one was visible and conspicuous; one was visible, but not distinguishable; and three were not visible. Based on these findings there would be no adverse effect to the historic district.

South Jenny Lake Findings: For the visual impact study at South Jenny Lake, the 26-foot-high PVC pipe was held up at each of the five proposed locations to simulate the height of the monopoles. A total of 30 photographs were taken for the five locations. Monopoles 1 through 4 are visible from the southern boundary of the district, including from the two relocated buildings (ranger station and store). However, because integrity of location, setting, and feeling for the district were previously impacted by construction of the parking lot and relocation of the buildings, and the 26-foot-tall poles are predominantly screened by trees, the impact of the ODAS infrastructure would result in no adverse effect to the district.

Jenny Lake Lodge Findings: For the visual impact study at Jenny Lake Lodge, the crane was set up east of the complex, adjacent to a water tower. Photographs were taken from 12 locations, four of which were located within the district boundaries. The proposed new infrastructure includes an 80-foot-high monopole tower and two equipment shelters located roughly 400 feet to the southeast of the district boundary. Of the four photos taken by Enertech within the boundaries of the district, two were visible, but not conspicuous, and the other two were not visible. Additional photographs taken by NPS within the district also indicate that the proposed monopole was either visible but not distinguishable or visible but not conspicuous. Based on these findings there would be no adverse effect to the historic district.

Jackson Lake Lodge Findings: For the visual impact study at Jackson Lake Lodge, the 26-foot-high PVC pipe was held up in eight different locations that were selected in consultation with the NPS. A total of 54 photos were taken, all within the developed area of the Jackson Lake Lodge NHL boundaries. Of the eight locations, five locations had two to four viewpoints that were visible and conspicuous from housing or parking. However, exposure from these viewpoints would be limited because employees and/or visitors would just be passing through the area. Based on these findings there would be no adverse effect to the historic district.

Signal Mountain Developed Area Findings: For the visual impact study at Signal Mountain, the crane was set up in an employee housing area, adjacent to a basketball court. Photographs were taken from seven locations, six of which were located within the developed area and one of which was along Teton Park Road. The Signal Mountain developed area was previously determined not eligible for listing in the NRHP; as such, the proposed installation of the 80-foot-high monopole would have no effect on this property. The Jackson Lake Dam site was listed on the National Register of Historic Places in 1981, and is eligible under Criteria A and C for its association with the conservation, settlement, and engineering as a component among the first federally financed irrigation projects authorized by the Reclamation Act of 1902. The dam was constructed in 1901, and enlarged in 1916 and 1932. While utility conduit would be attached to the dam to extend the fiber optic line to the north end of the park, the line would be black to best blend into the surrounding concrete infrastructure, and located as to be least visually intrusive.

Colter Bay Village Findings: For the visual impact study at Colter Bay, the crane was set up in Loop F, a tent loop within the Colter Bay Campground, adjacent to a restroom building. Photographs were taken from 12 locations, nearly all which were located within the district boundaries. Two of the photographs were taken along the shoreline of Jackson Lake to the north of the village. One of these photographs was taken at Leek's Marina, the former location of an NRHP-listed lodge building (Leek's Lodge site) that was destroyed by fire in 1988. The second was taken from within the boundaries of the AMK Ranch site, an NRHP-listed historic district. Of the 12 photos taken by Enertech, 10 were within the Colter Bay Village Historic District. Of these, eight were not visible, and two were visible, but not conspicuous. The pole was also not visible in the photographs taken from the NRHP-listed AMK Ranch site and Leek's Marina. Based on these findings there would be no adverse effect to the historic district.

Flagg Ranch Findings: For the visual impact study at Flagg Ranch, the crane was set up near the sewage treatment ponds. Photographs were taken from five locations. Of the five locations photographed by Enertech, three were taken from within the Flagg Ranch site. One was visible and conspicuous, and two were not visible. Of the two taken from outside the Flagg Ranch property, one was taken from the deck of the Snake River Bridge #2, and another from North Park Road, east of the maintenance area at Flagg Ranch. Both of these were not visible. Based on these findings there would not be a strong impact to the property's potential eligibility for listing in the NRHP, nor would the action impact the integrity of setting and feeling of the NRHP-listed Snake River Bridge #2. The proposed improvements would result in no adverse effect to eligible and listed properties.

Visual Impact Analysis of Historic Districts Summary

The visual impact study resulted in a finding of "no adverse effect" to NRHP-listed or -eligible historic districts or individual properties. There would not be a strong impact to the property's integrity of setting and feeling as the color of the monopoles would be NPS-approved brown to blend with the existing environment, and all equipment shelters would be constructed to match the surrounding environment. Although new elements could be introduced around the historic districts, it is expected that compliance with NEPA, Section 106 of the NHPA, and other applicable laws and policies as part of the permit request process would ensure that physical impacts to character-defining features of the historic districts would not occur. In terms of Section 106, the Proposed Action would have no adverse effect on historic properties. Additionally, the setting of the historic districts would not be affected because the fiber optic network would be constructed underground and would not be visible.

Cumulative Effects

Past, present, and reasonably foreseeable future actions that have impacted cultural resources include those listed in Section 3.1. Because of mitigation measures required for protection of cultural resources, past actions have also been required to avoid or minimize impacts to cultural resources to the extent possible. Collectively, past actions would continue to have adverse cumulative impacts on cultural resources. In combination with the Proposed Action the impacts would continue to result in adverse impacts, but would not substantially change the impacts that are already occurring because of measures taken to reduce impacts to cultural resources. In most cases the infrastructure was located as to be the least visually intrusive by blending it into the surrounding environment or placing it where screening by vegetation or topography makes it less conspicuous or creates a low visual contrast. For the most part infrastructure that would be

visible, would not be distinguishable or conspicuous, and there would be no adverse effects to the historic districts.

3.4 Visitor Use and Experience

3.4.1 Affected Environment

The overall numbers of visitors to the park are increasing, and the patterns and types of use are changing. In 2017, visitation to the park was the highest on record with 4,969,000 total visits. From 2006 through 2015, park recreation visitation at Grand Teton increased 31% and visitation at John D. Rockefeller, Jr. Memorial Parkway increased 38% (NPS 2017). Visitor use in the park is primarily concentrated in the major developed areas, such as South Jenny Lake, Jackson Lake Lodge, Moose, and Colter Bay. Overall, the park gets high satisfaction ratings from visitors – people are finding and enjoying the wide array of activities available in the park (NPS 2017).

The summer visitor season runs from May until October, with the peak use period occurring in July and August. Concession and NPS facilities are open during this time and the lodges, cabins, and campgrounds typically operate at full capacity during this period. The primary summer attractions are viewing and photographing the Teton Range and other iconic landscapes and wildlife; swimming, boating, and fishing on area lakes and the Snake River; hiking; horseback riding; bicycling; mountain climbing; backcountry/wilderness camping; and picnicking. Interpretive services are provided at some of the developed areas including nature walks, evening programs, visitor centers, and a museum. In addition to heavy summer visitation, over the last several years there has been an increase in travel during the shoulder seasons. Visitor use during this period is weather dependent and highly unpredictable due to possible late spring and early fall snow storms. While most park areas are not heavily visited in the winter, Flagg Ranch is a major winter use operation and staging area for over-snow trips into Yellowstone National Park.

