

## CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

NEPA requires that environmental documents disclose the environmental effects or consequences of a proposed federal action and any adverse impacts that could not be avoided, if the proposed action were implemented. This section of the EA provides a basis for comparing the four alternatives and the impacts that would result from their implementation. Impact topics were selected based on internal and external scoping. This section is based on review of scientific information collected by the NPS, external sources, and scientific literature.

Each impact topic is analyzed for direct, indirect, and cumulative impacts from each of the four alternatives. Impacts are described in terms of context (site specific, local, and/or regional effects), duration (short-term or long-term), timing (direct or indirect), and type (adverse or beneficial). Context, duration, and timing are factored into intensity thresholds (negligible, minor, moderate, major) defined for each impact topic. Definitions of intensity levels vary by impact topic, but the following definitions apply to all impact topics:

Term	Definition
<b>Beneficial</b>	a positive change in the condition of the resource or a change that moves a resource toward its desired condition
<b>Adverse</b>	a negative change in the condition of the resource or a change that moves a resource away from its desired condition
<b>Direct</b>	an effect that is caused by an action and occurs at the same time and place
<b>Indirect</b>	an effect that is caused by an action but is later in time or farther removed in distance, but is still reasonably foreseeable
<b>Short-term</b>	an effect which in a short amount of time would no longer be detectable, as a resource returns to its pre- disturbance condition; generally the duration of any portion of this project, which is expected to be one year or less
<b>Long-term</b>	a change in a resource or its condition that does not return to pre- disturbance levels and for all practical purposes is considered permanent

### Cumulative Effects

NEPA regulations require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to the other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non- federal) or person undertakes such other actions” (40 CFR 1508.7). Cumulative impacts for each alternative were analyzed by adding the direct and/or indirect impacts of each impact topic to other past, present, and reasonably foreseeable future actions within Yellowstone National Park and surrounding areas. The scope for cumulative impacts varies to some degree for each impact topic.

Because cumulative impacts were determined by combining the impacts of each alternative with other past, present, and reasonably foreseeable future actions, it was necessary to identify other ongoing or reasonably foreseeable future projects at Yellowstone National Park and, if applicable, the surrounding region. The geographic scope for this analysis includes elements mostly within the park’s boundaries, while the temporal scope includes projects within a range of approximately ten years. Given this, the following projects were identified for the purpose of conducting the cumulative effects analysis:

- **Canyon Junction to Tower Junction (Dunraven Road) Road Improvement Project:**  
 This road reconstruction project began in late summer 2003. The segment of the Grand Loop Road that comprises the Dunraven Road construction project stretches from Tower Junction to Canyon Junction, a total of 18.4 miles (29.3km). The entire road will be widened from its existing 19–22 feet to 24 feet and design will address needs for better drainage, more pullouts and parking areas, and slopes that can revegetate in the short, 2–3 month growing season. Design and construction are being accomplished in two phases. The first phase, from Chittenden Road to Canyon Junction, was completed in 2005. The second phase from Chittenden Road to Tower Junction is scheduled to begin in 2010, but is dependent upon highway funding. The second phase of the project would include the Tower Fall Campground road and the entrance road to Roosevelt Lodge, again dependent on funding. This project may also be split into three phases due to costs and the potential lack of funding for the entire project (Federal Highways proposed project schedule, 2007). The project would also include modification of the existing parking area at Calcite Springs (26 auto spaces, 3 RV/bus spaces). The road would shift away from the existing parking area to improve safety by separating the parking from the road. A traffic island would protect some very large Douglas-fir trees. The large parking area (approximately 80 auto spaces, approximately 9 RV/bus spaces) at the Tower Fall general store would be modified.
- **Beartooth Highway and Northeast Entrance Road Construction:**  
 (aka Beartooth Highway Segment 1, Phase 2) – This work consists of reconstructing 4.3 miles of road adjacent to the park and widening it from a current 20 feet to 28 feet. Construction is expected to finish summer 2008. Additional Beartooth Highway work is proposed for the future.
- **West Yellowstone Contact Station, under construction:** Construction of a new visitor contact station located just outside the park in the town of West Yellowstone, Montana. This is a joint venture between the West Yellowstone Chamber of Commerce and the NPS.
- **New West Entrance Station, under construction:** A new entrance station has just been constructed to address delays that have occurred in the past with vehicles backing up at the gate due to poor queuing space, and narrow lanes. This project was completed in the summer of 2008.
- **Snowcoach Sheds at Canyon and Grant:** Preliminary planning, pre-design & cost analysis is underway. Construction is anticipated in 2008 or 2009.
- **South Entrance Seasonal Four-Plex:** This structure, to be used as employee housing was completed in the fall of 2007. Propane will need to be tied in to an individual system or to a propane “farm” by the park next year.
- **Old Faithful 8-Plex:** For use as employee housing in the Old Faithful administrative area. Design work on this structure is underway.
- **Albright Visitor Center Remodel:** The interior of this building would be remodeled to allow for improved exhibits, improve accessibility, and improve seismic stability. Work is currently planned for 2009.
- **Old Faithful Visitor Education Center:** Anticipate a construction start date of early summer 2008. Construction would last through summer of 2010.
- **OF Inn, Old West Wing Rooms, ongoing:** Renovation includes installing seismic, electrical, and plumbing upgrades. Historic building elements of the building will also be refinished. Work is expected to be completed in summer of 2008.

- **Old Faithful Lodge, ongoing:** This project includes the remodel of many public areas of the building including: the gift shop, the registration desk, and the public restrooms. Work is expected to be complete by the summer of 2008.
- **Lake Winter Springs Rehab:** This project would address seeking alternatives to augment the existing water supply for the Lake development. Work is currently scheduled for late summer/early fall 2008.
- **Grant Sludge Drying Beds:** Construct sludge drying beds for the sewage system at Grant. Work is scheduled to take place in 2008.
- **Canyon Lift Station:** Construct a sewage lift station for the Canyon administrative area. Work to be completed by NPS crews in 2008.
- **Grant Visitor Center:** This project involves the rehabilitation of the visitor center at Grant Village. This in-house project is ongoing, and addresses an interior remodel and a new roof structure.
- **Mammoth Jail:** Rehabilitation of this historic structure is scheduled to take place in 2008. The exterior of the building rehabilitation will address spalling concrete and structural cracking.
- **Mammoth Justice Center:** Construction of a justice center across from the U.S. Post Office building in Mammoth is ongoing. Construction began in 2007 and is expected to be completed in 2008.
- **Canyon Rim Drives road project, ongoing:** This project was started in 2007 with the rehabilitation of the Artist Point parking area and pedestrian walkways and observation areas. The project continued in 2008, where most work is concentrated on the North Rim Drive, camper services access road, and parking area just northeast of Canyon Village.
- **Lamar River Bridge Reconstruction/Replacement:** The Lamar River Bridge is scheduled to be reconstructed or replaced in 2009 dependant upon funding availability. Alternatives currently include reconstruction of the current bridge, replacement of the bridge in its current location, replacement of the bridge adjacent to its current location. Depending upon the alternative chosen, approximately one half mile of the Tower to Northeast Entrance road could be shifted to match the alignment of a new bridge. The old roadbed would then be rehabilitated, and the old bridge removed.
- **Norris-Madison Phase 3 road reconstruction project:** This project, scheduled to begin in fall 2008, is the third phase of the Madison to Norris road project. Work will include paving the new alignment above the Gibbon Canyon, and the removal of the road along approximately two miles of the Gibbon River. A new bridge will be constructed upstream of Gibbon Falls to connect the new alignment with the existing road alignment. A bridge at the north end of Gibbon Canyon will be removed.
- **Norris to Golden Gate – Road Reconstruction Project, future:** The road segment from Norris to Golden Gate is scheduled to be reconstructed in 2011. The project would take 2-3 years to complete.
- **Sylvan Pass Reclamation and Road Reconstruction:** This project would reconstruct a portion of the East Entrance Road through Sylvan Pass, and rehabilitate an area that has for many years

served as a source of gravel and rock for road reconstruction projects within the park. Design work for the Sylvan Pass project in progress and scheduled construction in 2008.

- **NEON:** The National Ecological Observatory Network (NEON) is a continental-scale monitoring platform for discovering and understanding impacts of climate change, land use change, and invasive species on ecology. NEON would gather long-term data on ecological responses of the biosphere to changes in land use and climate, and on feedbacks with the geosphere, hydrosphere, and atmosphere. It would consist of distributed sensor networks and experiments, linked by advanced cyber infrastructure to record and archive ecological data for at least 30 years. The Yellowstone Northern Range site has been selected by NEON, Inc. as one of 20 Core Wildland Sites throughout the country. Core NEON sites would require permanent scientific monitoring equipment. A full proposal would detail what types and where such infrastructure is needed. Any infrastructure proposals would follow the guidelines determined through this plan and additional compliance might be required.

## NATURAL RESOURCES

### Wildlife - Threatened and Endangered Species

#### Guiding Regulations and Policies

Protective measures for threatened and endangered species are provided pursuant to the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*). Section 7(c) of the Endangered Species Act of 1973, as amended, requires the preparation of a biological assessment for any federal action that is a major construction activity to determine the effects of the proposed action on listed and proposed species. If a biological assessment is not required (i.e., all other actions), the lead federal agency is responsible for review of proposed activities to determine whether listed species will be affected. If it is determined that the proposed activities may affect a listed species, then federal agencies should contact the U.S. Fish and Wildlife Service to discuss consultation requirements. If it is determined that any federal agency program or project "is likely to adversely affect" any listed species, then formal consultation should be initiated with the U.S. Fish and Wildlife Service. Alternatively, informal consultation can be continued so the U.S. Fish and Wildlife Service can assist with determining how the project could be modified to reduce impacts to listed species to the "not likely to adversely affect" threshold. If it is concluded that the project "is not likely to adversely affect" listed species, then the federal agency should request that the U.S. Fish and Wildlife Service review the assessment and concur with the determination of not likely to adversely affect.

#### Methodology and Assumptions

The primary biological resource concern associated with wireless communications facilities (WCFs) includes potential adverse effects to Threatened and Endangered populations and their habitats. Potential effects to listed species including Canada lynx were evaluated using the best available information regarding the construction, operation, and maintenance of wireless telecommunications facilities. Wildlife biologists used scientific literature, data from long-term monitoring efforts in Yellowstone National Park and the Greater Yellowstone Ecosystem, and professional knowledge to define the intensity thresholds (i.e., degree of change) for impacts to listed species (Table 3). For these thresholds, the term *habitat* is defined as the suite of resources (e.g., denning sites, food, shelter, etc.) and environmental conditions (e.g., precipitation, prey base) that enable the presence, survival, and reproduction of a population, even if potentially suitable areas are currently unoccupied. Short-term effects are defined as those occurring during and immediately after construction (i.e., approximately one year), including conservation measures and monitoring of effects and effectiveness. Longer-term effects are considered permanent (i.e., anything beyond one year).

## Intensity Level Definitions

Yellowstone National Park biologists familiar with each of the threatened and endangered species present in Yellowstone were consulted for their knowledge and opinion on potential project impacts. These biologists consulted records of threatened and endangered species sightings within Yellowstone National Park historic records of sightings, publications, and their detailed knowledge of the life habits of the species in question. The evaluation of effects included direct, indirect, interrelated, interdependent, and cumulative impacts as defined by the Endangered Species Act (ESA).

Consultation with the U.S. Fish and Wildlife Service (USFWS) will occur on the preferred alternative. During Section 7 consultation (called §7 Consultation), any mitigation proposed by the park for impacts to threatened or endangered species would include avoidance, minimization, and conservation measures as defined by the ESA.

The thresholds of change for the intensity of impacts to threatened and endangered species are defined as follows:

- Negligible:** No federally listed species or its proposed or designated critical habitat would be affected.
- Minor:** Effects are either insignificant, discountable, or wholly beneficial for individual members of the species. Negative effects are very localized, temporary, and not of measurable consequence to individuals, particularly effects related to human disturbance or habitat modification that might affect breeding, sheltering, or feeding of individuals.
- Moderate:** Effects are readily detectable, localized, and are often long-term in nature. Actions would result in some change to a population or individuals of a species or designated critical habitat. The change would be measurable and of consequence.
- Major:** Effects are readily detectable at the population level and are long-term in nature.
- Duration** Short-term effects would last only during the implementation of the project including its mitigation and monitoring measures. Long-term effects would typically constitute a permanent impact.

## Canada lynx

### IMPACTS OF ALL ALTERNATIVES

**Analysis.** Wireless services would likely occur in all alternatives with applications for new wireless communications facilities (WCFs) being considered for the Lake developed area using temporary or permanent infrastructure and equipment in all but Alternative B. A WCF at Lake development would be located at the existing lattice tower site just northwest of Fishing Bridge Junction, near the wastewater treatment facility, or near the water tank in the Lake administrative area. In Alternative C, the cell tower at Old Faithful would be moved to a site near the water treatment plant when feasible, and in Alternative B, it would remain at its existing location and camouflaged. Improvements to viewsheds and safety at Mt Washburn should be improved by removing antennas and placing them on a new platform tower adjacent to the existing lookout. Equipment would remain in the existing space under the observation deck. Improvements to viewsheds on Bunsen Peak by removing obsolete equipment, and the cell coverage link would also occur. In alternatives C and D, new infrastructure would be added to increase the capacity of the data transmission system

within the park. The transmission line to the top of Bunsen Peak would remain in service to provide power for this potential use (except Alt. B). FM equipment would remain on Bunsen Peak, but the equipment shed would be replaced with smaller equipment cabinet-sized enclosures.

At the extreme, wireless projects have the potential to reduce foraging habitat, and to disrupt lynx foraging, resting, or natal denning activities. However, the effects of new WCFs installation and maintenance of existing and new infrastructure would be negligible or minor under all alternatives because projects would involve little habitat loss, both individually and collectively, and because conservation measures applied by the park during installation of wireless facilities would minimize lynx disturbance.

The effects of individual wireless projects depend primarily on whether or not the project occurred in an LAU (Fig. 14), whether the LAU is currently occupied (Murphy et al. 2006) by lynx, the amount of site disturbance required to install the equipment, and the number and route of helicopter flights (e.g., whether or not over lynx habitat) required to support installation. The impact area of a typical WCF in the backcountry is expected to be  $\leq 25\text{m}^2$ . The type of wireless project (e.g., cell tower versus YVO or RAWs) is not important because the habitat loss, amount of construction-related disturbance, and the size of the equipment is expected to be collectively insignificant for each type.

For all alternatives, the effects of individual wireless projects that occur outside LAUs would be negligible (§7, ESA—no effect) on lynx. Areas outside LAUs typically support no lynx and provide little or no foraging opportunity for major lynx prey such as snowshoe hares and red squirrels. New or improved structures outside LAUs would not be large enough to impede movements of resident or transient lynx. Infrastructure associated with WiFi would be limited to existing developed areas and would have no new effects on lynx.

Projects that occur within LAUs (Fig. 14) (e.g., many in Alternatives C and D) would have minor effects (§7, ESA—may affect, not likely to adversely affect) on lynx. Such projects would cause either no loss of lynx habitat (i.e., sites in non-habitat or habitat currently in an unsuitable condition) or would cause an insignificant loss of lynx habitat (under each alternative,  $< 0.05$  acre per structure and less than  $< 1$  acre collectively across all LAUs).

Disturbance of resident lynx and their natal dens at any location would be highly unlikely because the duration of construction would be short ( $< 1$  month), because lynx occur in very low numbers in the park, and because their distribution is largely restricted to the Absaroka Range and the Central Plateau (Murphy et al. 2006). Although lynx reproduction is documented in Yellowstone, no natal den sites are documented. Under all alternatives, however, helicopter flights for transporting equipment over occupied LAUs would occur more than 1000 feet above ground level (except landings)  $\leq 2$  flights per LAU would be allowed each year. These measures would likely reduce lynx disturbance associated with equipment transport to the level of insignificant.

Individual wireless sites would also be too small to significantly alter travel patterns of lynx, regardless of their location. Transport of wireless and construction-related equipment along park roads would pose very little (i.e., discountable) risk of vehicle-strike mortality because few lynx are present. If vehicle-strike mortality to a lynx should occur, all WCF installation activity along roads would cease pending re-initiation of consultation with the USFWS. No vehicle-strike mortalities of lynx are documented in the Yellowstone Ecosystem.

No adverse modification of proposed lynx critical habitat (FWS 2008) would result from implementation of any project alternative. The collective impact area of WCF projects in backcountry areas ( $< 1$  acre) is very small (insignificant) in comparison to the 6.7 million acres of proposed lynx critical habitat in Unit 5. Implementation of any alternative, may affect, but is unlikely to adversely affect proposed lynx critical habitat.

**Cumulative Impacts.** The important past, present, and reasonably foreseeable actions occurring within the park and the surrounding area that might contribute to cumulative effects on lynx include road and facilities construction or reconstruction projects, subsequent visitor use of improved roads and facilities, and fire management. Similar to installation and management of wireless facilities, these activities potentially contribute to disturbance of lynx foraging, resting, or natal denning, or affect lynx habitat quality and quantity. Collectively, these activities at worst would be expected to have long-term minor adverse impacts to lynx because (1) few lynx naturally occur in the park, and (2) anthropogenic disturbance would be expected to occur primarily along roads or in developed areas of the park and largely outside of lynx habitat. In addition, fire management activities in the park are directed toward maintaining the natural fire regime (as consistent with human health and property concerns) and should be beneficial to lynx habitat in the long-term (Ruediger et al. 2000). The impacts to lynx populations resulting from these effects, in combination with the long-term minor impacts under all wireless alternatives, would result in long-term, minor, and adverse impacts to lynx populations found in the park.

**Conclusion.** Under all alternatives, there would be a limited change (decrease or increase) in wireless service and infrastructure (Table 3). However, WCFs would be located primarily in or near developed or existing disturbed areas of the park, thereby minimizing potential adverse effects on lynx. During construction of new WCFs, only short-term, minor adverse impacts (§7, ESA-insignificant), if any, would be expected to occur due to disturbance. Implementation of restrictions on the number and height of helicopter flights over occupied lynx habitat would greatly reduce the chances of disturbance-related effects on lynx. Habitat loss under all alternatives would be collectively insignificant. No vehicle-strike mortality is expected under any alternative. The cumulative effects of each alternative would be long-term, negligible to minor, and adverse. Because there would be no major, adverse impacts to lynx whose conservation is necessary to fulfill purposes identified in Yellowstone's establishing legislation; key to the natural and cultural integrity of the park; and identified as a goal in other park or NPS planning documents; there would be no impairment to this resource. Implementation of this alternative would not result in any unacceptable impacts to lynx and is consistent with §1.4.7.1 of NPS *Management Policies* 2006. With respect to consultation with the U.S. Fish and Wildlife Service, our assessment of effects under all alternatives would be a "may affect, not likely to adversely affect." for lynx and "no adverse modification" for proposed lynx critical habitat.

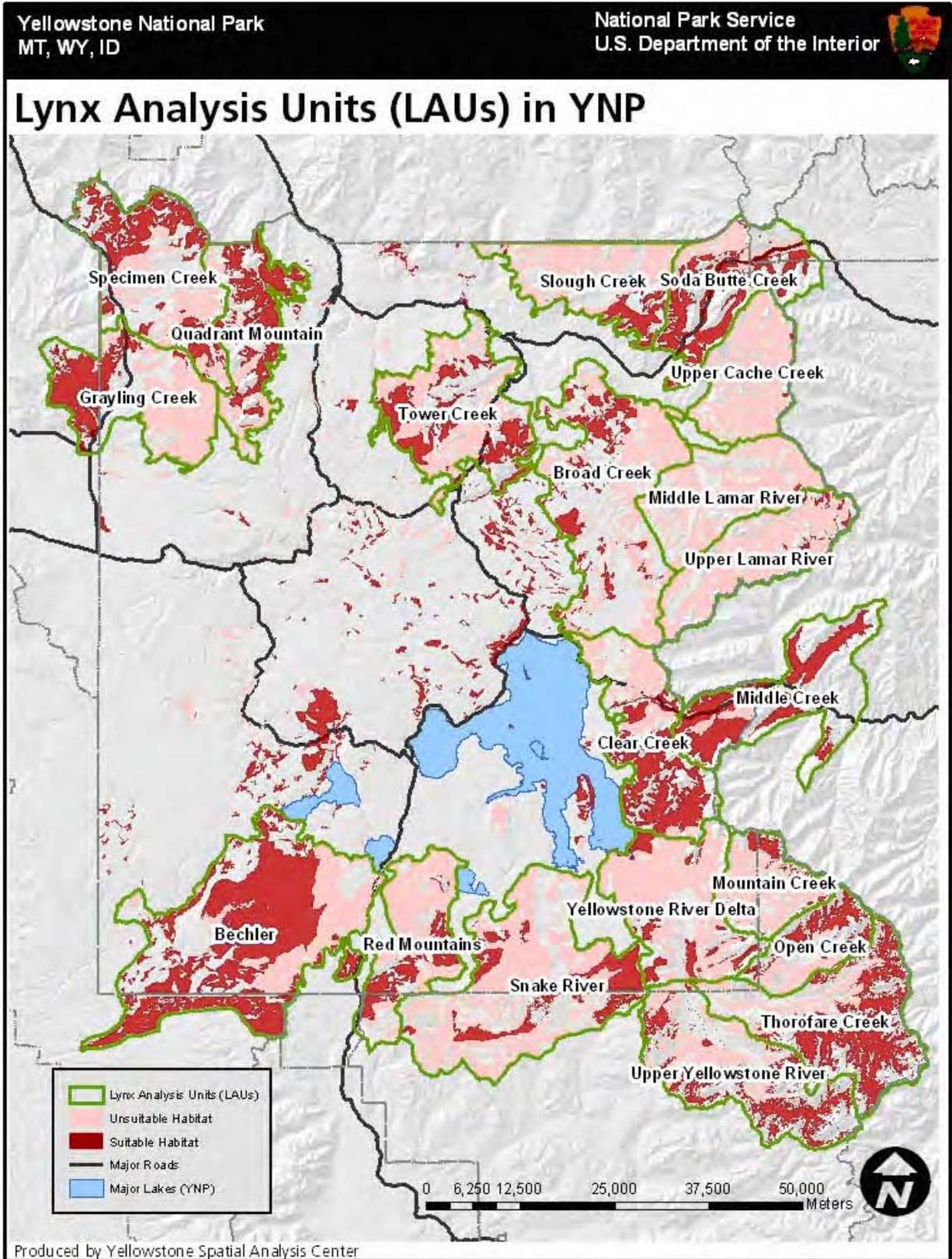


Figure 14 - Lynx Analysis Units

## Gray Wolves

### IMPACTS OF ALL ALTERNATIVES

**Analysis.** Wireless services would likely occur in all alternatives with applications for new WCFs considered for the Lake developed area using temporary or permanent infrastructure and equipment in all but Alternative B. A WCF would be located at the existing lattice tower site just northwest of Fishing Bridge junction, near the wastewater treatment facility, or near the water tank in the Lake administrative area. In Alternative C, the cell tower at Old Faithful would be moved to a site near the water treatment plant when feasible. Improved viewsheds and safety at Mt Washburn would occur by removing antennas and placing them on a new platform tower adjacent to the existing lookout. Equipment would remain in the existing space under the observation deck. Viewsheds on Bunsen Peak may also be improved by removing obsolete equipment, the cell coverage link, and Yellowstone Volcano Observatory equipment. In all alternatives, new infrastructure would be added to increase the capacity of the data transmission system within the park. The transmission line to the top of Bunsen Peak would remain in service to provide power for this potential use. FM equipment would remain on Bunsen Peak, but the equipment shed would be replaced with smaller equipment cabinet-sized enclosures.

All the wireless alternatives would have negligible or minor effects on wolves. Very little (< 1 acre) wolf or ungulate (prey) habitat would be modified or lost due to wireless projects proposed in each of the alternatives. Many wireless sites would occur in existing disturbed areas and have no effect on wolves. Adult wolves are tolerant of human disturbance and the presence of human infrastructure in developed areas and along roads in Yellowstone National Park, and wolves do not appear to avoid the portions of their pack territories that are in close proximity to roads or park developments (Kerry Murphy, personal communication 2008). Wolves commonly use areas near park developments and travel on or near interior Yellowstone roads during the day. They often bed near (<0.25 miles) roads and may prey on ungulates in the vicinity. Similarly, wolves do not avoid sites in the backcountry that contain antennas or small structures if they do perceive the site as a threat. Although wolves will encounter wireless sites in remote areas, construction activity should not significantly affect wolf behavior or travel patterns. Installation and maintenance, including helicopter landings and flights to or over wireless sites will not occur within one mile of active natal dens and rendezvous areas, and wireless sites will not be large enough to significantly alter wolf travel patterns. Transport of raw materials and construction equipment to wireless sites poses a small risk of vehicle-strike mortality to wolves. Eighteen wolves have been killed by vehicles on park roads. However, no losses associated with park staff or construction projects have been documented since wolves were reintroduced in 1995. Vehicle-strike mortality to wolves on park roads is currently being addressed in formal consultation with the USFWS.

**Cumulative Impacts.** Similarly to lynx, the important past, present, and reasonably foreseeable actions occurring within the park and the surrounding area that might contribute to cumulative effects on wolves include road and facilities reconstruction or improvement projects, subsequent visitor use of improved roads and facilities, and fire management. Human disturbance could cause temporary displacement of wolves from human presence, particularly in developed areas and along roads. Although visitors using park roads cause vehicle-strike mortality, this likely has no long-term negative effect on wolf population viability. Fire management activities in the park are directed toward maintaining the natural fire regime (as consistent with human health and property concerns) and should be beneficial to wolf prey (and thus wolves) in the long-term. Overall, the impacts to wolf populations resulting from these past, present, and future actions, in combination with the long-term minor impacts under all alternatives, would result in long-term, minor, and adverse (SESA-insignificant) impacts to wolf populations found in the park.

**Conclusion.** Under all alternatives, there would be a limited decrease or increase in wireless service and infrastructure. However, WCFs would be located primarily in or near developed or already-disturbed areas, thereby minimizing potential adverse impacts to wolves. During construction of new

WCFs, short-term minor adverse (§7 ESA-insignificant) impacts would be expected to occur from disturbance.

The collective effects of disturbance to resident wolves associated with construction and long-term presence of wireless sites would have little, if any, effect on wolf behavior. Disturbance to den and rendezvous sites will be nearly eliminated by controlling the timing of construction and location of wireless sites. No vehicle-strike losses of wolves are expected under any alternative. Because there would be no major, adverse impacts to gray wolves whose conservation is necessary to fulfill purposes identified in Yellowstone’s establishing legislation; key to the natural and cultural integrity of the park; and identified as a goal in other park or NPS planning documents; there would be no impairment to this resource. Implementation of this alternative would not result in any unacceptable impacts to gray wolves and is consistent with §1.4.7.1 of NPS *Management Policies* 2006. The cumulative effects each alternative are negligible or minor. No significant loss of wolf habitat would occur. With respect to consultation with the U.S. Fish and Wildlife Service, our assessment of effects under all alternatives would be “may affect, not likely to adversely affect.” The cumulative effects of each alternative would be long-term, negligible to minor, and adverse. Implementation of this alternative would not result in any unacceptable impacts and is consistent with §1.4.7.1 of NPS *Management Policies* 2006.

**Table 3 - Impact thresholds under the National Environmental Policy Act (NEPA) and the 1973 Endangered Species Act (ESA) for threatened or endangered species in Yellowstone National Park.** LAU: Lynx Analysis Unit (see text).

Species	Potential Human Effect	Criteria for “no effect” (ESA) or “negligible” effect” (NEPA) finding	Criteria for “not likely to adversely affect” (ESA) or “negligible–minor” (NEPA) finding	Criteria for “likely to adversely affect” (ESA) or ≥ minor (NEPA) finding
Canada lynx (threatened)	Disturbance of adults	Site is not in an occupied LAU	Site is in an occupied LAU, but flights supporting equipment installation and monitoring are > 1000 feet above lynx habitat. Chances of lynx disturbance are highly unlikely (i.e., discountable).	Repeated disturbance of an individual(s) may occur due to low-level (<1,000 AGL) flights over occupied LAUs
	Disturbance of active natal or maternal dens	Site is not in an occupied LAU	Site is in an occupied LAU, but flights supporting equipment installation and monitoring are > 1000 feet above lynx habitat and occur infrequently (≤ 2 per year). Chances of lynx disturbance are highly unlikely (i.e., discountable).	Significant audible or visual disturbance of lynx at a natal den may occur due to frequent (≥ 3 per year) low-level (< 1,000 ft AGL) flights over occupied LAUs.
	Habitat modification	Site is not in an LAU	(1) Site is within an LAU and in suitable habitat, but suitable habitat occupies >70% of the LAU, or site disturbance is insignificant (< 0.5 acre); or (2) the site is not in suitable lynx habitat (i.e., is in unsuitable or non-habitat)	Site is in an LAU and in suitable lynx habitat, suitable habitat occupies <70% of the LAU, and site disturbance is significant (> 0.5 acre).
	Vehicle-strike mortality due to material or	No past vehicle-strike losses have occurred	No past vehicle-strike losses have occurred in the park	At least one vehicle-strike mortality has

	equipment transport, parkwide	in the park due to transport	due to equipment transport	occurred due to equipment transport
Gray wolf (threatened)	Disturbance of adults	Site is within a developed area	Site is in an existing disturbed area at roadside or in backcountry	Repeated disturbance of individual(s) is likely
	Disturbance of active natal or maternal dens	Site is within a developed area	Site is ≥ 1.0 miles from an active den	Site is within 1.0 miles of an active den
	Habitat modification	Site is within a developed area	Impact area is <0.5 acre	Impact area is >0.5 acre
	Incidental wolf mortality due to material transport or construction	No past vehicle-strike losses have occurred in the park due to transport	No past vehicle-strike losses have occurred in the park due to equipment transport	At least one vehicle-strike mortality has occurred due to equipment transport

## Migratory Birds and Birds of Special Management Concern

### Guiding Regulations and Policies

Protective measures for migratory birds are provided pursuant to the Migratory Bird Treaty Act (16 U.S.C. 703) and Bald and Golden Eagle Protection Act (16 U.S.C. 668). The Migratory Bird Treaty Act establishes that all migratory birds and their parts (including eggs, nests, and feathers) are fully protected. The act establishes a prohibition, unless permitted by regulations, to “pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird...or any part, nest, or egg of any such bird.” The act also provides the Secretary of the Interior with authority to determine when “hunting, taking, capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any...bird, or any part, nest or egg” could be undertaken and to adopt regulations for this purpose.

Under the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act, every federal agency has a mandatory obligation to protect the many species of migratory birds, including eagles and other raptors that may occur on lands under their jurisdiction. These regulations also include Yellowstone National Park’s bird Species of Management Concern including bald eagle, peregrine falcon, trumpeter swan and white pelican. The U.S. Fish and Wildlife Service recommends the following information be considered to assess project effects during planning analysis and promote the conservation of migratory bird populations: 1) the current status and habitat use of migratory birds in the project area, which may include the number of individuals, breeding pairs, population trends, and active nests within and adjacent to the project area; 2) a full, quantitative analysis of the effects of the proposed action on migratory bird species and their habitats; 3) measures that will reduce or eliminate (minimize) adverse effects to migratory birds, including protective buffers, seasonal restrictions, maintenance of habitat within the project area, raptor-proofing designs for power lines and other towers, and netting of waste pits; and 4) the projected short- and long-term trends to migratory birds and their trends during and after project completion using monitoring, modeling, and current literature.