Visitor Information, Education, and Interpretation

New generations of visitors are seeking ways to find information and to connect with park resources through digital media that provide current, if not real-time, information (NPS 2017). The Park’s Foundation Document states, “technology, demographics, and economics continue to change, and with them patterns of use and visitor needs. Visitors do a lot of advance planning with the internet, and visitors are looking for more customized experiences. There is also an increased need and demand for improved wireless telecommunications in the parks” (NPS 2017).

The NPS and its partners have developed a growing range of new and social media resources to support park education programs (<https://www.nps.gov/hfc/services/education/>). The official Grand Teton National Park website currently includes educational information about the park including interpretive programming, alerts (e.g., road conditions and construction closures), maps, lodging, things to do, etc. and links to information regarding backcountry/wilderness and other permits, lodging, and camping. In addition to the website, the park has developed an interactive mobile app that has self-guided tours, maps, photo locations, digital postcards, and up to date accessibility information for trails and facilities. There is also a plethora of other online tools that inform and connect park visitors to the park and its resources. Currently visitors can access these resources before visiting the park, but access to these tools is limited once inside the park due to a lack of reliable connectivity. In addition to wanting to take advantage of internet-

based resources the park has developed, some visitors also expect to be able to use their phones or have internet access while in the park.

As communications technology becomes more widespread, some visitors have expressed concerns about how technology such as cell phones affect the visitor experience in the park. The types of wireless service available (cell phone, internet access), locations, and the siting of wireless telecommunications facilities such as cell towers can affect how visitors experience the park.

Visitor Protection/Safety

Visitor safety programs include emergency medical services; search and rescue (SAR); structural fire; and law enforcement. The park's land-based telephone system, cellular communication system (voice conversations and text messages), and two-way radio system are the primary communications methods to support essential law enforcement and public safety functions.

Currently, NPS radios are the primary means of communication among park personnel working in the field, and radio repeaters at strategic locations in the park enable communication from most locations, including some that are very remote. The radio system is the park's primary form of emergency communications and EMS, structural fire, wildland fire, law enforcement, SAR, weather, avalanche, earthquake and other required types of necessary emergency services response. This is the preferred method, as it allows dispatch and all responders to be kept apprised of the situation. The NPS is the primary provider of these services within the park, although outside agencies have direct access to Grand Teton dispatch and are able to communicate with park responders in instances where outside assistance is needed.

Teton Interagency Dispatch Center (TIDC) is located in Moose, Wyoming and is an all-risk dispatch center providing for wildland fire, law enforcement, SAR, EMS, structural fire, maintenance, and resource management dispatching. TIDC serves the Bridger-Teton National Forest, Grand Teton National Park, and John D. Rockefeller, Jr. Memorial Parkway, as well as wildland fire and prescribed fire activities for the USFWS (National Elk Refuge), Wyoming State Forestry (Teton Zone), and County Fire Services for Teton and Sublette counties and the northern portion of Lincoln County. However, radios may not be effective for communicating with concessioners, outside entities, or office-based park staff who do not have access to radios. In such cases, phones (either cellular or land-based) are used when available.

As mentioned in Section 3.1, plans are currently underway for development of a nationwide first responder network called FirstNet that would improve emergency communications. FirstNet supports unified and advanced emergency communications and the network integrates with existing LTE and developing cellular standards. This new network would require up to date telecommunications infrastructure to operate to its full potential.

3.4.2 Environmental Consequences of the No Action Alternative

Under this alternative, there would be no additional telecommunications infrastructure in the park as described in the telecommunications right-of-way permit request. Visitors would continue to experience spotty cellular coverage in many areas of the park and they would be able to utilize the wireless technology only to the extent that it is currently available. Many areas of the park would remain without this service. As the demand for wireless capacity increases, if there is no change in the level of service there would be less ability to meet demand. In developed areas, some visitors may consider the lack of service to be an inconvenience. For

those individuals who are not dependent on this technology, there would be no impacts from the No Action Alternative.

Under the No Action Alternative, various user groups would be impacted differently by continuation of the current telecommunications infrastructure. For those visitors that feel cellular service and wireless internet service is an important enhancement of their visitor experience, impacts would be adverse as they would continue to experience a lack of cell phone coverage and wireless internet connections. For those visitors that feel cellular service and wireless internet service detract from their experience, impacts would be beneficial because service would not be expanded beyond current levels.

Under the No Action Alternative existing limited coverage and capacity would likely remain the same, as opportunities for coverage extending to developed areas from outside the park are limited due to topography, distance, etc. Cellular coverage would not increase, and potential impacts to park operations, whether beneficial or adverse, that improved communications via telecommunications infrastructure might cause, would not occur.

Under this alternative, there would be no additional cellular coverage in the park as described in the telecommunications right-of-way permit request. Any future telecommunications projects would require compliance and would be reviewed on case-by-case basis. Replacement or upgrade of existing facilities would occur as needed, but no comprehensive plan would guide efforts. Each facility would be required to complete the NEPA process and follow existing siting guidelines before construction.

Visitor Information, Education, and Interpretation

Under the No Action Alternative, visitor information, education, and interpretation would continue to rely on existing infrastructure. Access to NPS and partner social media resources to support park education programs would remain limited inside the park due to a lack of uninterrupted connectivity. This would result in lack of access to educational information, interpretive programming, alerts (such as road conditions and construction closures), up to date accessibility information for trails and facilities, links to information regarding backcountry/wilderness and other permits, maps, and lodging, among many other resources intended to inform and connect park visitors to the park and its resources.

The park would continue to use existing technology to share information and provide interpretive services to visitors. Social media is increasingly used to communicate with the public about park conditions, and visitors increasingly rely on use of social media to monitor weather and road conditions within the park. Visitors would continue to find it difficult to obtain park information online while in the park; they would continue to obtain information from communities where WiFi and cellular signals are available or in person at park visitor centers.

There would be no improvements to access to communication via internet and cellular service under this alternative. Because these communication services have become a standard of life for many people in this day and age, visitors would continue to expect to have access to internet and cell service and expect the park to be “mobile-friendly.”

Visitor Protection/Safety

Under the No Action Alternative, visitor safety programs including emergency medical services, SAR, structural fire, and law enforcement would continue to rely on the existing infrastructure.

Upgrades to the NPS two-way narrowband radio system would be made as needed, which is the park's primary form of emergency communications and is therefore important for the health and safety of park visitors, employees, and residents. Under this alternative the NPS's radio system would remain unreliable in some areas of the park due to topography and distance between the existing radio repeaters.

Service would not be improved in any of the park's developed areas. Two-way radios and coverage from existing telecommunications facilities would continue to be available to those with appropriate devices, and emergency contact times would not be expected to change. Under the No Action Alternative, cell phones would remain an option in areas where service is currently available, but their use would not be expanded to other areas. Emergency contact time would be dependent on other forms of communication if incidents requiring assistance occur in areas where there is no cellular coverage.

Additional cellular access would not be available to supplement the radios. Problems related to NPS staff in the field with radios communicating with concessioners, outside entities, or office-based NPS staff who do not have access to radios would continue. Without infrastructure upgrades, use of or coordination with the proposed FirstNet nationwide first responder network would be limited by the existing telecommunications infrastructure.

Cumulative Impacts. Past, present, and reasonably foreseeable future actions that have impacted or have the potential to impact visitor experience were listed in Section 3.1. The impacts of these actions have been adverse in the short term, primarily related to construction activities which cause disruptions or disturbances, but beneficial in the long term as visitors have been able to enjoy pathways, trails, and improvements in developed areas. The impacts of past, present, and reasonably foreseeable future actions on visitor safety include improvements to operations because installation of some fiber optic cables has already occurred. The proposed FirstNet project would also have beneficial impacts where it is operational by improving communications with outside agencies and ultimately would enhance visitor safety, although the lack of telecommunications infrastructure in the park would limit the system's potential effectiveness. The impacts of the No Action Alternative on emergency services would be adverse in the long term, due to a lack of service in many developed areas which can affect visitor safety. Collectively, past actions would continue to have both beneficial and adverse cumulative impacts on visitor use and experience. The impacts of the No Action Alternative on visitor experience would be beneficial or adverse, depending on an individual's view on telecommunications technology in the park.

3.4.3 Environmental Consequences of the Proposed Action

Improved cellular service under the Proposed Action may impact visitor experience of the park. While some visitors use technology to learn and improve their experience, others value locations and experiences where technology is scarce. An increase in telecommunications capabilities would potentially affect visitor experience beneficially or adversely depending on individual preference. Therefore, improved cellular signals, and the potential increase in use of mobile devices in developed areas of the park, may have beneficial and adverse impacts depending on visitor expectations.

The proposed area of fiber optic and cellular expansion is focused on the developed areas of the park that have a significant park staff presence and/or see a high volume of park visitors. Within

these areas both groups would be affected. Large portions of the park (including many of the hiking trails and backcountry/wilderness areas) would not be affected by the new infrastructure.

The proposed fiber optic network would allow for high speed internet and network services to be available for park operations and concessions in the developed areas and wireless internet service to be available in some locations to provide service to park hotel lodging rooms and lobbies, stores, and other developed areas identified in Section 2.1. The new high-speed internet capability would provide reliable network capability for use by park visitors and concession and partner operations that directly serve park visitors.

Visitor Information, Education, and Interpretation

The Proposed Action would provide wireless cellular and data coverage at strategic locations across the park. This would enable the NPS to disseminate information (including interactive educational information) to visitors in more ways and to better relate to a broader spectrum of the public. The major impacts on park visitors would include: increased educational opportunities due to the availability of interactive information to support park education programs such as the park website and other sources (including park-developed applications, interpretive programming, alerts, maps, Google earth, etc.); the ability to stay connected to family and friends while visiting the park, including the ability to share the experience of the park using social media; and the ability to receive email and other critical information while visiting the park. Access to these resources from within the park would be improved because of the increased connectivity.

Improvements under the Proposed Action may provide new ways to use technology as an educational tool, as well as providing the NPS opportunities to more easily and quickly communicate park conditions to visitors. In areas with improved cellular service, visitors may increase their use of cellular devices for route finding, information (via electronic educational and interpretive media), communication with family members or friends, emergency services, and with park information services (rangers, interpreters, etc.). Improved communications within the coverage area would directly benefit those who utilize this technology. For those visitors that feel cellular service and wireless internet service enhance their experience, they would enjoy increased cell phone coverage and wireless internet connections as an important part of their visitor experience. Visitors may benefit from improved cellular signals in the developed areas because of ready access to park information, such as real-time information on reservation systems, parking, camping, etc.

However, visitors may also observe an increase in disruptions due to use of cell phones by other visitors that may degrade some individual's experience. Visitors who prefer a more primitive experience may oppose the telecommunications infrastructure and may be bothered by the presence of the technology. There would likely be more encounters with people talking on their cell phones or playing music or broadcasting other noise. For those visitors that feel cellular service and wireless internet service detract from their experience, the noise or social impact from wireless devices could create a noticeable impact to visitor use that causes a change in visitor satisfaction. Some visitors might choose to pursue their activities in less developed areas.

Cell phone coverage is not proposed for the backcountry/wilderness; however the backcountry/wilderness areas that have cell phone coverage as a result of "spillover" from coverage in developed areas would increase compared to current conditions. Similar to visitor impacts in the front country, effects would likely be both adverse and beneficial depending on

visitor's perceptions. Some people would likely be bothered by additional noise in the backcountry/wilderness where solitude and natural sounds are more expected, while some visitors may be more content and have peace of mind believing that they can use a cell phone to contact family or friends or to get help in case of emergency.

Impacts to visitor experience from improvements to the NPS two-way radio system would be negligible. For the most part, visitors would not be aware of changes occurring as a result of the improved two-way radio system. Enhanced communication would result in improved communications and safety, but visitors would not likely attribute this to the new system.

Activities related to installation of the fiber optic network and wireless telecommunications facilities may temporarily inconvenience visitors. Installation activity would affect visitor experience during implementation; the intensity and nature of these activities would vary depending on location and timing as would the effects on visitor experience. Installation activities would generate varying numbers of vehicle trips to accommodate workers and equipment. Less intensive efforts at facility locations after installation (e.g., revegetation efforts) would require fewer workers and fewer trips, thus disruption or inconvenience to visitors would be more limited.

Visitor Protection/Safety

The proposed coverage would provide additional cellular service for accident reporting and improved communications between visitors and park staff. The improved cellular coverage would enhance communications with the park's law enforcement rangers, who are responsible for ensuring safety and security for park infrastructure and visitors, including visitor safety programs such as emergency medical services; SAR; structural fire; and law enforcement. Park staff would be able to use cell phones in more areas to supplement the NPS radio and land-line telephone systems. Overall the new infrastructure would improve emergency response communications and thus improve visitor safety. Visitors would have a greater ability to contact park staff to report incidents or emergencies and could potentially reduce response time.

Improvements to the NPS's two-way radio system would enhance the park's primary form of emergency communications used for EMS, structural fire, wildland fire, law enforcement, SAR, weather, avalanche, earthquake and other required types of necessary emergency services response, including for communication with outside agencies and the TIDC. This would have beneficial impacts to visitor safety both within the park and on surrounding lands. Improvements would also facilitate plans for development of the FirstNet first responder network that would improve emergency communications.

The proposed wireless communication facilities would broadcast wireless signals to the identified developed areas. Although it is not the intent of the plan, moderate or weak wireless signals may extend or spillover to areas within line-of-sight of the poles including undeveloped and backcountry/wilderness areas. The limited backcountry/wilderness areas that currently have spillover cell phone coverage from developed areas would be expanded. The expanded coverage outside of targeted developed areas could improve backcountry/wilderness user connectivity with cellular service which would potentially enhance access to 911 and other services in the event of an emergency. However, backcountry/wilderness users should not expect to have cellular connectivity once they leave the park developed areas. While some emergency communication needs may be served via the spillover effect, park information would explain to

backcountry/wilderness users that the uncertain nature of this communication does not support additional risks in the backcountry/wilderness.

Cumulative Impacts.