Executive Order (EO) 13186, “Responsibility of Federal Agencies to Protect Migratory Birds” requires each federal agency taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations to develop and implement a Memorandum of Understanding with the

U.S. Fish and Wildlife Service to promote the conservation of migratory bird populations. Despite extended consultation and numerous drafts with proactive steps to benefit migratory birds in park units, the National Park Service and U.S. Fish and Wildlife Service were unable to resolve a method to allow for incidental take. Thus, a Memorandum of Understanding was never signed (Peter Dratch, National Park Service, personal communication 2007).

U.S. Fish and Wildlife Service Guidelines for Recommendation on Communications Tower Siting, Construction, Operation, and Decommissioning were developed recognizing that staff may need to be involved in the review of proposed facilities and the evaluation of their impacts on migratory birds. These guidelines would be to be used until the Communications Tower Working Group, a group of government agencies, industry, academic researchers and non-governmental organizations, develops significant new mitigation measures to prevent bird strikes related to wireless telecommunications facilities. They are provided in accordance with the Fish and Wildlife Coordination Act, as amended, the Migratory Bird Treaty Act, and Section 7 of the Endangered Species Act, as amended. Section 4.4 (Biological Resource Management) of the management policies for units of the National Park Service requires that managers "... maintain as parts of the natural ecosystems of parks all plants and animals native to park ecosystems. The term 'plants and animals' refers to all five of the commonly recognized kingdoms of living things and includes such groups as flowering plants, ferns, mosses, lichens, algae, fungi, bacteria, mammals, birds ..." (NPS 2006).

### **Methodology and Assumptions**

The primary biological resource concern associated with WCFs is potential adverse effects to bird populations and their habitats. The potential effects to resident and migratory birds, including bird species of management concern were evaluated using the best available information regarding the construction, operation, and maintenance of wireless telecommunications facilities. Wildlife biologists used scientific literature, data from long-term monitoring efforts in Yellowstone National Park and the vicinity, and professional knowledge to define the following intensity thresholds (i.e., degree of change) for impacts to bird species. For these thresholds, the term *habitat* is defined as the suite of resources (e.g., food, shelter) and environmental conditions (e.g., precipitation, predators) that enable the presence, survival, and reproduction of a population, even if potentially suitable areas are currently unoccupied. Short-term effects are defined as those occurring during and immediately after construction (i.e., approximately one year), including conservation measures and monitoring of effects and effectiveness. Longer-term effects are considered permanent (i.e., anything beyond one year).

### **Intensity Level Definitions**

The following thresholds were used to determine the magnitude of effects on avian species and Bird Species of Management Concern:

- Negligible:** Adverse or beneficial impacts to individuals, their habitat, or the natural processes sustaining them would be extremely unlikely to occur or not be measurable.
- Minor:** Adverse or beneficial impacts to individuals, their habitat, or the natural processes sustaining them would affect a small, localized portion of the species' range in the park. Few occurrences of mortality for any avian species would be documented at WCFs. Short- or longer-term disturbances to individuals may occur and a small amount of habitat could be permanently modified or removed. However, these impacts would not measurably affect the movements, reproduction, or survival of many individuals, or the demography of population(s). Sufficient habitat would remain functional to maintain the viability of all resident and migratory species in the vicinity of any existing or possible future WCFs.
- Moderate:** Adverse or beneficial impacts to individuals, their habitat, or the natural processes sustaining them would affect a moderate portion of the species' range in the park.

Relatively frequent occurrences of mortality for any avian species would be documented at WCFs. Short- or longer-term disturbances could measurably affect the movements, reproduction, or survival of individuals, or the demography of population(s). However, impacts would not significantly increase the susceptibility of population(s) in or near the park to environmental or demographic uncertainty (e.g., severe winters, droughts, disease epidemics, skewed age or sex ratios). Sufficient habitat would remain functional to maintain the viability of all resident and migratory species in the vicinity of any existing or possible future WCFs.

**Major:** Adverse or beneficial impacts to populations, their habitat, or the natural processes sustaining them would be long-term and affect a large proportion of a species' range in the park. Avian mortality at WCFs would be consistently observable and documented in large numbers of individuals and/or species. The susceptibility of population(s) in or near the park to environmental or demographic uncertainty would significantly increase.

**Duration** Short-term effects would last only during the implementation of the project including mitigation and monitoring measures. Long-term effects would constitute a permanent impact.

### **IMPACTS OF ALTERNATIVE A: NO ACTION**

**Analysis.** Applications for WCFs would be considered within any portion of Yellowstone National Park on a case-by-case basis. Replacement or upgrade of WCFs would occur as needed, but no comprehensive plan would guide efforts. Power to the summit of Mt. Washburn would not be upgraded and current passive reflectors and microwave dishes would remain to support the commercial phone and data system. The best available technology would be required for new WCFs and outdated and unused infrastructure would be removed. New applications would be subject to all applicable guidance, including the U.S. Fish and Wildlife Service guidance for the siting, construction, operation and decommissioning of communications towers (see "Actions Common to All Alternatives"). Theoretically, there would be no imposed limit on the number of WCFs that could be constructed in the park. However, each facility would be required to complete the NEPA process before construction and implement the siting criteria. Thus, WCFs would not be permitted to the point where there would be numerous stand-alone facilities in one location that would increase the potential adverse impacts to avian species to a large degree. Based on this assumption, the construction of WCFs would result in long-term minor adverse impacts to birds if the number of new facilities is kept low, to long-term moderate adverse impacts if the number of new WCFs is high. There could be long-term minor to moderate adverse impacts to resident and migratory birds because construction of WCFs could be considered in any portion of the park, including *de facto* wilderness and areas with higher quality habitat. Construction of WCFs in high quality habitat for avian species could result in impacts such as collision with WCFs or avoidance of otherwise high-quality habitat by avian species.

Communications towers are known to be a risk factor to birds and, as a result, any new towers pose additive risks. Construction of new WCFs would result in short-term minor adverse impacts to birds and surrounding habitat due to ground disturbance at construction sites and the temporary removal or degradation of vegetation during construction of WCFs and associated structures. Construction would also create noise disturbance and expose potential avian habitat to an increase in human presence. However, once construction is over, and depending upon the degree to which impacted habitats return to their pre-construction state, birds may return and resume use of these sites. Implementation of the U.S. Fish and Wildlife Service guidance for communications towers should minimize habitat disturbance and inadvertent deaths of birds around WCFs or associated structures, thereby limiting habitat fragmentation and other adverse effects. The exclusion of new WCFs from wetlands and other habitats and locations where birds are known to concentrate should reduce adverse impacts to birds. Also, the co-location of any new WCFs could reduce the risks associated

with additional WCFs. The height restriction and exclusion of guy wires from new WCFs would also reduce potential adverse impacts to birds because taller towers pose a greater risk of collision than shorter towers and guy wires are a known avian collision risk factor at towers. Thus, the potential impact of bird collisions with WCFs should be long-term, minor, and adverse. If monitoring during and after construction of new WCFs determines that greater impacts are occurring to migratory birds and bird species of management concern than anticipated, then these findings will be taken into consideration for the site-specific NEPA document for each new facility application.

**Cumulative Impacts.** Past, present, and reasonably foreseeable actions occurring within the park and the surrounding area that would be expected to contribute to cumulative impacts include activities with construction of potential future WCFs. These projects would cause temporary displacement of migratory birds and bird species of management concern from human presence and construction noise in multiple areas of the park. The removal of vegetation to accommodate WCFs, trails, and road improvements would also result in an increase of permanent loss of avian habitats in multiple areas of the park, resulting in habitat fragmentation and the permanent displacement of some birds. Operation and maintenance of WCFs, trails, and roads not associated with WCFs would impact birds sensitive to noise and human presence, causing displacement of these species from habitat in the vicinity of these areas. Because of these impacts, the above projects would be expected to have long-term minor to moderate adverse impacts to avian species in areas surrounding the park. The impacts to avian species resulting from these past, present, and future actions, in combination with the long-term minor to moderate adverse impacts under the no action alternative, would result in long-term, minor to moderate, and adverse impacts to migratory birds and bird species of management concern found in the park.

**Conclusion.** Under the no-action alternative, there would be long-term minor to moderate adverse impacts to migratory birds and bird species of management concern from habitat loss and increased collision risk, depending on the number of WCFs sited in the park. Implementation of the U.S. Fish and Wildlife Service guidance for communications towers should minimize habitat disturbance and inadvertent deaths of birds around WCFs or associated structures, thereby limiting habitat fragmentation and other adverse effects. During the construction of new WCFs, short-term minor adverse impacts would be expected to occur from the temporary habitat loss and disturbance. Cumulative impacts would be long-term, minor to moderate, and adverse. Because there would be no major, adverse impacts to migratory birds or species of management concern whose conservation is necessary to fulfill purposes identified in Yellowstone's establishing legislation; key to the natural and cultural integrity of the park; and identified as a goal in other park or NPS planning documents; there would be no impairment to this resource. Implementation of this alternative would not result in any unacceptable impacts to avian species and is consistent with §1.4.7.1 of *NPS Management Policies* (2006).

## IMPACTS OF ALTERNATIVE B: REDUCTION IN WIRELESS SERVICES

**Analysis.** Essential wireless services for life, health, and safety would be provided, while the number of WCFs would be reduced in the park. Cell phone infrastructure would be removed at Old Faithful, Grant Village, Canyon, and Tower-Roosevelt developed areas. As a result, cell phone service in these areas would be unavailable. Cell phone service would remain in the Gardiner-Mammoth area. Cell phone antennas would be relocated from Bunsen Peak to Elk Plaza. The power transmission line to the summit of Bunsen Peak and all equipment except the passive reflector would be removed. The footprint of the existing facility at Elk Plaza would experience some possible increase in height of the tower, and a slight expansion of the existing fenced equipment area or construction of a new building. Some antennas on Mt. Washburn would be relocated onto a newly constructed support structure adjacent to the current lookout.

The removal of infrastructure, relocation of equipment, and consolidation of antennas and other equipment on Elk Plaza would result in the temporary disturbance of migratory birds and Bird Species of Management Concern and degradation of habitat for some avian species. Once these

activities are completed, and depending upon the degree to which affected habitats return to their pre-construction state, birds may return and resume use of these sites. Implementation of the U.S. Fish and Wildlife Service guidance for the siting, construction, operation and decommissioning of communications towers (see "Actions Common to All Action Alternatives") during this consolidation will reduce potential adverse effects to birds. Thus, the long-term impact of this alternative on migratory birds would be negligible to minor and adverse.

**Cumulative Impacts.** Past, present, and reasonably foreseeable future actions that would be expected to contribute to impacts on avian species would be the same as those described for the no-action alternative, and result in long-term, minor to moderate, and adverse impacts. The impacts to migratory birds and Bird Species of Management Concern resulting from these past, present, and future actions, in combination with the negligible to minor adverse impacts under alternative B, would result in long-term negligible to minor adverse impacts to avian species found in the park.

**Conclusion.** Under alternative B, there would be an overall reduction in potential adverse impacts to migratory birds and bird species of management concern from WCFs, and WCFs would be excluded from the main areas of avian habitat. During the removal, relocation, and consolidation of WCFs, short-term minor adverse impacts would be expected due to temporary habitat loss and disturbance. However, implementation of the U.S. Fish and Wildlife Service guidance for communications towers should minimize habitat disturbance and inadvertent deaths of birds around WCFs or associated structures, thereby limiting habitat fragmentation and other adverse effects. Cumulative impacts would be long-term, negligible to minor, and adverse. Because there would be no major, adverse impacts to migratory birds or species of management concern whose conservation is necessary to fulfill purposes identified in Yellowstone's establishing legislation; key to the natural and cultural integrity of the park; and identified as a goal in other park or NPS planning documents; there would be no impairment to this resource. Implementation of this alternative would not result in any unacceptable impacts to avian species and is consistent with §1.4.7.1 of *NPS Management Policies* (2006).

### **IMPACTS OF ALTERNATIVE C: LIMITED INCREASE IN WIRELESS (PREFERRED ALTERNATIVE)**

**Analysis.** A limited increase in wireless service would likely occur because applications for new WCFs would be considered for the Lake developed area using temporary or permanent infrastructure and equipment. A WCF may be located at the existing lattice tower site just northwest of Fishing Bridge junction, near the wastewater treatment facility, or near the water tank in the Lake administrative area. The cell tower at Old Faithful would be moved to a site near the water treatment plant when feasible. At Mt. Washburn improvements to viewsheds and safety may occur by relocating antennas and placing them to a new platform tower adjacent to the existing lookout. Equipment would remain in the existing space under the observation deck. Improvements may also occur to viewsheds on Bunsen Peak by relocating and replacing obsolete equipment to Elk Plaza. New infrastructure would be added to increase the capacity of the data transmission system within the park. The transmission line to the top of Bunsen Peak would remain in service to provide power for this potential use. FM equipment would remain on Bunsen Peak, but the equipment shed would be replaced with smaller equipment cabinet-sized enclosures.

This alternative would exclude the majority of suitable bird habitat in the park from consideration for WCFs, thereby minimizing potential adverse impacts to migratory birds and bird species of management concern. Short-term negligible adverse impacts would be expected from construction, operation, and maintenance of WCFs because new facilities would be located primarily in or near developed or already disturbed areas of the park. Birds in or adjacent to these areas would experience low-level disturbance from noise associated with construction, operation, and maintenance. However, once construction is over, and depending upon the degree to which impacted habitats return to their pre-construction state, birds may return and resume use of these sites. Implementation of the U.S. Fish and Wildlife Service guidance for communications towers should minimize habitat disturbance and inadvertent deaths of birds around WCFs or associated

structures, thereby limiting habitat fragmentation and other adverse effects. The exclusion of new WCFs from wetlands and other habitats and locations where birds are known to concentrate should reduce adverse impacts to avian species. Also, the co-location of any new WCFs could reduce the risks associated with additional WCFs. The height restriction and exclusion of guy wires from new WCFs would also reduce potential adverse impacts to birds because taller towers pose a greater risk of collision than shorter towers and guy wires are a known avian collision risk factor at towers. Thus, the potential long-term impact of bird collisions with WCFs should be negligible to minor, and adverse. If monitoring during and after construction of new WCFs determines that greater impacts are occurring to birds than anticipated, then these findings will be taken into consideration for subsequent WCFs.

**Cumulative Impacts.** Past, present, and reasonably foreseeable future actions that would be expected to contribute to impacts on avian species would be the same as those described under the no-action alternative, and result in long-term minor to moderate adverse impacts. The impacts to avian species resulting from these past, present and future actions, in combination with the negligible to minor adverse impacts under alternative C, would result in long-term, negligible to minor, and adverse impacts to avian species found in the park.

**Conclusion.** Under Alternative C, there would be a limited increase in wireless service and infrastructure. However, WCFs would be located primarily in or near developed or already disturbed areas of the park, thereby minimizing potential adverse impacts to birds. Long-term, negligible to minor and adverse impacts would occur in those areas of the park where WCFs would be considered due to the potential for habitat loss and bird collisions with WCFs in these areas that are not considered the main areas of habitat for avian species. During construction of new WCFs, short-term minor adverse impacts would be expected to occur from the temporary habitat loss and disturbance. However, implementation of the U.S. Fish and Wildlife Service guidance for communications towers should minimize habitat disturbance and inadvertent deaths of birds around WCFs or associated structures, thereby limiting habitat fragmentation and other adverse effects. Cumulative impacts to migratory birds and bird species of management concern would be short- and long-term, negligible to minor, and adverse. Because there would be no major, adverse impacts to migratory birds or species of management concern whose conservation is necessary to fulfill purposes identified in Yellowstone's establishing legislation; key to the natural and cultural integrity of the park; and identified as a goal in other park or NPS planning documents; there would be no impairment to this resource. Implementation of this alternative would not result in any unacceptable impacts to avian species and is consistent with §1.4.7.1 of *NPS Management Policies* (2006).