Past, present, and reasonably foreseeable actions occurring within the park would include an increase in cell phone service in the developed areas as well as the availability of wireless internet to visitors. The impacts of many of the actions considered in the cumulative impacts analysis have been adverse in the short term, primarily related to construction activities which cause disruptions or disturbances, but beneficial in the long term as visitors have been able to enjoy improved amenities in the front country. These actions have had and would continue to have beneficial, long-term cumulative impacts on visitor experience. The impacts of past, present, and reasonably foreseeable future actions on safety and emergency services include improvements to operations because of fiber optic cable installation that has already occurred. The FirstNet project would also have beneficial impacts by improving communications with outside agencies and ultimately would enhance visitor safety. Although there would be some adverse impacts related to unintentional cell coverage in wilderness, past actions in combination with the Proposed Action would have beneficial impacts on visitor experience as discussed above. The direct and indirect impacts of the Proposed Action on visitor experience would be beneficial or adverse, depending on an individual's view of wireless telecommunications technology in the park. When the effects of the Proposed Action are combined with other past, present, and reasonably foreseeable future impacts, the total cumulative impact would continue to be primarily beneficial in the long term. The incremental impacts of the Proposed Action would contribute moderately to the impacts that are already occurring.

4 CONSULTATION, COORDINATION, AND PREPARERS

This EA has been prepared with input from and coordination with interested agencies, tribal governments, organizations, and individuals. This chapter provides a summary of the opportunities that have been made available for consultation and coordination on the plan, including those that have taken place with the public as well as government and non-governmental agencies or organizations.

4.1 Internal Scoping

The IDT comprised of NPS specialists worked to develop alternatives and issues of concern for the analysis based on internal discussions as well as feedback from the public during the public scoping process (described below). During development and the subsequent review of the right-of-way permit requests, the NPS, USBR, and the applicant worked together to develop the least resource impactful designs to be considered in the permits, while accomplishing park objectives. This process began in 2013 and has continued through 2018. The park also coordinated with concessioners in the siting of telecommunications facilities within their respective concession land assignments in order to minimize the impact on their operations.

4.2 External Scoping

During the summer of 2017, a formal public engagement process for development of the plan was announced by publication of a scoping notice by the NPS on the Planning, Environment & Public Comment (PEPC) website. Scoping included outreach to federal, state, and local agencies, as well as the general public. All were asked to share their thoughts and concerns for the future of telecommunications infrastructure in the park between June 14, 2017 and July 14, 2017. To inform stakeholders about the scoping process, a newsletter describing the context for the plan and how to comment was distributed. This newsletter provided a general overview of the planning schedule, provided background on issues and opportunities within the park, and described the elements that would guide planning and management.

In order to reach a broad audience, the newsletter and information about public scoping were shared with the public in a variety of ways. The public was notified by an email sent on June 14, 2017. The email was sent to 440 interested parties; of these, 179 or 40% opened the public scoping email. Hard copies of the scoping newsletter were made available in several locations, including the park visitor centers.

The NPS collected public comments during this scoping phase of the planning effort in order to understand the public's perspectives on key issues and management options for telecommunications infrastructure in the park. During the public scoping period, a total of 35 individual correspondences were received. Of these, 34 were submitted directly to the NPS PEPC website. One hard copy letter was mailed to the park and entered into the PEPC system.

4.3 Agency Consultation

4.3.1 Endangered Species Act

A scoping letter was sent to the Cheyenne, Wyoming, USFWS Ecological Services Office during the scoping period in June 2017. A list of species was requested from the USFWS Information, Planning, and Conservation System website on March 15, 2017, and updated on December 11, 2017 for the entirety of the park (USFWS 2017).

On April 27, 2018 a BA for the proposed plan with a determination of effects regarding federally listed species was sent to the USFWS. The NPS requested initiation of informal consultation with the USFWS in accordance with Section 7 of the ESA. The BA included a determination of a *“may affect, is not likely to adversely affect”* for Canada lynx and its critical habitat, North American wolverine, and Western yellow-billed cuckoo. Concurrence on this finding was received from the USFWS on May 14, 2018. At the end of September 2018, the grizzly bear was relisted as threatened under the ESA. As a result, an updated species list dated October 16, 2018 was received from USFWS. A Revised BA was submitted to USFWS on November 15, 2018. Concurrence on the not likely to adversely affect determination for grizzly bear was received on December 14, 2018.

4.3.2 Section 106 of the National Historic Preservation Act

In accordance with Section 106 of the National Historic Preservation Act, consultation with the Wyoming SHPO concerning potential impacts to cultural resources has been initiated for the Proposed Action and is ongoing. The park officially initiated the Section 106 review process with the Wyoming SHPO on April 13, 2018. Prior to the formal consultation initiation, the park and SHPO had been communicating about the plan via general park compliance updates over the phone.

During the week of May 21st 2018, a Historic Preservation Specialist with the Wyoming SHPO, conducted visibility analysis field visits at the park. The park's Acting Branch Chief of Cultural Resources and the SHPO representative reviewed the potential visual impacts from multiple proposed locations and helped to fine-tune potential tower locations.

On June 21, 2018, a representative from the NPS Intermountain Regional Office Heritage Partnerships Program conducted a site visit with the Acting Branch Chief of Cultural Resources to Jackson Lake Lodge, where the Proposed Action was discussed, and the logic behind telecommunications infrastructure placement was reviewed in detail. Consultation with the regional office on potential effects to the NHL and the project area overall remain ongoing.

In October 2018, the Class III cultural resources inventory report and a formal determination of no adverse effect was submitted to the SHPO. The SHPO concurred with the no effect determination on November 21, 2018.

4.4 Tribal Consultation

During scoping, the park sent letters to the following affiliated tribes: Coeur d'Alene Tribe of the Coeur d'Alene Indian Reservation; Assiniboine and Sioux Tribe of the Fort Peck Reservation; Comanche Nation, Oklahoma; Confederated Salish and Kootenai Tribes of the Flathead Reservation, Montana; Confederated Tribes of the Colville Reservation; Fort Belknap Indian Community of the Fort Belknap Reservation of Montana; Shoshone Tribe of the Wind River Reservation; Confederated Tribes of the Umatilla Indian Reservation; Crow Tribe; Arapaho Tribe of the Wind River Reservation, Wyoming; Northern Cheyenne Tribe of the Northern Cheyenne Indian Reservation; Blackfeet Tribe of the Blackfeet Indian Reservation; Shoshone-Bannock Tribes of the Fort Hall Reservation; Yakama Nation; Burns Paiute Tribe; Kiowa Indian Tribe of Oklahoma; Apache Tribe of Oklahoma; Nez Perce Tribe of Idaho; Rosebud Sioux Tribe; Kootenai Tribe of Idaho; Oglala Sioux Tribe; Standing Rock Sioux Tribe; and Yankton Sioux. The letter informed them about the plan and asked for input or concerns about the plan. A response was received from the Cheyenne & Arapaho Tribes; they did not identify any issues related to the Proposed Action.

In October 2018, an invitation to comment on the Grand Teton National Park and John D. Rockefeller, Jr. Memorial Parkway Telecommunication Plan and Draft Environmental Assessment and Class III cultural resources inventory report was sent to the park's affiliated tribes.

4.5 List of Preparers and Reviewers

The following individuals were involved in the development and review of the plan.

National Park Service

- Margaret Wilson, Planner
- Daniel Noon, Chief of Planning
- Truda Stella, Intermountain Region NEPA Specialist
- Nida Shaheen, Intermountain Region NEPA Specialist
- John Stephenson, Wildlife Biologist
- Rusty Mizelle, P.E., PMP, Chief, Project Management
- Kate Birmingham, Cultural Resources Branch Chief
- Dave Gustine, Branch Chief of Fish and Wildlife
- Daniel Reinhart, Daniel Reinhart, Supervisory Vegetation Ecologist
- Heather McDonald, Teton Interagency Dispatch Center
- J. David Reus, Concessions Asset Manager
- Terry Roper, Fee and Revenue Business Manager
- Sue Consolo-Murphy, Chief of Science and Resource Management
- Kevin Materna, Acting IT Branch Chief
- Scott Guenther, Jenny Lake District Ranger
- Megan Kohli, Acting Deputy Chief of Interpretation

Bureau of Reclamation

- Richard Jackson, Natural Resource Specialist/NEPA Lead
- Nikki Polson, Archaeologist
- Rochele Ochoa, Natural Resources Specialist
- Amy Goodrich, Natural Resources Specialist
- Tara Hagen, Realty Specialist

North Wind Resource Consulting

- Jace Fahnestock, Project Management
- Kelly Green, NEPA Specialist
- Scott Webster, Biologist
- Greta Rayle, Historic Preservation
- Helana Ruter, Historian
- Tim Funderburg, GIS Manager

REFERENCES

- American Cancer Society. 2018. Cellular Phone Towers. <https://www.cancer.org/cancer/cancer-causes/radiation-exposure/cellular-phone-towers.html>
- Carr, E., E. Jackson-Rotondo, and L. Werner. 2006 Draft Mission 66 Multiple Property Documentation Form. Report on file Grand Teton National Park, University of Wyoming Department of Anthropology, Wyoming State Historic Preservation Office.
- Cassity, M. 2003. National Historic Landmark Nomination: Murie Ranch Historic District. Electronic document at <https://www.nps.gov/NHL/find/statelists/wy/MurieHD.pdf>, accessed on 10 July 2018.
- Caywood, J., A. Hubber, and K. Schneid. 1997a. Jenny Lake Civilian Conservation Corp (CCC) Camp Messhall and Bathhouse National Register of Historic Places Registration Form. Historical Research Associates, Missoula.
- Caywood, J., A. Hubber, and K. Schneid. 1997b. Jenny Lake Boat Concession Facilities National Register of Historic Places Registration Form. Historical Research Associates, Missoula.
- Daugherty, J. 1999. A Place Called Jackson Hole: A Historic Resource Study of Grand Teton National Park. GRTE, Moose, Wyoming.
- Engle, E. 2011. Signal Mountain Developed Area Determination of Eligibility for the National Register of Historic Places. Wyoming Cultural Properties Form on file at the Wyoming State Historic Preservation Office, Cheyenne, Wyoming.
- EPA. 1998. Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses. April 1998.
- Fraser, C. 1980. National Register of Historic Places Registration Form: Chapel of Transconfiguration. Electronic document at <https://npgallery.nps.gov/GetAsset/13c502de-4a9b-4555-9557-56f6dcb6f8f0>, accessed 10 July 2018.
- Humstone, M., H. Sikk, and H. Walker. 2009. Wyoming Cultural Properties Form for the North Jenny Lake Lodge. On file at the Wyoming State Historic Preservation Office, Cheyenne, Wyoming.
- Littlejohn, M. 1998. Grand Teton National Park Visitor Study. National Park Service, Visitor Services Project, Cooperative Park Studies Unit, University of Idaho.
- Longfield, K. 2009. *Wyoming Cultural Properties Form for the Moose Headquarters Development Area*. On file at the Wyoming State Historic Preservation Office, Cheyenne, Wyoming.
- Mardorf, C., B. Engle, and K. Miller. 2011. Menor's Ferry Historic District National Register Nomination. Document on file at Grand Teton National Park, Moose.
- Mehls, S.F. 1988. Jenny Lake Ranger Station Historic District National Register of Historic Places Registration Form. Western Historical Studies, Inc., Lafayette, Colorado.

- Mehls, S.F. 1990. 4 Lazy F Dude Ranch National Register of Historic Places Registration Form. Electronic document at https://npgallery.nps.gov/NRHP/GetAsset/NRHP/90000611_text, accessed 10 July 2018.
- National Park Service (NPS). 2006a. NPS Management Policies. <http://www.nps.gov/policy/MP2006.pdf>, Management Policies. Washington D.C.
- NPS. 2006b. Grand Teton National Park Transportation Plan Final Environmental Impact Statement, Grand Teton National Park. Moose, Wyoming.
- NPS. 2010. Moose Headquarters Rehabilitation – Site Work Finding of No Significant Impact. Electronic document at https://www.nps.gov/grte/learn/management/upload/GRTE_MooseHQ_FONSI_RD_Signature.pdf, accessed on 30 March 2017.
- NPS. 2012. Replace Moose Water System and Address Critical Water System Deficiencies Environmental Assessment. Grand Teton National Park, Moose, Wyoming.
- NPS. 2014. Jenny Lake Renewal Plan Environmental Assessment. Grand Teton National Park, Moose, Wyoming.
- NPS. 2016. Gros Ventre Junction Pathway User Safety Improvements Categorical Exclusion. Grand Teton National Park, Moose, Wyoming.
- NPS. 2017. Foundation Document. Grand Teton National Park, John D. Rockefeller, Jr. Memorial Parkway. Wyoming. May 2017.
- North Wind Resource Consulting. 2018. A Class III Cultural Resources Survey of 612 Acres and Visual Impact Study of Eight Infrastructure Locations for the Fiber Optic and Cellular Broadband Extension Project, Grand Teton National Park, Teton County, Wyoming, Grand Teton National Park, Teton County, Wyoming. North Wind Cultural Resources Report No. 30207.
- Reed, P.S. and E.B. Wallace. 2002. National Historic Landmark Nomination Form for the Jackson Lake Lodge. Submitted to the United States Department of the Interior, National Park Service.
- State of Wyoming. 2014. Wyoming Governor's Executive Order 2015-4 and the Upper Snake River Basin Sage-Grouse Conservation Plan.
- U. S. Fish and Wildlife Service (USFWS). 2016. Grizzly Bear in the Greater Yellowstone Area (<http://igbconline.org/yellowstone-subcommittee/>),
- USFWS. 2017. Online species list for Teton County, Wyoming. At the IPaC (Information, Planning, and Conservation Systems). Website: <http://ecos.fws.gov/ipac/>.
- USFWS. 2018. Recommended Best Practices for Communication Tower Design, Siting, Construction, Operation, Maintenance, and Decommissioning. Migratory Bird Program U. S. Fish and Wildlife Service Falls Church, Virginia April 2018. <https://www.fws.gov/birds/management/project-assessment-tools-and-guidance/guidance-documents/communication-towers.php>.
- World Health Organization (WHO). May 2006. Electromagnetic fields and public health. Background. <http://www.who.int/peh-emf/publications/facts/fs304/en/>

Appendix A – Alternatives and Designs Considered But Dismissed

The alternatives, locations, and configurations that were considered during the process are described below along with the reasons for dismissal (40 CFR 1504.14(a)). Under provisions of NEPA of 1969, as amended (42 USC 4321 et seq.), all of the alternatives considered including those considered but eliminated from further discussion constitute the “range of alternatives.” The following designs and/or technology were considered but dismissed because other options were available and selected that were less environmentally damaging.