#### **IMPACTS OF ALTERNATIVE D: SUBSTANTIAL INCREASE IN WIRELESS SERVICES**

**Analysis.** A significant increase in wireless service would likely occur because applications for new WCFs would be considered for the Lake and other developed areas as well as along park roads and some backcountry areas using temporary or permanent infrastructure and equipment. Also, new applications would be considered for WCFs that provide seasonal cell coverage at the Norris, Madison, Bridge Bay, Tower-Roosevelt, and Fishing Bridge campgrounds through construction of new facilities. Cell coverage would be provided along major roads using antennas on existing power line poles and/or additional cell towers. The cell tower at Old Faithful would be camouflaged to reduce visual impacts when feasible. Improvements to viewsheds and safety at Mt. Washburn could occur by removing antennas and placing them on a new tower with an associated new equipment building and security fence. Improvements to viewsheds on Bunsen Peak may also occur by removing obsolete equipment and the cell coverage link (which would be moved to Elk Plaza). New infrastructure would be added to increase the capacity of the data transmission system within the park. The transmission line to the top of Bunsen Peak would remain in service to provide power for this potential use. FM equipment would remain on Bunsen Peak, but the equipment shed would be replaced with smaller equipment cabinet-sized enclosures.

Adverse effects under this alternative would be greater than for alternative C because new WCFs would be considered at campgrounds and along major roads. However, this alternative would still exclude the majority of suitable bird habitat in the park from consideration for WCFs, thereby reducing potential adverse impacts to birds. Short-term, negligible to minor and adverse impacts would be expected from construction, operation, and maintenance of WCFs because new facilities would be located primarily in or near developed areas of the park. Migratory birds and bird species of management concern in or adjacent to these areas would experience low-level disturbance from noise associated with construction, operation, and maintenance. However, once construction is over, and depending upon the degree to which impacted habitats return to their pre-construction state, birds may return and resume use of these sites. Implementation of the U.S. Fish and Wildlife Service guidance for communications towers should minimize habitat disturbance and inadvertent deaths of birds around WCFs or associated structures, thereby limiting habitat fragmentation and other adverse effects. The exclusion of new WCFs from wetlands and other habitats and locations where birds are known to concentrate should reduce adverse impacts to birds. Also, the co-location of any new WCFs could reduce the risks associated with additional WCFs. The height restriction and exclusion of guy wires from new WCFs would also reduce potential adverse impacts to birds because taller towers pose a greater risk of collision than shorter towers and guy wires are a known avian collision risk factor at towers. Thus, the potential impact of bird collisions with WCFs should be long-term, negligible to minor, and adverse. If monitoring during and after construction of new WCFs determines that greater impacts are occurring to avian species than anticipated, then these findings will be taken into consideration for subsequent WCFs.

**Cumulative Impacts.** Past, present, and reasonably foreseeable future actions that would be expected to contribute to impacts on avian species would be the same as those described for the no-action alternative, and result in long-term, minor to moderate, and adverse impacts to avian species in areas surrounding the park. The impacts to migratory birds and bird species of management concern resulting from these past, present and future actions, in combination with the minor to moderate adverse impacts under Alternative D, would result in long-term, minor to moderate, and adverse impacts to avian species found in the park.

**Conclusion.** There would be long-term, minor to moderate and adverse impacts from habitat loss and increased collision risk, depending on the number of WCFs sited in the park. During the construction of new WCFs, short-term minor adverse impacts would be expected to occur from the temporary habitat loss and disturbance. However, implementation of the U.S. Fish and Wildlife Service guidance for communications towers should minimize habitat disturbance and inadvertent deaths of birds around WCFs or associated structures, thereby limiting habitat fragmentation and other adverse effects. Cumulative impacts would be long-term, minor to moderate, and adverse. Because there would be no major adverse impacts to migratory birds or species of management concern whose conservation is necessary to fulfill purposes identified in Yellowstone's establishing legislation; key to the natural and cultural integrity of the park; and identified as a goal in other park or NPS planning documents; there would be no impairment to this resource. Implementation of this alternative would not result in any unacceptable impacts to avian species and is consistent with §1.4.7.1 of *NPS Management Policies* (2006).

## Wilderness

### Methodology and Assumptions

In evaluating environmental impacts, the NPS would take into account (1) wilderness characteristics and values, including the primeval character and influence of the wilderness; (2) the preservation of natural conditions; and (3) assurances that there would be outstanding opportunities for solitude, that the public would be provided with a primitive and unconfined type of recreational experience; and (4) that wilderness would be preserved and used in an unimpaired condition.

Yellowstone would use a Minimum Requirement Analysis (MRA) to determine whether a proposed

management action is appropriate or necessary for the administration of the areas as wilderness, to the wilderness resources and character, and the selection of the management method (tool) that causes the least amount of impact to wilderness resources and character. The MRA would be appropriate for a use or activity, determined to be necessary to accomplish an essential task, which makes use of the least intrusive tool, equipment, device, force, regulation, or practice that will achieve the wilderness management objective.

In the determination of minimum requirement, the potential disruption of wilderness character and resources will be considered before, and given significantly more weight than, economic efficiency and convenience. If a compromise of wilderness resources or character is unavoidable, only those actions that preserve wilderness character and/or have localized, short-term adverse impacts would be acceptable.

Administrative use of motorized equipment or mechanical transport would be authorized only if determined by the MRA process to be the minimum requirement needed by management to achieve the purposes of the area as wilderness, including the preservation of wilderness character and values, or in emergency situations involving the health or safety of persons actually in the area. The use of motorized equipment and the establishment of management facilities are specifically prohibited when other reasonable alternatives are available.

Administrative facilities (e.g., ranger stations and/or patrol cabins, fire lookouts, radio and/or cellular telephone antennas, radio repeater sites, associated storage or support structures, and facilities supporting trail stock operations) would be allowed in wilderness if they are determined to be the minimum requirement necessary to carry out wilderness management objectives.

The MRA cannot be used to permit new road construction, permit new or widen or extend any existing rights-of-way, or allow inappropriate commercial uses or unlawful uses in wilderness. No new roads, permanent heliports, helipads, or airstrips would be allowed in wilderness unless specifically authorized by statute or legislation. Temporary vehicular access and aviation landing facilities may be permitted only to meet the minimum requirements of emergency situations, and will be restored, per an approved restoration plan, as rapidly as possible.

Scientific activities are encouraged and permitted in wilderness when these activities are consistent with the NPS responsibilities to preserve and manage wilderness. Scientific activities may be conducted in wilderness when the desired information is essential for the understanding of health, management, or administration of wilderness and the project cannot be reasonably modified to eliminate or reduce the nonconforming wilderness use(s) or if it increases scientific knowledge, even when this serves no immediate wilderness management purposes, provided it does not compromise wilderness resources or character. Scientific activities (including inventory, monitoring, and research) that involve a potential impact to wilderness resources or values can be allowed when the benefits outweigh the impacts on the wilderness resource or values, and as long as the project will not significantly interfere with other wilderness purposes (recreational, scenic, educational, conservation or historical) over a broad area, or for a long period of time.

Research and monitoring devices (e.g., data loggers, meteorological and seismic stations) may be installed and operated in wilderness if: (1) the desired information is essential for the administration and preservation of wilderness and cannot be obtained from a location outside of wilderness without significant loss of precision and applicability, and (2) the proposed device is the minimum requirement necessary to accomplish the research objective safely. All such activities must also be evaluated using the minimum requirement concept. Devices located in wilderness will be removed when determined to be no longer essential.

Impact analyses focused on wilderness character and/or wilderness experience, including the perpetuation of natural ecological relationships and processes, continued existence of native wildlife and vegetation populations, absence of permanent human structures, opportunities for solitude, and

opportunities for primitive and unconfined recreation. The thresholds of change for intensity of impacts and the duration of impacts are defined below.

### Intensity Level Definitions

- Negligible:** Impacts to wilderness character or wilderness experience would not be detectable or barely detectable to visitors.
- Minor:** One or more attributes of wilderness character and wilderness experience change temporarily or in small ways in one or more locations. The change would impact a few visitors' experiences, but would result in little distraction from the quality of the experience.
- Moderate:** One or more attributes of wilderness character and wilderness experience change substantially in a single distinct region, or affect multiple regions; however, the change is not permanent and does not affect an entire visitor season. The change would noticeably decrease or improve the quality of the experience for a many visitors.
- Major:** One or more attributes of wilderness character and wilderness experience change substantially across more than one distinct region, on a permanent basis and over an entire visitor season. The change substantially improves many visitors' experiences or severely lowers the quality of most visitors' experiences; examples include addition or elimination of a recreation opportunity or a permanent change to an area.
- Duration:** Short-term effects would last only during the implementation of the project including mitigation and monitoring measures. Long-term effects would constitute a permanent impact.

### IMPACTS OF ALTERNATIVE A: NO ACTION

**Analysis.** Under Alternative A, no action would be taken to develop comprehensive park guidelines and plan for installation of wireless cellular services, coverage and related infrastructure. Yellowstone National Park staff would evaluate project proposals for wireless services on a case-by-case basis and would develop recommendations regarding various actions for a decision by the park superintendent. Actions related to wireless communications would be considered by emergency actions, placement of temporary (two years or less) facilities not related to emergency actions that would improve the efficiency of NPS, concessioners, and contractor operations, and replacement or upgrading of existing telecommunications and monitoring infrastructure that would not require new facilities to be constructed.

Existing resource monitoring and park radio telecommunications equipment and service would remain in Yellowstone's backcountry. The five cellular sites currently located in the park: Old Faithful, Grant Village, Mt. Washburn, and Bunsen Peak, and Elk Plaza are located within or near the bounds of existing developed areas and not within Yellowstone's recommended wilderness. Varying degrees of cell phone coverage occur within recommended wilderness, usually adjacent to developed areas. This spillover coverage would continue in all alternatives, but would not be targeted for these areas, and would be minimized to the extent possible. As in the past, no roads would be constructed within recommended wilderness, and no utilities would be extended into these areas.

**Cumulative Impacts.** Under existing and future minimum requirement analyses and approvals, ongoing administrative flights (primarily research, wildland fire management, and maintaining NPS radio systems) and occasional use of chainsaws to maintain backcountry trails would continue to occur in Yellowstone's recommended wilderness, resulting in short-term, negligible adverse impacts.

Ongoing recreational use of backcountry trails and campsites, including the use of stock, would contribute to long-term negligible adverse impacts to vegetation from trampling and erosion. Park staff strives to rehabilitate vegetation and soils when needed. Backcountry visitation could increase slightly over the next several decades as a result of population growth in surrounding counties and elsewhere; however, impacts to wilderness beyond a minor adverse intensity are not anticipated. None of the projects listed in the cumulative scenario earlier in this chapter occur within recommended wilderness. The impacts of these projects to wilderness resources would be mostly from noise occurring during construction activities, and this noise would diminish with distance into wilderness areas. When added to the other past, present, and reasonably foreseeable future actions within Yellowstone's recommended wilderness, Alternative A would have negligible to minor direct and indirect impacts.

**Conclusion.** Alternative A would result in minor direct or indirect impacts. There would be long-term, minor, adverse cumulative impacts to wilderness from administrative and recreational use due to the potential for additional research monitoring sites within wilderness, and some spillover cellular phone coverage from adjacent developed areas. Because there would be no major adverse impacts to wilderness whose conservation is necessary to fulfill purposes identified in Yellowstone's establishing legislation; key to the natural and cultural integrity of the park; and identified as a goal in other park or NPS planning documents; there would be no impairment to this resource. Implementation of this alternative would not result in any unacceptable impacts to wilderness and is consistent with §1.4.7.1 of *NPS Management Policies* (2006).

## IMPACTS OF ALTERNATIVE B: REDUCTION IN WIRELESS SERVICES

**Analysis.** Under Alternative B, wireless services needed for life, health, and safety would be provided while the number of WCFs would be reduced in the park. Cell phone service would be removed at Old Faithful, Grant Village, Canyon, and Tower-Roosevelt. Cell phone service would remain in the Gardiner-Mammoth area with a tower at Elk Plaza. Existing resource monitoring and park radio telecommunications equipment and service would remain in Yellowstone's backcountry. No new facilities for resource monitoring are envisioned under this alternative. Cell phone service is not an expectation in Yellowstone's backcountry, and no commercial cell phone sites are envisioned to be constructed there as part of this alternative. The removal of cell phone sites from Grant, Old Faithful, Mount Washburn, and Bunsen Peak would remove infrastructure, and cell service coverage, enhancing wilderness qualities.

**Cumulative Impacts.** Under existing and future minimum requirement analyses and approvals, ongoing administrative flights (primarily research, wildland fire management, and maintaining NPS radio systems) and occasional use of chainsaws to maintain backcountry trails would continue to occur in Yellowstone's recommended wilderness, resulting in short-term, negligible adverse impacts. Ongoing recreational use of backcountry trails and campsites, including the use of stock, would contribute to long-term negligible adverse impacts to vegetation from trampling and erosion. Park staff strives to rehabilitate vegetation and soils when needed. Backcountry visitation could increase slightly over the next several decades as a result of population growth in surrounding counties and elsewhere; however, impacts to wilderness beyond a minor adverse intensity are not anticipated. When added to the other past, present, and reasonably foreseeable future actions within Yellowstone's recommended wilderness, Cumulative impacts from Alternative B would have negligible to minor direct and indirect impacts.

**Conclusion.** Alternative B would result in negligible to minor direct or indirect impacts. There would be negligible to minor beneficial impacts to wilderness from administrative and recreational use due to existing research monitoring sites, and some spillover cellular coverage in the Mammoth Hot Springs area due to the Elk Plaza cell site. Because there would be no major adverse impacts to wilderness whose conservation is necessary to fulfill purposes identified in Yellowstone's establishing legislation; key to the natural and cultural integrity of the park; and identified as a goal in other park

or NPS planning documents; there would be no impairment to this resource. Implementation of this alternative would not result in any unacceptable impacts to wilderness and is consistent with §1.4.7.1 of *NPS Management Policies* (2006).

### **IMPACTS OF ALTERNATIVE C: LIMITED INCREASE IN WIRELESS (PREFERRED ALTERNATIVE)**

**Analysis.** Under Alternative C, a limited increase in wireless service would likely occur because applications for new WCFs would be considered for the Lake developed area using temporary or permanent infrastructure and equipment. Existing resource monitoring and park radio telecommunications equipment and service would remain in Yellowstone's backcountry. The cellular and wireless communications sites currently located in the park: Old Faithful, Grant Village, Mt. Washburn, Bunsen Peak, and Elk Plaza are within or near the bounds of existing developed areas and not within Yellowstone's recommended wilderness. The addition of cell phone coverage at Lake would increase the amount of spillover cell phone coverage into recommended wilderness, though the infrastructure would be located outside these boundaries. Additional impacts of this alternative are due to limited ground disturbance associated with the placement of a seismic monitoring station located near the Thorofare Ranger Station, and three stream gauging stations. Additional future resource monitoring stations may be added, but only if information can not be gathered from non-wilderness areas and a minimum tool analysis has been completed. Impacts would be mitigated by following the siting criteria listed in Chapter 2. Through the use of these criteria, impacts associated with viewing or hearing noise from infrastructure would be kept to minor or less.

**Cumulative Impacts.** Under existing and future minimum requirement analyses and approvals, ongoing administrative flights (primarily research, wildland fire management, and maintaining NPS radio systems) and occasional use of chainsaws to maintain backcountry trails would continue to occur in Yellowstone's recommended wilderness, resulting in short-term, negligible adverse impacts. Ongoing recreational use of backcountry trails and campsites, including the use of stock, contribute to long-term negligible adverse impacts to vegetation from trampling and erosion. Park staff strives to rehabilitate vegetation and soils when needed. Backcountry visitation could increase slightly over the next several decades as a result of population growth in surrounding counties and elsewhere; however, impacts to wilderness beyond a minor adverse intensity are not anticipated. None of the projects in the cumulative impacts scenario occur within recommended wilderness. Cumulative impacts of alternative C would be negligible to minor direct and indirect on wilderness resources.