Other Locations or Other Types of Monopole Towers

A number of iterations were made during the development of this plan including site-specific changes in proposed wireless telecommunication locations. Multiple locations were initially considered that were ultimately determined to be visually intrusive, or to have the potential for adverse impacts to cultural resources or other resources, or too great an environmental impact. Two other sites – the Lizard Creek Campground and the University of Wyoming AMK Campus – were also considered, but are no longer proposed for wireless telecommunications sites, although fiber optic cable installation is still proposed to the Lizard Creek Campground and the AMK Campus. In Kelly, the substation site was identified first, but the visual resource survey found it was visible from all of Kelly, therefore it was relocated to the Kelly Pit. Other examples of changes made to reduce potential environmental impacts are in the project file.

In addition to different locations, different designs and types of towers were considered. The first consideration was the limits placed by applicable authorities. For example, wireless telecommunications facilities are subject to the USFWS guidance on siting such facilities including precluding the use of guyed towers. Once those were eliminated, multiple other cellular infrastructure designs (e.g., monopole heights and camouflage treatments) and configurations were considered at each site and facilities were changed and/or moved around to minimize potential impacts to resources. For example, early concepts proposed a single 80-foot monopole at South Jenny Lake, and three 80-foot flag poles (monopoles) to replace the Flagg Ranch flag poles. These were all dismissed once photo simulations were developed, which illustrated the potential impacts to viewsheds and cultural or historic resources. The IDT also agreed a single monopole or ODAS is less intrusive than current state of the art camouflaged towers. As a result of this and other considerations, only monopoles and ODAS are proposed in the park.

Outside of Park Boundaries

When the park received the permit request, park staff and the applicant looked at each site proposed and analyzed potential areas outside the park that would meet the same telecommunications objectives. The only area with a viable option outside the park was located outside the town of Kelly. Once the park analyzed the impacts, it was decided that locating the Kelly wireless telecommunications site within the park boundaries would be beneficial due to their concerns about potential impacts on the scenic and historic viewsheds in the southeast part of the park. By having it in the park, management could ensure any infrastructure constructed met park objectives. In addition, connecting existing fiber to a wireless telecommunications site outside of the park would require crossing park land regardless. The route selected is the least

impactful fiber optic route (from the Kelly Elementary School through the former landfill site) and has the least impacts on scenic and historic viewsheds.

Other Backhaul Network Alternatives

A backhaul fiber network must connect each wireless telecommunications facility (and any locations requiring a high-speed data connection) to an existing fiber network. Several alternatives utilizing existing fiber were considered, but the government-owned fiber network that was installed from 1998 to 2000 between Moose and Colter Bay is in poor condition and has low capacity. A microwave network was considered; this is typically less expensive to install because it does not require underground cable installation. However, it has limited backhaul capacity, requires a microwave dish (or dishes) at each wireless telecommunications location, and requires a line of site from each location to the other (or an intermediate microwave only tower). It was estimated that this approach would have required the 11 initially proposed wireless telecommunications facility locations to be replaced with 11 new 200-foot self-supported towers with cellular antennas and exposed microwave antennas above the tree line. Additionally, an estimated five 200-foot microwave only towers would have to be installed at remote locations to connect the sites due to trees and topography in the park. A microwave network alternative was not selected because of the potential for significant impacts to viewsheds in the park, the requirement for new roads and utilities to be constructed to access the remote towers, and the limited future capacity for growth.

Total Park Wireless Coverage

An alternative was considered that would have provided ubiquitous wireless coverage throughout all campsites, lodges, and roads within the park by placing a greater number of equipment shelters, towers, and antennas than is proposed under the Proposed Action. The current plan recognizes the clear relationship between desired coverage levels and the number of structures needed or authorized. The amount of coverage a single wireless telecommunications facility can provide is determined by a number of factors, including tower height and the area's topography. The goal of the plan is not to provide 100% coverage of the park, which would require a much greater number of towers. The ubiquitous wireless coverage alternative was not chosen because it would have required substantially more and taller towers to be installed in order to cover the roads across the park. The location of these towers would also have required additional roads and utility construction and thus would have resulted in substantially more environmental and viewshed impacts.

No Additional Wireless Telecommunications Facilities

Another alternative was considered that did not add any additional wireless telecommunications facilities to the park, only fiber optic internet. Under the applicable authorities the park is required to consider permit requests and grant them where they would not interfere with the planned purposes of the park or the mission of the NPS. Additionally the park has determined the need for upgraded wireless telecommunications systems in the park. Therefore, an alternative that does not allow new facilities was not carried forward for detailed analysis because it would not meet project objectives or resolve the need for the project.

Appendix B – Mitigations and Best Management Practices

The mitigation measures –which include park BMPs – identified in this section were designed to minimize impacts and have been incorporated as integral elements of the Proposed Action. These mitigations would be incorporated into any required permits as well as into any subsequent contracting. If additional site-specific requirements are identified as necessary during project activities, they would be implemented on a case-by-case basis in order to further reduce impacts to resources.

Construction

- Hours of work may be determined on a site-specific basis dependent upon visitor use and/or sensitive wildlife habitat.
- The location of all potential utility lines in work areas will be field located and marked prior to work to avoid impacts to existing utilities.
- Following construction, furnish the park GIS Office with utility location information, including a shapefile using coordinates NAD83 UTM 12N, company name, and type and number of lines.
- Control dust during construction by minimizing soil exposure, watering, and using other dust prevention methods.
- All project zones will be kept trash free at all times.
- To minimize the amount of ground disturbance, staging areas will be located in previously disturbed sites, away from visitor use areas to the extent possible. All staging areas shall be returned to pre-project conditions following completion. Parking of construction vehicles will be limited to these staging areas, existing roads, and previously disturbed areas.
- Identify and define construction zones with construction tape, snow fencing, or other material prior to any construction activity. Use the zone to confine activity to the minimum area required for construction. Construction activities, including material staging and storage, cannot occur beyond the construction zone fencing.
- Traffic will be controlled during construction if necessary to ensure safety of the public, park employees, and residents.
- Installation would require temporary shoulder closures along roadways and traffic control at roadway crossings.
- Contractors will coordinate with NPS and USBR staff to minimize disruption of normal park activities.

Cultural Resources

- If previously unknown archeological (human-modified) resources and/or human remains are discovered during construction, all work in the immediate vicinity (600 feet) of the discovery shall be halted until the resources are identified and documented and an appropriate mitigation strategy developed. Contact the NPS archeologist.
- All vegetation modification, including tree removal, at NRHP-listed or -eligible properties will be reviewed and approved by the Section 106 specialists (as well as by

wildlife and vegetation specialists) in order to ensure no project actions affect the property's cultural resources.