**Conclusion.** Alternative C would result in negligible to minor direct or indirect impacts. There would be minor adverse cumulative impacts to wilderness from administrative and recreational use due to an additional cell site to provide coverage in the Lake developed area. Additional research monitoring sites could also occur. Because there would be no major, adverse impacts to wilderness whose conservation is necessary to fulfill purposes identified in Yellowstone's establishing legislation; key to the natural and cultural integrity of the park; and identified as a goal in other park or NPS planning documents; there would be no impairment to this resource. Implementation of this alternative would not result in any unacceptable impacts to wilderness and is consistent with §1.4.7.1 of *NPS Management Policies* (2006).

### **IMPACTS OF ALTERNATIVE D: SUBSTANTIAL INCREASE IN WIRELESS SERVICES**

**Analysis.** Under Alternative D, a substantial increase in wireless service would likely occur because applications for new WCFs would be considered for the Lake developed area and new applications for WCFs that provide seasonal cell coverage at the Norris, Madison, Bridge Bay, Tower, and Fishing Bridge campgrounds through construction of new facilities. This alternative also provides for cell coverage along primary roads using antennas on existing power line poles and/or additional cell towers. Existing resource monitoring and park radio telecommunications equipment and service would remain in Yellowstone's backcountry and additional YVO structures would be added as

permanent facilities in the park's recommended wilderness. The addition of cell phone coverage along the park's major roadways would likely cause an increase in cell phone coverage spillover into recommended wilderness areas adjacent to these roads. Distances the coverage would travel would be dependant upon the infrastructure of the equipment used, and the terrain in each area. More visitors would notice the additional coverage while hiking backcountry trails leading to changes in their wilderness experience. Other impacts would be the same as stated above for Alternative C.

**Cumulative Impacts.** Under existing and future minimum requirement analyses and approvals, ongoing administrative flights (primarily research, wildland fire management, and maintaining NPS radio systems) and occasional use of chainsaws to maintain backcountry trails would continue to occur in Yellowstone's recommended wilderness, resulting in short-term, negligible adverse impacts. Ongoing recreational use of backcountry trails and campsites, including the use of stock, contribute to long-term negligible adverse impacts to vegetation from trampling and erosion. Park staff strives to rehabilitate vegetation and soils when needed. Backcountry visitation could increase slightly over the next several decades as a result of population growth in surrounding counties and elsewhere; however, impacts to wilderness beyond a minor adverse intensity are not anticipated. When added to the other past, present, and reasonably foreseeable future actions within Yellowstone's recommended wilderness, Alternative D would have minor to moderate direct and indirect impacts.

**Conclusion.** Alternative D would result in minor to moderate direct or indirect impacts. There would be minor to moderate adverse cumulative impacts to wilderness from administrative and recreational use due to the potential for additional cell coverage along the Grand Loop Road, the Lake Development, potential additional research monitoring sites, and the resultant spillover into wilderness areas. Because there would be no major, adverse impacts to wilderness whose conservation is necessary to fulfill purposes identified in Yellowstone's establishing legislation; key to the natural and cultural integrity of the park; and identified as a goal in other park or NPS planning documents; there would be no impairment to this resource. Implementation of this alternative would not result in any unacceptable impacts to wilderness and is consistent with §1.4.7.1 of *NPS Management Policies* (2006).

## Soundscapes

### Guiding Regulations and Policies

36 CFR § 2.12 specifically prohibits operating motorized equipment or machinery (e.g., electric generating plants, motor vehicles, or motorized toys) or audio devices (e.g., radio, television set, tape deck or musical instrument) in a manner that exceeds a noise level of 60 dBA at 50 feet.

The National Park Service preserves, to the greatest extent possible, the natural soundscapes of the park (NPS 2006, Sec. 4.9). Intrusive sounds are a concern to park visitors: a system-wide survey revealed that nearly as many visitors come to national parks to enjoy the natural soundscape (91%) as come to view the scenery (93%) (NPS 2000).

### Methodology and Assumptions

Human-generated noise sources throughout the developed zone of Yellowstone include vehicular traffic; recreational activities, such as hiking, sightseeing, groups of visitors talking, and picnicking; and noises associated with administrative uses (e.g., construction activities, road maintenance activities). Representative background average sound levels in Yellowstone's developed areas during daytime hours (7am to 7pm) in the Old Faithful area are: 52 decibels (dBA) (summer), 42 dBA (winter); in the West Yellowstone-to-Madison road corridor: 53 dBA (summer) and 40 dBA (winter) (Burson, unpublished data).

Human-generated noise sources in the backcountry zone are substantially less than in the developed zone, especially as one moves farther away from park developments and roads. Noise sources include recreational activities, such as hiking, horseback riding, and boating; general aviation and

commercial overflights, and administrative uses (e.g., occasional use of chainsaws to clear trails; overflights for wildlife monitoring; occasional installation of NPS radio or scientific monitoring equipment). Representative background average sound levels during daytime hours (7 AM to 7 PM) in Yellowstone's backcountry are at Fern Lake in upper Pelican Valley: 36 dBA (summer) and 26 dBA (winter) and on the Mary Mountain trail 1.5 miles from the Old Faithful-to-Madison road corridor: 27 dBA (winter) measured (Burson, unpublished data).

Potential impacts to the natural soundscape were evaluated based on the existing sound levels in comparison to potential noise levels associated with each of the alternatives. This evaluation is a qualitative assessment. Short- and long-term noise levels were considered. Short-term noise impacts would result from the construction of WCFs and installation of scientific monitoring equipment and long-term noise impacts would result from the operation and maintenance of additional WCFs as well as the use of devices such as cell phones.

Noises resulting from the operation and maintenance of WCFs include the air conditioning units in each equipment building. Another source of noise at WCFs would be an emergency generator located within the equipment buildings. It was assumed generator noise levels for additional facilities would be similar to the noise levels produced from the existing cooling units and would occur for a similar duration. These levels are included in the representative background noise levels reported in the section above.

Assumptions made for the analysis included:

1. Noise from construction activities would be short-term and would occur during the summer construction period for any additional facility built. It is assumed that the construction activities would be confined to normal, daytime working hours (7 AM to 7 PM).
2. Long-term noise levels associated with the operation and maintenance of any additional facilities would include noise from cooling fans and emergency generators located in the equipment building of each facility. It is assumed that the noise levels of new facilities would be comparable to the existing facilities, including generator testing and use. It could be expected that as technology advanced the noise levels created by the generators and cooling fans may decrease. This WCS plan/EA uses current technology as the baseline, but future noise levels may be quieter.
3. To analyze the impacts to natural soundscapes of visitors talking on cell phones, background conversation levels are assumed to be about 60 dBA at 3–5 feet. Cell phone ring sound levels were assumed to be up to 70 dBA at 3 feet (Burson, personal communication). From point sources, sound levels decrease approximately 6 dBA for every doubling of distance (e.g., 70 dBA at 3 feet is approximately 46 dBA at 50 feet) (Burson, personal communication).

## Intensity Level Definitions

Given this methodology and the accompanying assumptions, the following criteria have been developed to assess the noise impacts for each of the alternatives:

- Negligible:** Natural sounds would prevail; noise generated by WCF construction, operation, or maintenance would be infrequent or absent, mostly immeasurable. Noise associated with the use of cell phones would be infrequent or absent.
- Minor:** Natural sounds would be predominant in backcountry areas, where management objectives call for natural processes to dominate. In developed areas, human-generated noise could be heard frequently throughout the day at moderate levels, or infrequently at higher levels; still, uninterrupted natural sounds could be heard regularly.

**Moderate:** Natural sounds would predominate in backcountry areas, but noise generated by WCF construction or installation of scientific equipment or NPS radio equipment could occasionally be present at low to moderate levels. In developed areas, human-generated noise would predominate during daylight hours. Uninterrupted natural sounds could still be heard occasionally.

**Major:** In backcountry areas, natural sounds would be impacted by human noise sources frequently or for extended periods of time at moderate intensity levels (but no more than occasionally at high levels), and in a minority of the area. In developed areas, noise generated by WCF construction, operation, or maintenance, installation of scientific equipment or NPS radio equipment, or the use of cell phones, would impact natural sounds most of the day at low to moderate intensity levels, or more than occasionally at high levels; noise would disrupt conversation for long periods of time and/or make enjoyment of other activities in the area difficult. In these areas, uninterrupted natural sounds would rarely be heard during the day.

**Duration:** Short-term effects would last during construction of a facility, typically up to three months. Long-term effects would be anything beyond the construction of a facility through the life of the facility, including maintenance activities.

### **IMPACTS OF ALTERNATIVE A: NO ACTION**

**Analysis.** An increase in wireless service would likely occur under the no-action alternative because applications for new WCFs, considered on a case-by-case basis, could be considered for the Lake developed area; the Norris, Madison, and Tower campgrounds; along major roads using antennas on existing power line poles and/or additional cell towers. There could be an increase in scientific monitoring equipment, including new gauging stations installed on the Upper Yellowstone River and the Bechler River. Cell phone coverage is not expected to be approved for Yellowstone's backcountry because it would interfere with wilderness mandates and NPS policy; however, small backcountry areas are expected to have cell phone coverage as a result of spillover from coverage in developed areas.

The operation of additional cooling units and generators that may be added would result in long-term, moderate, adverse impacts to natural soundspaces because of the higher ambient noise level in the localized area. Mitigation of these impacts include locating WCFs well away from any normal visitor use areas and the operation of additional cooling units and generators would not produce noise levels that exceed standards set in 36 CFR Section 2.12, based on the available data on cooling unit sound levels. Cooling systems similar to the ones currently in place at the park would produce a noise level of 60 dBA at 50 feet from the source.

Construction activities associated with the additional WCF at Lake and the changes at Mt. Washburn, Bunsen Peak, Elk Plaza, and Old Faithful developed area and installations at campgrounds and along power lines would result in short-term, moderate, adverse impacts to natural soundspaces in the developed zone because of the higher ambient noise level produced by construction activities. Installation of scientific equipment and NPS radio equipment in recommended wilderness would result in short-term, moderate, adverse impacts to natural soundspaces because of the higher ambient noise level produced by construction activities, including the potential use of helicopters for transport and the use of mechanized equipment for installation.

The additional use of cell phones in the Lake developed area, at campgrounds, and at pullouts and visitor attractions along the Grand Loop Road, and the continued use of cell phones at other developed areas in Yellowstone, would result in long-term, moderate adverse impacts to natural soundscapes. Impacts would be focused on areas, such as the boardwalk around Old Faithful, where visitors are often in close proximity to one another. Cell phones ringing, which could produce sounds up to 70 dBA at 3 feet (equivalent to 58 dBA at 24 feet), or cell phone conversations, which produce

about 60 dBA at 3-5 feet or 42 dBA at 24 feet), would be additive to the average ambient sound levels as represented by background levels at Old Faithful.

The use of cell phones in backcountry areas would not be expected to increase over current conditions; however, the impact to natural soundscapes would be long-term, minor, and adverse impacts. The impacts of cell phones ringing or cell phone conversations would be above the ambient sound levels measured in recommended wilderness; also, these types of human-generated sounds are contrary to wilderness mandates. The impacts would be mitigated by the small areas of cell phone coverage available in the backcountry under the no-action alternative.

The combined impacts to natural soundscapes under the no action alternative are expected to be short- and long-term, minor-to-moderate, and adverse.

**Cumulative Impacts.** Projects that would contribute to cumulative impacts to the park's natural soundscapes include construction of facilities such as the Old Faithful Visitor Education Center, which is likely to be completed during 2008 and 2009. The impacts resulting from these past, present, and future actions, in combination with the short- and long-term minor to moderate adverse impacts under the no-action Alternative would result in short-term and long-term minor to moderate, adverse impacts to natural soundscapes.

**Conclusion.** The combined impacts to natural soundscapes under the no-action alternative are expected to be short- and long-term, minor-to-moderate, and adverse. Cumulative impacts under this alternative would also be short- and long-term, minor to moderate, and adverse. Because there would be no major, adverse impacts to soundscapes whose conservation is necessary to fulfill purposes identified in Yellowstone's establishing legislation; key to the natural and cultural integrity of the park; and identified as a goal in other park or NPS planning documents; there would be no impairment to this resource. Implementation of this alternative would not result in any unacceptable impacts to soundscapes and is consistent with §1.4.7.1 of *NPS Management Policies* (2006).

## IMPACTS OF ALTERNATIVE B: REDUCTION IN WIRELESS SERVICES

**Analysis.** Wireless services for life, health, and safety would be provided, while the number of WCFs would be reduced in the park. Cell phone service, and associated WCFs, would be removed at Old Faithful, Grant Village, Canyon, and Tower-Roosevelt developed areas. Cell phone service would remain in the Gardiner-Mammoth area. Cell phone antennas would be relocated from Bunsen Peak to Elk Plaza. All equipment and the power transmission line to the summit of Bunsen Peak would be removed, with the exception of the passive reflector. Some antennas on Mt. Washburn may be relocated onto a newly constructed support structure.

The operation of fewer WCFs would result in long-term, minor beneficial impacts to natural soundspaces because of the lower ambient noise level associated with fewer cooling systems, generators, and other mechanisms.

Construction activities to remove WCFs would result in short-term, minor adverse impacts to natural soundspaces in developed areas because of the higher ambient noise level produced by construction activities. Removal of scientific equipment in recommended wilderness would result in short-term, minor adverse impacts to natural soundspaces because of the higher ambient noise level produced by removal activities, including the potential use of helicopters for transport and the use of mechanized equipment for removal.

The use of cell phones in developed areas would be reduced in Alternative B, thus this alternative would result in long-term, minor beneficial impacts to natural soundscapes. The use of cell phones in backcountry areas would be reduced under Alternative B due to a reduction in areas covered by cell phone spillover. This would result in long-term, minor beneficial impacts to natural soundscapes.

The combined impacts to natural soundscapes under Alternative B are expected to be long-term, minor, and beneficial.

**Cumulative Impacts.** Projects that would contribute to cumulative impacts to the park's natural soundscapes are similar to those described in the no action alternative. The impacts resulting from these past, present, and future actions, in combination with the long-term minor beneficial impacts under Alternative B, would result in long-term minor beneficial impacts to natural soundscapes.

**Conclusion.** The combined impacts to natural soundscapes under Alternative B are expected to be long-term, minor, and beneficial. Cumulative impacts under Alternative B would also be long-term, minor, and beneficial. Because there would be no major, adverse impacts to soundscapes whose conservation is necessary to fulfill purposes identified in Yellowstone's establishing legislation; key to the natural and cultural integrity of the park; and identified as a goal in other park or NPS planning documents; there would be no impairment to this resource. Implementation of this alternative would not result in any unacceptable impacts to soundscapes and is consistent with §1.4.7.1 of *NPS Management Policies* (2006).

### **IMPACTS OF ALTERNATIVE C: LIMITED INCREASE IN WIRELESS SERVICES (PREFERRED ALTERNATIVE)**

**Analysis.** A limited increase in wireless service would occur because applications for new Wireless service and WCF would be considered for the Lake developed area. The cell tower at Old Faithful would be relocated to a site near the water treatment plant when feasible. Antennas may also be relocated from the Mt. Washburn Lookout to a new platform tower adjacent to the existing lookout. Obsolete equipment, including cell antennas would also be removed or relocated from Bunsen Peak to Elk Plaza. In addition, wireless Internet access would be available to visitors in many hotels and stores throughout the park. There would be a slight increase in scientific monitoring equipment throughout the park.

The operation of an additional cooling unit and generator at Lake would result in long-term, minor, adverse impacts to natural soundspaces because of the higher ambient noise level in the local area. This WCF would be located well away from any normal visitor use area, mitigating much of the impact to visitors, since noise levels decrease 6 dBA with a doubling of distance from the source of the noise.

Construction activities associated with the additional WCF at Lake and the changes at Mt. Washburn, Bunsen Peak, Elk Plaza, and Old Faithful would result in short-term, minor adverse impacts to natural soundspaces in developed areas because of the higher ambient noise level produced by construction activities. Installation of scientific equipment and NPS radio equipment in recommended wilderness would result in short-term, minor adverse impacts to natural soundspaces because of the higher ambient noise level produced by construction activities, including the potential use of helicopters for transport and the use of mechanized equipment for installation.

The additional use of cell phones in the Lake developed area, and the continued use of cell phones at other developed areas would result in long-term, minor adverse impacts to natural soundscapes. The use of cell phones in backcountry areas would not be expected to increase over current conditions; however, the impact to natural soundscapes because of cell phone "spillover" coverage would be long-term, minor, and adverse impacts.

The combined impacts to natural soundscapes under the preferred alternative are expected to be short- and long-term, minor, and adverse.

**Cumulative Impacts.** Projects that would contribute to cumulative impacts to the park's natural soundscapes are similar to those described in the no action alternative. The impacts resulting from these past, present, and future actions, in combination with the short- and long-term minor adverse impacts under the preferred alternative, would result in short-term and long-term minor adverse impacts to natural soundscapes.

**Conclusion.** The combined impacts to natural soundscapes under the preferred alternative are expected to be short- and long-term, minor, and adverse. Cumulative impacts under the preferred alternative would also be short- and long-term, minor, and adverse. Because there would be no major, adverse impacts to soundscapes whose conservation is necessary to fulfill purposes identified in Yellowstone's establishing legislation; key to the natural and cultural integrity of the park; and identified as a goal in other park or NPS planning documents; there would be no impairment to this resource. Implementation of this alternative would not result in any unacceptable impacts to soundscapes and is consistent with §1.4.7.1 of *NPS Management Policies* (2006).

### **IMPACTS OF ALTERNATIVE D: SUBSTANTIAL INCREASE IN WIRELESS SERVICES**

**Analysis.** An increase in wireless service would likely occur because applications for new WCFs would be considered for the Lake developed area. Also, new applications for WCFs would be considered that provide seasonal cell coverage at the Norris, Madison, and Tower campgrounds through construction of new facilities. Cell coverage would also be provided along major roads using antennas on existing power line poles and/or additional cell towers. Visitors would have access to wireless Internet throughout most developed areas if WiMax access is installed. There would be an increase in scientific monitoring equipment, including new gauging stations installed on the upper Yellowstone River and the Bechler River.

The operation of additional cooling units and generators at the Lake area and at Madison, Norris, and Tower campgrounds, and any needed for road coverage, would result in long-term, moderate, adverse impacts to natural soundscapes because of the higher ambient noise level in the localized area. These WCFs would be located well away from any normal visitor use areas and would not exceed noise standards set in 36 CFR, mitigating much of the impact to visitors, since noise levels decrease 6 dBA with a doubling of distance from the source of the noise.

Construction activities associated with the additional WCFs at Lake, Madison, Norris, and Tower-Roosevelt, and the changes at Mt. Washburn, Bunsen Peak, Elk Plaza, and Old Faithful, and installations along power lines, or other areas needed for road coverage, would result in short-term, moderate, adverse impacts to natural soundscapes in the developed zone because of the higher ambient noise level produced by construction activities. Installation of scientific equipment and NPS radio equipment in recommended wilderness would result in short-term, moderate, adverse impacts to natural soundscapes because of the higher ambient noise level produced by construction activities, including the potential use of helicopters for transport and the use of mechanized equipment for installation.

The additional use of cell phones in the Lake developed area, at campgrounds, and at pullouts and visitor attractions along the Grand Loop Road, and the continued use of cell phones at other developed areas in Yellowstone, would result in long-term, moderate adverse impacts to natural soundscapes. Cell phone coverage in backcountry areas would be expected to increase over current conditions due to spillover from providing coverage on the roads; the impact to natural soundscapes would be long-term, minor, and adverse.

The combined impacts to natural soundscapes under Alternative D are expected to be short- and long-term, moderate, and adverse.

**Cumulative Impacts.** Projects that would contribute to cumulative impacts to the park's natural soundscapes are similar to those described in the no-action alternative. The impacts resulting from these past, present, and future actions, in combination with the short- and long-term minor to moderate adverse impacts under Alternative D, would result in short-term and long-term minor to moderate, adverse impacts to natural soundscapes.

**Conclusion.** The combined impacts to natural soundscapes under Alternative D are expected to be short- and long-term, minor to moderate, and adverse. Cumulative impacts under Alternative D would also be short- and long-term, minor to moderate, and adverse. Because there would be no major, adverse impacts to soundscapes whose conservation is necessary to fulfill purposes identified in Yellowstone's establishing legislation; key to the natural and cultural integrity of the park; and identified as a goal in other park or NPS planning documents; there would be no impairment to this resource. Implementation of this alternative would not result in any unacceptable impacts to soundscapes and is consistent with §1.4.7.1 of *NPS Management Policies* (2006).

## CULTURAL RESOURCES (Historic Structures and Cultural Landscapes)

### Guiding Regulations and Policies

In accordance with the Advisory Council on Historic Preservation's regulations implementing §106 of the NHPA (36 CFR Part 800, Protection of Historic Properties), impacts to historic properties including cultural landscapes for this project were identified and evaluated by (1) determining the area of potential effect (APE); (2) identifying cultural resources present in the area of potential effect that were either listed in or eligible to be listed in the National Register of Historic Places; (3) applying the criteria of adverse effect to affected cultural resources either listed in or eligible to be listed in the National Register; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

### Methodology and Assumptions

The purpose of this analysis is to determine if the placement of WCFs (including for cell phone coverage, scientific monitoring, NPS two-way radio system, and wireless Internet coverage) in the park is compatible or in conflict with historic properties and landscapes within the park and the direction provided by the *National Historic Preservation Act*. Thus, the guidance of this act was integrated into the impact thresholds. To determine impacts, the current and past uses of an area were considered and the potential effects of facility placement on visitor experience analyzed. This analysis is qualitative as the exact location of potential future WCFs is not known.

Impacts to historic properties and cultural landscapes are described in terms of type, context, duration, and intensity, as described above, which is consistent with the regulations of the Council on Environmental Quality (CEQ) that implement the National Environmental Policy Act (NEPA). The topics of archeological resources, ethnographic resources, and museum collections were dismissed from further consideration (see *Impacts Dismissed from Further Consideration*) because none were identified in the project area and potential future sites would avoid any impacts to these resources. The §106 Summary in the preferred alternative is an assessment of the effect of the implementation of the alternative on cultural resources including historic properties and cultural landscapes based upon the criteria of effect and adverse effect found in the Advisory Council's regulations.

Under the Advisory Council's regulations, a determination of either *adverse effect* or *no adverse effect* must be made for affected historic properties and cultural landscape that are eligible for or listed on the National Register of Historic Places. An *adverse effect* occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that would qualify it for inclusion in the National Register (e.g., diminishing the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association). *Adverse effects* also include reasonably foreseeable effects caused by the preferred alternative that would occur later in time, be farther removed in distance, or be cumulative (36 CFR Part 800.5, Assessment of Adverse Effects). A determination of *no adverse*

*effect* means there would be an effect, but the effect would not diminish in any way the characteristics of the cultural resource that qualify it for inclusion in the National Register of Historic Places.

The CEQ regulations and the National Park Service's *Conservation Planning, Environmental Impact Analysis and Decision-Making* (Director's Order 12, NPS 1992) also call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact (e.g., reducing the intensity of an impact from major to moderate or minor). Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under NEPA only. It does not suggest that the level of effect as defined by §106 is similarly reduced. Although adverse effects under §106 may be mitigated, the effect remains adverse.

In order for a historic property to be listed in the National Register of Historic Places, it must meet one or more of the following criteria of significance: (A) be associated with events that have made a significant contribution to the broad patterns of our history; (B) be associated with the lives of persons significant in our past; (C) embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic value, or represent a significant and distinguishable entity whose components may lack individual distinction; (D) have yielded, or may be likely to yield, information important in prehistory or history. In addition, the historic property must possess integrity of location, design, setting, materials, workmanship, feeling, and association (*National Register Bulletin, How to Apply the National Register Criteria for Evaluation*).

**The Importance of the Property's Setting in Yellowstone:** To retain historic integrity (and thereby avoid adverse effect) a property will always possess several, and usually most, of the seven aspects of integrity, which are location, design, setting, materials, workmanship, feeling, and association. While all aspects of integrity may be potentially affected by the proposals in this document, wireless telecommunications facilities have the potential to affect the setting and feeling by directly and indirectly affecting views from and within historic properties. In addition, the placement of antennas and other facilities on historic properties may affect the design, materials, and workmanship of that property. Proposed roads that are associated with WCFs also have the potential to affect the design of a historic district or cultural landscape.

"Setting" is the physical environment of a historic property. Whereas location refers to the specific place where a property was built or an event occurred, setting refers to the character of the place in which the property played its historical role. It involves how, not just where, the property is situated and its relationship to surrounding features and open space. Setting often reflects the basic physical conditions under which a property was built and the functions it was intended to serve. In addition, the way in which a property is positioned in its environment can reflect the designer's concept of nature and aesthetic preferences. The physical features that constitute the setting of a historic property and their relationships should be examined not only within the exact boundaries of the property, but also between the property and its surroundings. This is particularly important for districts (NR Bulletin #15).

Within the context of Yellowstone National Park, the setting of all historic properties has always, since its creation, been that of a scenic reserve as well as a place where natural and cultural resources were left unimpaired. Outstanding scenic character has always distinguished national parks from other areas, including national forests. In Yellowstone, it was the primeval character of the scenery that, combined with its outstanding natural features, led to its creation as a national park. The words, "retention of the park in its natural condition," contained in the 1872 enabling legislation, were later supplemented by the 1916 NPS Organic Act which charged the new bureau to, "conserve the scenery and the natural and historic objects and the wild life therein and...provide for the enjoyment of the same in such a manner and by such a means as will leave them unimpaired for the enjoyment of future generations." Thus, preservation of natural "scenery" has historically

been part of the park's purpose and mission. During the design and construction of most historic roads, trails, overlooks, buildings, etc., preservation of the natural scenery and primeval landscape was one of the fundamental objectives of park managers.

Of primary importance to the setting of a historic property in Yellowstone is its relationship to the very feature for which it was designed. The locations selected for most facilities were historically based either on the desire to select and develop viewpoints that revealed scenic vistas and features to their best advantage, thus maximizing the viewer's landscape experience, or on the desire to protect scenic vistas from any form of artificial obtrusion or interference. There are, therefore, some fundamental viewsheds between certain contributing features/patterns of a historic property and the setting. Examples of this relationship include the viewshed of the Old Faithful Geyser and surrounding Upper Geyser Basin from the Old Faithful Inn NHL (or vice versa), or the viewshed of Yellowstone Lake and surrounding wilderness from the historic Lake Hotel or Fishing Bridge Museum NHL. This visual relationship between the historic properties and its setting, feeling and association is integral to the property's integrity, and is of primary importance.

**Area of Potential Effect (APE):** In Section VI.C "Area of Potential Effects" in the *Nationwide Programmatic Agreement for Review of Effects on Historic Properties for Certain Undertakings Approved by the Federal Communications Commission, September 2004*, the presumed APE is ½ mile to 1-1/2 miles, depending on the height of the proposed WCF. However, due to the importance of outstanding natural scenic character to the setting and design of historic properties within Yellowstone, the APE is defined as the property itself and the entire viewshed or entire "seen area" in and around the property, even outside historic property boundaries. In the case of Yellowstone, historic properties that are near adjacent communities outside the park's boundaries, the APE and setting would be determined on a case-by-case basis.

**Existing and Desired Condition of the APE:** The contributing features and patterns of the historic property must retain integrity of location, design, setting, materials, workmanship, feeling, and association. Within the park, the setting outside the boundaries of the historic property, including long distance views, mostly appear to be free of artificial obtrusions or interference. Man-made structures stand out in stark contrast to the vast natural setting. Of particular importance are those views from certain contributing features of a historic property and the natural feature it was designed around, as in the case of the viewshed between Old Faithful Inn and the geyser basin of the Old Faithful Geyser. In addition, facilities that are constructed within an APE should harmonize with or blend into the landscape using the siting and design criteria established in this document.

For purposes of analyzing potential impacts to historic structures and cultural landscapes, the thresholds for the intensity of an impact are defined as follows. The methodology used for assessing impacts to an historic structure is based on how the project will affect the features for which the structure is significant. Since the undertakings described in each alternative would be programmatic in nature, rather than specific, these conditions are common to all thresholds:

- (a) The WCF would follow siting and design criteria to ensure facilities are appropriately camouflaged, and
- (b) "Fundamental viewsheds" are those that are between the historic property and the natural feature or vista it was designed for; such as the viewshed of the Old Faithful Geyser and surrounding Upper Geyser Basin from the Old Faithful Inn NHL (or vice versa), or the viewshed of Yellowstone Lake and surrounding wilderness from the historic Lake Hotel or Fishing Bridge Museum NHL, for example.

## Intensity Level Definitions

- Negligible:** Impact(s) would not alter contributing features/patterns of the historic property. The impact of the WCF is not measurable. For purposes of §106, the determination would be no effect.
- Minor:** Impact would alter contributing features or patterns of the historic property or its setting, but the integrity of the property is not diminished. The WCF would be camouflaged so that it is not discernable as a WCF within the APE. The WCF is not detectable within fundamental viewsheds. For purposes of §106, the determination of effect would be no adverse effect. Stabilization/preservation of character defining features and patterns in accordance with *The Secretary of the Interior's Standards for the Treatment of Historic Properties*, and *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guideline for the Treatment of Historic Landscapes* would be beneficial. For purposes of §106, the determination of effect would be no adverse effect.
- Moderate:** Impact alters contributing features/patterns of a historic property, and the integrity is slightly diminished. The WCF is camouflaged so that it is not discernable as a WCF from/within a majority of the APE; however, it is detectable from a small portion of the APE. WCF is not detectable within fundamental viewsheds. National Historic Landmarks are affected. For purposes of §106, the determination of effect would be adverse effect. A memorandum of agreement (MOA) is executed among the National Park Service and applicable state historic preservation officer and, if necessary, the Advisory Council on Historic Preservation in accordance with 36 CFR 800.6(b). Measures identified in the MOA to minimize or mitigate adverse impacts would reduce the intensity of impact under NEPA from major to moderate. Rehabilitation and restoration of a structure, building, or landscape in accordance with *The Secretary of the Interior's Standards for the Treatment of Historic Properties*, and *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guideline for the Treatment of Historic Landscapes* would be beneficial. For purposes of §106, the determination of effect would be no adverse effect.
- Major:** Alteration of a feature(s) would diminish the overall integrity of the resource. The determination of effect for §106 would be adverse effect. Measures to minimize or mitigate adverse impacts cannot be agreed upon and the National Park Service and applicable state historic preservation officer and/or Advisory Council are unable to negotiate and execute a memorandum of agreement in accordance with 36 CFR 800.6(b). Adverse impact occurs when any of the following conditions, alone or in combination, are met: impact alters contributing features/patterns so that the integrity of the resource is diminished to the extent that it is no longer eligible for listing in the National Register; WCF can be seen from/within a majority of the APE; WCF is seen within fundamental viewsheds. For purposes of §106, the determination of effect would be adverse effect. Reconstruction of a structure, building, or landscape in accordance with *The Secretary of the Interior's Standards for the Treatment of Historic Properties* and *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guideline for the Treatment of Historic Landscapes* would be beneficial. For purposes of §106, the determination of effect would be no adverse effect.
- Duration:** Short-term effects would last during construction of a facility, typically from 1-2 months. Long-term effects would be anything beyond the construction of a facility through the life of the facility, including maintenance activities.