- All work on or near historic buildings, structures, sites, and landscapes will be conducted in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties in consultation with NPS or USBR respective cultural resources specialists. Any deviation from the approved specifications must be submitted for further review to ensure that NPS and USBR cultural resource specialists have considered the potential impacts to the resource.
- Consult with NPS or USBR respective cultural resource specialists or archeologists in advance (generally 60 days) of any ground disturbing activities or work on or near buildings, structures, sites and landscapes eligible for or determined eligible for listing in the NRHP in order to avoid impacts to these resources.
- Inform all contractors and subcontractors of the penalties for illegally collecting artifacts or intentionally damaging archeological sites or historic properties.

Soils

- Avoid rutting or excessive soil compaction caused by vehicles or equipment by restricting construction activities during saturated soil conditions or severe weather conditions to reduce potential damage to soils and vegetation. In the event of adverse weather conditions, the project leader will consult with the NPS resource management representative to ensure that ground conditions are acceptable for project activities.
- To minimize soil loss/erosion at the project site, erosion control BMPs including protection measures such as sediment traps, silt fences, erosion check screens/filters, jute mesh, will be used if necessary, to prevent the loss of soil.
- The primary goal for site restoration and erosion control is to avoid all erosion from the site. Erosion control will focus on avoidance and be directed at bore sites, handholes, and building and monopole installations, and any areas where surface disturbance exceeds 1 foot in width. The major treatments for these areas would include:
 - Dust Control
 - Soil Roughening
 - Re-contouring
 - Seeding
- If it is determined that there is a need for additional erosion control around bore, handhole, and monopole and building installation sites, additional controls likely to be used will include.
 - Sediment Basins
 - Sediment Traps
 - Silt Fences
 - Vegetated Buffers
- Topsoil should be salvaged at the beginning of all ground disturbance activities by scraping the topsoil to the side prior to deeper digging. Topsoil refers to the uppermost layers of soil and includes fine particles, small roots, rocks, and cobbles. It is usually darker in color, and is the layer in which the majority of roots grow and beneficial microorganisms exist. It is usually the top 2-6 inches. Conserving topsoil will minimize impacts to vegetation and help preserve valuable micro-organisms and the native seed bank.

- Store salvaged topsoil separately from other materials. Limit the height of topsoil stockpiles to 36 inches. Do not stockpile topsoil or subsoil within drip line of remaining trees. Excess soil will be stored only at approved locations.
- Replace topsoil and other excavated soils and rock in the proper order, cobble lowest, then subsoil, then topsoil. Use a trench box if one is needed to reduce disturbance. Spread topsoil as near to the original location as possible.
- Do not drive or operate equipment on newly replaced topsoil. Do not re-enter the project site once revegetation/restoration work has been initiated and/or completed.
- If previously unknown paleontological (fossils) resources are discovered during construction, all work in the immediate vicinity (600 feet) of the discovery shall be halted until the resources are identified and documented and an appropriate mitigation strategy developed.

Vegetation

- Plant surveys for rare and/or sensitive species are required prior to ground disturbing activities and must be conducted during growing seasons when these species could be identified.
- If mitigation of construction disturbance requires the planting of vegetation, native vegetation of local genetic stock from the area of the park in which the infrastructure is located will be used, when possible. A monitoring and control plan will be in place to avoid the introduction or spread of any exotic vegetation.
- Seed mixes used for revegetation in roadside corridors will be composed of native species and approved by NPS SRM Vegetation Branch staff.
- Prior to project implementation, NPS SRM Vegetation Branch staff will conduct invasive, non-native plant surveys in the project area. Invasive weed control measures will be implemented to monitor and mitigate impacts within the first 3 years (minimum) of construction.
- To reduce the threat of non-native, invasive vegetation being introduced to the park, all imported material (i.e., sand, gravel, rock, rip-rap, etc.) must be obtained from a park approved or county weed district approved source. If a new material source is requested, NPS vegetation staff will seek county-approved material source pits and/or perform a non-native, invasive plant inspection.
- Material sources, including sand, gravel, rock, rip-rap, mulch, etc. that is not attained from a county or park approved weed-free material sources must be precooked (300 degrees) or washed to prevent spread on invasive weeds in the park.
- Use wooden mats for vehicle and equipment access to the site to limit damage to existing vegetation.
- Preserve existing trees to the extent possible, and during installation, avoid damaging roots of nearby trees.
- All vehicles and equipment will arrive at the job site in a condition free of mud, dirt, and plant material. A method such as pressure washing prior to transport will be needed to comply with this requirement. Prior to offloading of any equipment, inspection and verbal approval must be obtained from the NPS resource management representative or delegated representative. The spread of non-native, invasive plant species in the park is a serious concern, and no equipment will be allowed to offload or remain within the

park if dirt or other contaminants with the potential to harbor seeds or other plant material is apparent.

Visual Resources

- Wireless telecommunications facilities will be constructed in a manner that is compatible with the character of surrounding structures or otherwise made unobtrusive through use of the best available technologies (e.g., slimline poles, enclosed antenna, and micro-cells), screening with vegetation or existing topography, concealment, and/or camouflage. However, use of stealth facilities or other best available technologies must not diminish the physical or visual integrity of cultural resources.
- Finishes or colors that would be shiny or reflective in sunlight would not be allowed.
- Trees and other vegetation adjacent to the footprint of the proposed wireless telecommunications facilities must be protected from damage. Topographic cuts and fills for wireless telecommunications facilities must be minimized and justified. NPS staff will identify appropriate mitigations for approved cuts or fills.
- Security or safety lighting will be down-shielded to keep light within the site boundaries.

Fish and Wildlife

- To prevent introduction of terrestrial or aquatic invasive species, all equipment, including rubber-tired land and tracked land vehicles, and construction and facility equipment must be thoroughly cleaned, and inspected by NPS personnel before being operated in the park.
- Unless otherwise noted (i.e., elk rutting and near sage grouse leks), limit routine construction activities to 30 minutes after sunrise to 30 minutes prior to sunset to avoid disturbance to wildlife.
- To protect special status species:
 - Inform staff about the potential for special status species in or near the area of the proposed activity. Work will cease if a special status species is discovered in the project area, until NPS staff re-evaluates the project. Protective measures, including potential modification of the work or the work schedule, could be determined necessary.
 - In circumstances when it is deemed necessary to conduct activities near sites known to support Canada lynx (*Lynx canadensis*) or North American wolverine (*Gulo gulo luscus*), the NPS biologist will be consulted with to minimize impacts to the listed species (e.g., working quietly on-site, and minimizing time in or near habitats en route to their work sites).
- All project activities must comply with Grand Teton's Superintendent's Compendium regulations related to food storage and park recommended BMPs for living and working in bear country (2016 and as updated). Bear "attractants" include food, drinks, garbage, cooking utensils, dirty/soiled pots/pans/plates, stoves, grills (charcoal or gas), empty or full coolers, storage containers with food or previously holding food (except approved bear resistant canisters), beverage containers, pet food/bowls, and any odorous item that may attract a bear such as toiletries.
 - At all times in all locations, including the backcountry/wilderness, all staff (NPS, Volunteers-in-Parks, contractors, etc.) must ensure that all bear attractants are

attended at all times. All unattended attractants must be stored securely inside a building, a bear resistant food storage locker (if available), in a hard sided vehicle with doors locked and windows closed, or in an Interagency Grizzly Bear Committee approved portable bear resistant food storage canisters; or disposed of properly in a bear-resistant garbage receptacle. Backpacks and/or daypacks containing unsecured attractants (i.e., not in a canister) must not be left unattended.

- All personnel must attend a briefing on proper food/attractant storage and bear safety presented by a qualified member of the NPS bear management team or their designee. Please contact the NPS Bear Management Office at least two weeks prior to the desired start date to schedule a briefing.
- All human-bear conflicts must be reported to Teton Interagency Dispatch Center immediately. All bear sightings must be reported to the NPS Bear Management Office within 24 hours.
- Provide for proper storage and disposal of materials that may be toxic to bears. All potentially toxic attractants, including petroleum products, must be stored or disposed of in such a way that they are not available to bears.
- Construction debris must be separated from human food garbage and disposed of in dumpsters that can be closed at night. No open dumpsters are allowed. However, a request for an exception to the open dumpster stipulation can be made to the project manager who will consult with the NPS Bear Management Office to determine if such use will be authorized. The use of open dumpsters will only be considered if the following conditions can be met: the open dumpster must be stored behind a locked fence out of view and inaccessible to the public, will be labeled construction debris only, and be inspected daily to ensure that no human food garbage is in the dumpster.
- For all projects occurring within the Grizzly Bear Primary Conservation Area, coordinate with the NPS Bear Management Office to ensure that all project activities comply with habitat standards in the Final Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Area (USFWS 2016, <http://igbconline.org/yellowstone-subcommittee/>), and to the extent practicable, that projects occurring in occupied grizzly bear habitat outside of the Primary Conservation Area adhere to the spirit of standards in the Final Conservation Strategy (USFWS 2016).
 - Minimize human interaction and potential grizzly bear mortality by continuing the park's hazing strategies to prevent grizzly bears from becoming habituated to human residences.
 - Grizzly bears concentrate in certain areas during specific time periods to take advantage of concentrated food sources or because the area provides a high seasonal food value due to diversity in vegetation and plant phenology (e.g., important spring or fall range). Where grizzly bear use is known or likely to occur and where practicable, delay disturbing activities during the spring in spring habitats to minimize displacement of grizzly bears.
 - Manage building construction/removal and other activities in a manner that will minimize noise and visual disturbances and facilitate safe movement through habitat by grizzly bears.

- Control speed, traffic, and parking to minimize negative impacts to grizzly bear activity, including active enforcement of speed limits.
- All project activities will adhere to all conservation measures outlined in the Lynx Conservation Assessment and Strategy (USFWS revised 2013). In particular, harvest of trees on site for the proposed activities within Lynx Analysis Units and/or in Critical Lynx Habitat will not be authorized without further review and analysis in consultation with USFWS.
- All project activities will comply with the NPS Superintendent's Compendium (2016 and as updated) closures implemented around wolf den/rendezvous sites. Should a den or rendezvous site not previously known be found within 1 mile of the proposed activity a seasonal area closure will be implemented as needed, typically between 15 April and 15 August.
- Prohibit construction activities before 8 a.m. and after 6 p.m. during the elk rutting and migration period (typically from September 1 to December 1, or as recommended by the NPS biologists).
- Avoid construction, maintenance, or other disturbing activities in crucial ungulate winter ranges (15 December to 15 April) and in identified ungulate parturition ranges (15 May - 30 June).
- Fencing (including temporary fencing for construction projects and permanent fencing) used in projects will comply with wildlife friendly fencing standards. Consult with the NPS SRM Fish and Wildlife Branch Ungulate Biologist for assistance with specifications and appropriate design.
- Care will be taken not to disturb any wildlife species (amphibians, reptiles, migratory birds, mammals, raptors, or bats) found nesting, hibernating, estivating (in an inactive dormant state during hot, dry periods), or otherwise living in, or immediately nearby, worksites. For example, areas will be avoided and buffers will be established around nests, dens, etc. until young fledge or dens are no longer occupied.
 - Before commencement of any activities that involve removal or manipulation of vegetation including large trees, grasses, and shrubs during the breeding season conduct a survey for nesting birds. Surveys must be conducted by qualified personnel before tree removal and/or ground disturbing activities begin. Work must be completed within two weeks of the nesting bird survey. If this is not possible, another survey must be scheduled with NPS biologists.
 - Eagles are specifically protected under the Bald and Golden Eagle Protection Act of 1940 (16 USC 668-668c) and the Migratory Bird Treaty Act. Project activities must not lead to the take of bald or golden eagles. The Bald and Golden Eagle Protection Act defines "take" to include disturbing birds.
 - Implement seasonal closures (typically February 1 to August 15) of ½ mile (2018 NPS Superintendent's Compendium) around occupied bald eagle nests and prohibit work on or occupancy of area within the closures while they are in effect.
 - It is the responsibility of the staff to report any eagle activity in the vicinity of proposed activity to NPS biologists in a timely way so that they may assess whether additional mitigation measures are needed to comply with the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act.
 - All project activities must comply with the NPS Superintendent's Compendium (2016 and as updated) closure regulations for sage-grouse leks and to the extent

practicable all project activities occurring within occupied sage-grouse habitat within the core sage-grouse area will apply the management direction and conservation measures outlined in the Wyoming Governor's Executive Order 2015-4 and the Upper Snake River Basin Sage-Grouse Conservation Plan (State of Wyoming 2014).

- Prohibit removal of shrub-steppe habitat within 4 miles of an occupied sage-grouse lek to protect breeding, nesting, and brood rearing habitat for sage-grouse in the park (generally between March 15 and June 30, or as recommended by NPS biologists monitoring sage-grouse). Exceptions may be made on a limited and case-by-case basis.
- Limit new permanent facilities (including, but not limited to roads, buildings, well pads, pipelines, leach fields, and vegetation treatments) within 0.6 miles of active sage-grouse lek areas.
- Restrict maintenance and rehabilitation activities between the hours of 6:00 p.m. and 8 a.m. at proposed activities within 4 miles of active leks/nesting complexes (generally from March 15 – June 30, or as recommended by NPS biologists).
- Limit noise to less than 10 decibels above ambient measures from 6:00 p.m. to 8:00 a.m. at the perimeter of leks (generally from March 1 – May 15, or as recommended by NPS biologists).
- Efforts will be made to minimize disturbance to mature sagebrush cover in identified winter concentration areas.
- NPS biologists will use the Wyoming Density and Disturbance Calculation Tool to assess activities that involve vegetation or ground disturbance within the sage-grouse core area that correspond with recommended mitigations for sage-grouse and their habitat.

Wetlands and Water Resources

- When surface water features are to be crossed using directional boring, the drilling pits will be installed outside of the bank and floodplain areas.
- Boring under wetlands and water courses or installing the fiber optic cable by suspending it on existing bridges will avoid creating impacts to these habitats including riparian areas.

Appendix C – Site Drawings and Photo Simulations