## IMPACTS OF ALTERNATIVE A: NO ACTION

**Analysis.** Under this alternative, a WCF may be proposed within the APE, for any of the park's historic properties and cultural landscapes. The APE for Yellowstone's historic properties is the property and its setting, which in Yellowstone is the entire viewshed or "seen area" from the property. Proponents would be required to comply with the siting and design guidelines established in this document, which are common to all alternatives. The intent of these guidelines is to ensure the WCF is not discernable as a WCF from or within most portions of any historic properties and their settings. The guidelines also ensure contributing features, patterns, and settings of historic properties are not adversely affected. Proponents would also be required to comply with NEPA, Section 106 consultation with SHPOs, and other referenced laws, policies, executive orders, and guidelines, including *The Secretary of the Interior Standards for the Treatment of Historic Properties*; both with and without the *Guidelines for the Treatment of Cultural Landscapes*. Therefore, this alternative has the potential to have long-term, minor adverse impacts to one or more of the park's historic properties and cultural landscapes. The application process outlined for the WCF siting and design criteria under alternative A would have no adverse effect on historic resources.

**Cumulative Impacts.** Past, present, and future actions that affect the same historic properties and their APE include the previous WCF antennae installations on Mt. Washburn Lookout, the cell tower at Elk Plaza, the lattice tower near the junction of Fishing Bridge Road with the Grand Loop Road, and the Old Faithful cell tower. Under the intensity level definitions of this document, these past actions would be considered overall as long-term, minor, and adverse. These past actions, in combination with the proposed actions under this alternative (which are guided by the siting and design criteria), would result in a long-term, minor adverse impact.

**Conclusion.** Due to the potential siting of new WCFs, which would follow the siting and design criteria established in this document, Alternative A would have long-term, minor adverse impacts (no adverse effect under Section 106) on historic resources. Because there would be no major, adverse impacts to historic resources whose conservation is necessary to fulfill purposes identified in Yellowstone's establishing legislation; key to the natural and cultural integrity of the park; and identified as a goal in other park or NPS planning documents; there would be no impairment to this resource under Alternative A. Implementation of this alternative would not result in any unacceptable impacts and is consistent with §1.4.7.1 of *NPS Management Policies* (2006).

## IMPACTS OF ALTERNATIVE B: REDUCTION IN WIRELESS SERVICES

**Analysis.** Under this alternative, essential life/health/safety wireless services would be provided, including NPS radio, land-line phone, and cell service at Gardiner-Mammoth. Because of this reduction of existing WCFs in the park, including the existing cell tower that is partially visible from Old Faithful Historic District and the alterations to the potentially eligible Mt. Washburn Lookout, these actions would be defined as "preservation" and "restoration" under *The Secretary of the Interior Standards for the Treatment of Historic Properties*. Therefore this alternative would have a long-term, moderate beneficial impact on the park's historic properties and cultural landscapes.

**Cumulative Impacts.** Past, present, and future actions that affect the same historic properties and their APE include reduction in height of WCFs near historic properties at Old Faithful removal of some equipment on Mt. Washburn Lookout. These actions to historic properties are considered "preservation and restoration" treatments. Therefore the cumulative impacts would be long-term, moderate beneficial. Under Section 106, this would be considered no adverse effect.

**Conclusion.** This alternative improves previous impacts to historic properties and cultural landscapes for some of the park's historic properties and WCF alterations on a potentially eligible structure (Mt. Washburn Lookout) would be removed. Impacts would be long-term, moderate beneficial; which is no adverse effect under Section 106. Because there would be no major, adverse impacts to historic resources whose conservation is necessary to fulfill purposes identified in Yellowstone's establishing

legislation; key to the natural and cultural integrity of the park; and identified as a goal in other park or NPS planning documents; there would be no impairment to this resource under Alternative B. Implementation of this alternative would not result in any unacceptable impacts and is consistent with §1.4.7.1 of *NPS Management Policies* (2006).

### **IMPACTS OF ALTERNATIVE C: LIMITED INCREASE IN WIRELESS SERVICES (PREFERRED ALTERNATIVE)**

**Analysis.** Under this alternative, cell service and WCF infrastructure would be allowed at the Lake developed area by the siting of a cell tower at one of two sites: near the existing lattice tower just northwest of the Fishing Bridge road junction near the wastewater treatment facility, or at the existing water tank site near the administrative area. During summer 2007, both areas were field checked for visibility from the Lake Hotel Historic District, the Lake Fish Hatchery Historic District, Fishing Bridge Historic District, East Entrance Road Historic District, and the Grand Loop Road Historic District. The existing facilities at these locations are currently not noticeable or detectable from these historic properties due to the landforms and vegetation that screen them. It is assumed that cell towers placed in the same locations (following the siting and design criteria established in this document) would also not be visible from these historic properties. The existing lattice tower just northwest of the Fishing Bridge road junction is screened by vegetation and that screen is susceptible to fire. Therefore, this action would have a long-term, minor adverse impact on these historic properties and cultural landscapes. In terms of Section 106, this would be a no adverse effect.

Cell service would also be improved at Canyon and Tower-Roosevelt due to upgrading of the existing facilities on Mt. Washburn. The cellular WCF at Bunsen Peak would be relocated to Elk Plaza. Bunsen Peak and Mt. Washburn are to some extent, visible from the Grand Loop Road Historic District. Improvements to the appearance of these mountain peaks would be slightly beneficial to the setting of the Grand Loop Road. The Mt. Washburn Lookout would have previous WCF alterations relocated away from the lookout to an area adjacent to the structure. There would be an improvement of previous visual impacts due the removal of equipment from the lookout structure. This would be a long-term moderate beneficial impact. The new tower would follow the siting and design guidelines. Therefore, this action would have a long-term minor adverse impact to historic properties.

The existing cell tower at Old Faithful would be relocated to an area near the existing water treatment plant. During summer 2007, this area was field checked for visibility from the Old Faithful Historic District and the Grand Loop Road. From several vantage points, a tower at this location would not be visible from these historic properties due to distance and existing natural topographic and vegetative screening (Figs. 16 and 17). The construction of this cell tower would follow the siting and design criteria established in this document to ensure it is camouflaged, as well as *The Secretary of the Interior Standards for the Treatment of Historic Properties*; with and without the *Guidelines for the Treatment of Cultural Landscapes*. Therefore this action would have a minor adverse impact to these historic properties. In terms of Section 106, this would be considered no adverse effect.

**Cumulative Impacts.** Past, present, and future actions that affect the same historic properties and their APE include the improvement of previous impacts to historic properties at Old Faithful and Mt. Washburn Lookout, and improvement to the setting provided by relocating the Bunsen Peak tower to Elk Plaza and the equipment from the Mt. Washburn Lookout to an adjacent area. These proposed actions would be classified as "restoration" as defined by *The Secretary of the Interior Standards*. The new WCFs proposed for these areas would be camouflaged and not discernable; following the siting and design guidelines. The combination of past, previous and future actions would result in a long term, minor adverse and beneficial impacts. Under Section 106, this would be considered no adverse effect.

**Conclusion.** This alternative improves the setting affected by the previous WCF installations with only a long-term, minor adverse impact for proposed replacement WCFs. It provides for cell phone

service at the Lake developed area without affecting historic properties greater than a long-term, minor adverse impact. It would follow the siting and design guidelines established in this document. It would improve the integrity and condition of the Mt. Washburn Lookout, which would be a long-term, minor beneficial impact. Since the WCF relocation of equipment from Mt. Washburn Lookout to an adjacent area would be sited using the siting and design guidelines, there would be long-term, minor adverse impact. Therefore, the potential impact for this alternative would be long-term, minor adverse, which is no adverse effect under Section 106. Because there would be no major, adverse impacts to historic resources whose conservation is necessary to fulfill purposes identified in Yellowstone's establishing legislation; key to the natural and cultural integrity of the park; and identified as a goal in other park or NPS planning documents; there would be no impairment to this resource under alternative C. Implementation of this alternative would not result in any unacceptable impacts and is consistent with § 1.4.7.1 of *NPS Management Policies* (2006).

## **IMPACTS OF ALTERNATIVE D: SUBSTANTIAL INCREASE IN WIRELESS SERVICES**

**Analysis.** This alternative proposes the actions outlined in Alternative C, with the addition of cell service on park Entrance Roads and Grand Loop Road, and at smaller campground developed areas. The cell tower at the Old Faithful developed area would remain at its existing location but would be camouflaged when feasible. Therefore, for those aspects of Alternative D that are the same as Alternative C, the impacts to historic properties and cultural landscapes would all be the same.

For additional cell service and WCF infrastructure in Alternative D, impacts have been analyzed. Cell service would be allowed in park campgrounds with more than 100 sites: Madison, Norris, Bridge Bay, Tower, and Fishing Bridge campgrounds. This would be accomplished through construction of new WCFs that would serve those locations. An additional tower may be needed to provide for cell coverage at the Bridge Bay Campground. Although none of these campgrounds are historic properties, they are adjacent to historic properties and National Historic Landmarks (NHLs) and may be within their APE. The Grand Loop Road Historic District would be within the APE of these proposed actions. It is not fully known how or where WCFs would provide cell coverage for these roads and campgrounds. However, by following and complying with the siting and design guidelines of this document, this alternative would have a long-term, moderate adverse impact due to the potential affect to NHLs, Historic Properties and Cultural Landscapes..

Cell coverage would be provided along major roads using antennas on existing power line poles and/or additional cell towers. The Grand Loop Road Historic District encompasses most of the road system in the park and passes through or within the APE of many park historic properties, including some NHLs and historic districts. The APE for the road historic district is the viewshed seen from the road as well as the district itself. It is reasonable to assume that a large network of antenna sites with associated equipment would be needed to provide the cellular coverage proposed for this alternative. This large network would increase the likelihood of adverse affect on NHLs or other historic properties. Therefore, the impact of this action is long-term, moderate and adverse. Under Section 106, this would be considered an adverse effect.

**Cumulative Impacts.** Past, present, and future actions that affect the same historic properties and their APE include the improvement of previous impacts to historic properties at Old Faithful, and improvement to the setting provided by relocating the Bunsen Peak tower to Elk Plaza and the equipment from the Mt. Washburn Lookout to an adjacent area. These proposed actions would be classified as "restoration" as defined by the Secretary of the Interior Standards. Therefore the cumulative impacts would be long-term, moderate beneficial impacts. The new WCFs proposed for these areas would be camouflaged and not discernable; following the siting and design guidelines. Therefore, the combination of past and proposed future actions would result in a long-term, moderate adverse impact. Under Section 106, this would be considered an adverse effect.

**Conclusion.** The use of best technologies for the actions proposed in this alternative would be required, and the siting and design guidelines established in this document and *The Secretary of the*

*Interior Standards for the Treatment of Historic Properties*; with and without the *Guidelines for the Treatment of Cultural Landscapes* would be followed. However, because continuous coverage along the Grand Loop Road and Entrance Roads Historic Districts and adjacent historic properties, and the additional WCFs required throughout the park road system and near minor and major park developments and campgrounds would be near park NHLs, historic districts and properties, the overall impact for this alternative would be long-term, moderate adverse which is an adverse effect under Section 106. Because there would be no major, adverse impacts to historic resources whose conservation is necessary to fulfill purposes identified in Yellowstone's establishing legislation; key to the natural and cultural integrity of the park; and identified as a goal in other park or NPS planning documents; there would be no impairment to this resource under Alternative D. Implementation of this alternative would not result in any unacceptable impacts and is consistent with §1.4.7.1 of *NPS Management Policies* (2006).

## **SOCIAL RESOURCES**

### **Health and Human Safety**

#### **Guiding Regulations and Policies**

The National Park Service is concerned about the safety of visitors to its parks and will work with project proposals to enhance visitor safety as long as proposals do not result in a derogation of NPS resources or conflict with the current or planned use of NPS property (NPS 2006).

The *NPS Management Policies* state that the NPS is committed to providing appropriate, high-quality opportunities for visitors to enjoy the parks. The policies also state, "While recognizing that there are limitations on its capability to totally eliminate all hazards, the National Park Service and its concessionaires, contractors, and cooperators will seek to provide a safe and healthful environment for visitors and employees" (sec. 8.2.5.1). Further, the NPS will strive to protect human life and provide for injury-free visits (sec. 8.2.5).

#### **Methodology and Assumptions**

The analysis of human health and safety considered the effects of exposure to radio frequency (RF) radiation from WCFs, the ability of cell phone users to reach emergency services, and the potential for automobile accidents related to cell phone use while driving.

The exposure to RF emissions from telecommunication facilities is an issue of concern for this WCS plan/EA. Under 47 CFR 1.1310, Part I, Radio frequency Radiation Exposure Limits are set which are based on the commonly accepted guidelines published by the Institute of Electrical and Electronics Engineers, Inc. and adopted by the American National Standards Institute (IEEE/ANSI) C95.1 – 1992 Standards. The FCC has adopted these standards as regulations and has established guidelines for evaluating compliance with them for human exposure to RF electromagnetic fields. Under all stated alternatives, it is the goals of this WCS plan to require and enforce all WCFs in Yellowstone National Park to meet or exceed RF related regulations and guidelines.

The IEEE/ANSI guidelines distinguish RF exposure into two distinct categories: Occupational/Controlled and General Population/Uncontrolled. Occupational/Controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons who are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure. The WCS Plan is committed to all future WCFs meeting both standards.

These guidelines are based on Maximum Permissible Exposure (MPE) limits, which factor in RF frequency, electric field strength, magnetic field strength, power density and average time of exposure using a complex formula to calculate an MPE limit. This limit varies between occupational and general populations, with occupational generally being more restrictive due to the higher probability of cumulative exposure effects on workers. The details of MPE limits are readily available from IEEE/ANSI and are best interpreted by an RF Engineer or Occupational Health Specialist before being applied to field applications. However, generally exposure to higher frequency equipment is worse than the same exposure to lower frequency equipment.

Approximate frequency ranges for common and existing WCF equipment in Yellowstone are listed in Table 4.

**Table 4- Frequency Ranges for Common Equipment**

Frequency Range	Type of Equipment
150-174 MHZ	2 Way Radio, UHF (Includes NPS Radio)
400-450 MHZ	2 Way Radio, (Includes NPS Radio)
800-900 MHZ	Cellular
1,200 MHZ, 2,400 MHZ & 5,400 MHZ	WiFi
1,430 MHZ & 12,180 MHZ	Satellite Internet
11,200 MHZ, 2,000 MHZ, 1,200 MHZ	Commercial phone / data backbone (Qwest)

Applications for WCFs in the park must be in compliance with RF regulations and would be evaluated through the required NEPA process. It would be required that all new proponents for WCFs in Yellowstone would meet the IEEE/ANSI-RF safety standards and any existing WCFs that currently do not meet these standards would be brought up to these standards by exiting operators under all alternatives of the WCS plan/EA. The impacts from RF emissions were determined using data collected on the existing facilities, and the assumption that all proponents would be compliant with these standards.

Impacts to cell phone users' abilities to connect with emergency services were determined by evaluating where coverage is currently provided and determining how each of the alternatives would change coverage. Greater coverage is assumed to provide better access to 911 emergency services.

Impacts from automobile accidents involving the use of cell phones were analyzed quantitatively based on existing traffic accident data. Accident data from 1975 through 2007 were analyzed to determine whether automobile accidents in the park increased, decreased, or remained stable following the installation of existing cell phone towers at Mt. Washburn (1997), Bunsen Peak/Elk Plaza (2000), Old Faithful (2001), and Grant Village (2001). This analysis shows that the number of auto accidents is highly correlated with the number of park visitors and has remained relatively stable at around 200 accidents per million visitors every year since 1975 (Obernesser and Gunther, unpublished data); thus, the impact of current cell phone coverage along roads on the number of auto accidents in the park is undetectable.

We also analyzed the number of wildlife strikes by vehicles, including large (>30 pounds) and mid-size (<30 pounds) mammals, based on existing data. Wildlife strike data for the park were analyzed to determine whether auto accidents within the areas of cell phone coverage increased, decreased, or remained stable following the installation of existing cell phone towers at Mt. Washburn (1997), Bunsen Peak/Elk Plaza (2000), Old Faithful (2001), and Grant Village (2001). The results of this analysis are as follows:

Mt. Washburn	Mean annual wildlife strikes pre-installation: 12.9 coverage area
	Mean annual wildlife strikes post-installation: 9.1

Bunsen/Elk Plaza	Mean annual wildlife strikes pre-installation: 8.6 coverage area Mean annual wildlife strikes post-installation: 7.4
Old Faithful	Mean annual wildlife strikes pre-installation: 2.0 coverage area Mean annual wildlife strikes post-installation: 1.3
Grant Village	Mean annual wildlife strikes pre-installation: 8.5 coverage area Mean annual wildlife strikes post-installation: 7.0

While other factors may be involved, there is no indication that under current cellular coverage, vehicular accidents or wildlife strikes has increased. The results of this analysis show that the number of wildlife strikes within the areas of cell phone coverage along roads in the park has remained stable before and after cell towers were installed (Gunther, unpublished data); thus the impact of current cell coverage on the number of wildlife strikes by vehicles is undetectable.

### Intensity Level Definitions

The impact intensities for visitor safety are as follows.

- Negligible:** The impact to visitor or park staff safety would not be measurable or perceptible.
- Minor:** The impact to visitor or park staff safety would be measurable or perceptible, but it would be limited to a relatively small number of individuals at localized areas.
- Moderate:** The impact to visitor or park staff safety would be measurable and perceptible and would involve a large number of individuals in many areas of the park. Automobile Accidents rates would change slightly, many visitors would have the potential to be exposed to radio frequency levels above MPE, and a large number of visitors and staff would have either additional or reduced 911 cell phone coverage.
- Major:** The impact to visitor or park staff safety would be substantial. Accident rates in areas usually limited to low accident potential would be expected to substantially increase in the short- and long-term and impacts to the safety of individuals would be readily apparent throughout the park.
- Duration:** Short-term impacts would last during facility construction, typically less than 1-2 months. Long-term impacts would occur throughout the life of the facility, taking into consideration operation and maintenance of the facility.

### IMPACTS OF ALTERNATIVE A: NO ACTION

**Analysis.** Under the no-action alternative, and in accordance with the processes set out in Reference Manual 53 and this plan for the evaluation of WCF applications, all applications for new facilities would be evaluated for radio frequency emissions. All new facilities would need to meet all applicable standards related to radio frequency emissions in order to be considered within the park and there would be negligible impacts to visitor or employee safety from radio frequency emissions. The existing microwave dish on Mt. Washburn could, since it is not within a fenced compound, result in exposure above MPE limits, resulting in a long-term, minor adverse impact.

Consideration of future WCFs in the park could allow for more areas of the park to have cellular coverage than is currently the case if applications were approved on a case-by-case basis. All developed areas and campgrounds could eventually have cell phone coverage. Currently,

approximately 35% of the major park roads have cell phone coverage. Under Alternative A, cell phone coverage might, if applications were approved on a case-by-case basis after NEPA review, increase to 100% of park roads. Additional coverage would provide long-term moderate beneficial impacts as park visitors and park staff would have cellular coverage in more areas of the park, increasing the ability to make the necessary contacts during an emergency.

Although the increased ability to use cell phones in Yellowstone may provide benefits, it also has the potential to create an increase in accidents as the ability to use these phones would distract drivers. Even with a hands-free device, drivers could still be distracted while using a phone and driving. The analysis of accident data show empirically that neither the number of accidents nor the number of vehicle wildlife strikes has risen since existing cell phone towers were installed between 1997–2001. Although some studies have shown that use of a cell phone can increase the risk of collision up to four times, further research has shown that these numbers may be overstated and that banning cell phones would not result in a statistically significant reduction in auto accidents (Redelmeier and Tibsharani 1997, Hahn and Prieger 2006). Based on analysis of Yellowstone accident and wildlife strike data, and consistent with the results of these studies, it would be expected that a large increase in the ability of drivers to use cell phones while driving could have long-term minor adverse impacts on the number of accidents related to cell phone use while driving.

**Cumulative Impacts.** Past, current, and reasonably foreseeable future actions that could contribute to cumulative impacts under the no-action alternative include any roadway improvements in the park by the Western Lands Federal Highways Program (WLFHP) in conjunction with the park, which could be expected to provide beneficial impacts to those traveling the roadways; however, the rate of auto accidents has remained stable at around 200 accidents per million visitors since 1975. Since the road improvement program began in 1991, approximately 35% of park roads have been reconstructed. Based on this limited percent of improved roads, after analyzing existing accident data, it is likely that the road improvement program will have a negligible impact on the number of auto accidents in the park. The impacts on human health and safety in the park resulting from these past, present and future actions, in combination with the long-term minor adverse and long-term moderate beneficial impacts under the no-action alternative, would result in long-term minor beneficial impacts to human health and safety.

**Conclusion.** Under the no-action alternative, combined impacts to human health and safety would be long-term minor beneficial based on increased access to emergency services, but also considering the minor adverse effects from continued potential radio frequency exposure on Mt. Washburn and potential for increased accidents resulting from a large increase in cell phone coverage of roads. Cumulative impacts under the no-action alternative would be long-term, minor, and beneficial.

## IMPACTS OF ALTERNATIVE B: REDUCTION IN WIRELESS SERVICES

**Analysis.** Under Alternative B, the removal of the WCF on Mt. Washburn, and Bunsen Peak would have a long-term minor beneficial effect in reducing radio frequency emissions. The ability of Yellowstone visitors and staff to use cell phones to reach emergency services under Alternative B would be reduced, resulting in a long-term moderate adverse impact to human health and safety.

The reduction of cell phone coverage along the roadways near Old Faithful, Grant Village, Canyon, Tower-Roosevelt, and near Mammoth developed areas would have little potential to reduce the number of auto accidents resulting from distracted drivers as there has been no increase in accidents since cell phone towers were installed in 1997–2001. It is expected that the decrease in the ability of drivers to use cell phones while driving proposed under Alternative B will have negligible impacts on the number of auto accidents related to cell phone use while driving.

**Cumulative Impacts.** Past, current, and reasonably foreseeable future actions that could contribute to cumulative impacts under Alternative B are similar to the no action alternative. The impacts on

human health and safety in the park resulting from these past, present and future actions, in combination with the long-term minor beneficial impacts from reducing radio frequency exposure and moderate adverse impact from reducing access to emergency services, would result in long-term minor adverse impacts to human health and safety.

**Conclusion.** Under Alternative B, combined impacts to human health and safety would be long-term, minor, and adverse based on reduced coverage and the ability to reach emergency services, but also considering the long-term minor beneficial impacts from any reduction in potential radio frequency exposure. Cumulative impacts under Alternative B would be long-term, minor, and adverse.

### **IMPACTS OF ALTERNATIVE C: LIMITED INCREASE IN WIRELESS (PREFERRED ALTERNATIVE)**

**Analysis.** Under the preferred alternative, and in accordance with the processes set out in Reference Manual 53 and this plan for the evaluation of WCF applications, all applications for new facilities would be evaluated for radio frequency (RF) emissions. All new facilities would need to meet all applicable standards related to radio frequency emissions in order to be considered within the park and there would be negligible adverse impacts to visitor or employee safety from radio frequency emissions. In addition, improvements to the Mt. Washburn site would ensure that visitors are not exposed to radio frequency emissions above MPE limits, resulting in long-term, minor beneficial impacts.

The addition of a WCF at the Lake developed area would allow a small increase in the total park area that has cell phone coverage. In addition, improvement at Mt. Washburn would improve cell phone coverage at the Tower-Roosevelt and Canyon developments. Coverage in these areas would provide long-term, minor beneficial impacts as park visitors and park staff would have cellular coverage in more areas of the park, increasing the ability to make the necessary contacts during an emergency.

Due to the minimal increase of cellular coverage to roads under the Preferred Alternative, and since cellular coverage under existing conditions has had no apparent impact on the number of accidents or the number of wildlife strikes, it is expected that this small increase in the ability of drivers to use cell phones while driving would have negligible impacts on the number of accidents related to cell phone use while driving.

**Cumulative Impacts.** Past, current, and reasonably foreseeable future actions that could contribute to cumulative impacts under the preferred alternative are similar to the no action alternative. The impacts on human health and safety in the park resulting from these past, present and future actions, in combination with the long-term minor beneficial impacts under the preferred alternative, would result in long-term minor beneficial impacts to human health and safety.

**Conclusion.** Under the preferred alternative, combined impacts to human health and safety would be long-term, minor, and beneficial based on increased coverage and the ability to reach emergency services and a reduction in potential exposure to radio frequency emissions. Cumulative impacts under Alternative C would be long-term, minor, and beneficial.

### **IMPACTS OF ALTERNATIVE D: SUBSTANTIAL INCREASE IN WIRELESS SERVICES**

**Analysis.** Under Alternative D, and in accordance with the processes set out in Reference Manual 53 and this plan for the evaluation of WCF applications, all applications for new facilities would be evaluated for radio frequency emissions. All new facilities would need to meet all applicable standards related to radio frequency emissions in order to be considered within the park and there would be negligible adverse impacts to visitor or employee safety from radio frequency emissions. In addition, improvements to the Mt. Washburn site would ensure that visitors are not exposed to radio frequency emissions above MPE limits, resulting in a minor beneficial impact.

The addition of a WCF at the Lake developed area, in most park campgrounds, and along road corridors would substantially increase cellular coverage throughout the park. Additional cell phone coverage in these areas would provide long-term moderate beneficial impacts as park visitors and park staff would have increased ability to make the necessary contacts during emergency situations. Although the increased ability to use cell phones in Yellowstone would provide benefits, it would also have the potential to create an increase in auto accidents as the ability to use cell phones would distract drivers similar to the no-action alternative. It is expected that the ability of drivers to use cell phones while driving would have long-term, minor adverse impacts on the number of accidents related to cell phone use while driving.

**Cumulative Impacts.** Past, current, and reasonably foreseeable future actions that could contribute to cumulative impacts under Alternative D are similar to the no-action alternative. The impacts on human health and safety in the park resulting from these past, present and future actions, in combination with the long-term moderate beneficial impacts under the preferred alternative, would result in long-term moderate beneficial impacts to human health and safety.

**Conclusion.** Under Alternative D, combined impacts to human health and safety would be long-term moderate and beneficial based on increased coverage and the ability to reach emergency services, and a reduction in potential exposure to radio frequency emissions, but also considering a long-term minor adverse impact from increased use of cell phones while driving. Cumulative impacts under Alternative D would be long-term, moderate, and beneficial.

## Park Operations

### Methodology and Assumptions

Yellowstone's law enforcement rangers are primarily responsible for providing safety and security for the park's visitors and infrastructure. Visitor safety programs include emergency medical services (1354 ambulance transports and 205 life flights from 2004 to 2007); search and rescue (66 incidents in 2002); structural fire (450 alarms and 10 fires in 2002); and law enforcement. Yellowstone is an area of exclusive federal jurisdiction, meaning that within the boundaries of the park, Yellowstone's law enforcement personnel have the sole authority and responsibility of enforcing both federal and state criminal and civil laws and regulations (NPS 2003).

Other essential park operations include interpretation, maintenance, administration, and resource management. Yellowstone staff manage nine visitor centers, museums, and contact stations; 1,700 administrative buildings, 12 campgrounds with more than 2,150 sites; 466 miles of roads; 15 miles of boardwalk; 1,100 miles of trails with 92 trailheads; and 301 backcountry campsites. Natural and cultural resources include one threatened and endangered species; 412 species of mammals and birds, birds, fish, reptiles and amphibians; over 10,000 hydrothermal features; 1,500 archeological sites; 379,000 cultural objects and natural science specimens; and 5,000,000 items in the park archives. The NPS employs more than 800 people during the peak summer season, and park concessioners employ an additional 3,400 (NPS 2007).

Each application for new, altered or renewal of WCFs in the park comes with an associated administrative workload. Applications must be evaluated and compared with park goals and plans to determine suitability. Once a WCF application is determined to be suitable, it must go through an environmental review analysis which would result in no additional NEPA compliance, if it falls within pre-existing compliance. It would result in requiring a NEPA Categorical Exclusion, Environmental Assessment or Environmental Impact Statement, if potential impacts warrant an assessment. Once that analysis is completed, and depending on the size, location and function of the proposed WCF, a Right-of-Way agreement, Memorandum of Understanding, formal contract or other form of agreement needs to be created in accordance with department policies and regulations, and permit issuance. Finally, the WCF alteration, upgrade or installation work and ongoing maintenance of the equipment, would be monitored by NPS staff.

The commercial telephone system and the NPS two-way radio system are the primary wireless communications methods to support essential law enforcement, public safety, resource management, maintenance, interpretive, and administrative functions. However, park staff uses cell phones, where service is available, as an adjunct to the park radio and commercial telephone systems. NPS staff and partners also use cell phones to conduct routine business. Staff scientists, science partners, and resource managers rely on infrastructure with wireless data transmission to conduct research and resource management in Yellowstone.

Park “management and operations”, for the purpose of this analysis, refers to the quality and effectiveness of park staff to maintain and administer park resources and provide for an effective visitor experience, while at the same time having the support available to conduct other essential park operations. This impact analysis is based on the current description of park operations presented in Chapter Three, *Affected Environment*.

Impacts to ability of staff to perform emergency services and essential operations were determined by evaluating where NPS radio coverage and cell phone coverage is currently provided and determining how each of the alternatives would change coverage. Greater coverage is assumed to provide greater benefits to park operations.

Scientific monitoring equipment using wireless technology to transmit data in real-time has become an essential component of understanding and protecting resources in Yellowstone. Increased ability to use wireless scientific monitoring equipment is assumed to provide greater benefits to park resource operations.

## Intensity Level Definitions

The following thresholds for evaluating impacts on park operations and management were defined and applied to beneficial and adverse impacts:

- Negligible:** Park operations would not be impacted or the impact would not have a noticeable or measurable impact on park operations.
- Minor:** Impacts would be detectable and would result in a measurable, but small, change in park operations.
- Moderate:** Impacts would be readily apparent and would result in a substantial adverse or beneficial change in park operations that would be noticeable to staff and the public.
- Major:** Impacts would be readily apparent and would result in a substantial change in park operations that would be noticeable to staff and the public and would be markedly different from existing operations.
- Duration:** Short-term effects would be less than one year. Long-term effects would continue beyond one year.

## IMPACTS OF ALTERNATIVE A: NO ACTION

**Analysis.** Under the no-action alternative, applications for WCFs would be considered on a case-by-case basis. Replacement or upgrade of WCFs would occur as needed, but no comprehensive plan would guide efforts. In accordance with the processes set out in Reference Manual 53 and this plan for the evaluation of WCF applications, all completed applications for new facilities would be evaluated. Theoretically, there would be no imposed limit on the number of WCFs that could be constructed in the park. However, each facility would be required to complete the NEPA process before construction and implement the siting guidelines.

The NPS two-way radio system could be upgraded as needed, resulting in a long-term, minor, beneficial impact to park operations (approximately 93% of the park is currently covered with the existing two-way radio system).

Consideration of future WCFs in the park would potentially allow for more park developed areas and areas of the park road to have cellular coverage than is currently the case. The park would likely receive applications for additional facilities in areas that currently have coverage by only one or a few providers. Increased coverage in these areas would provide long-term moderate beneficial impacts as park staff would have cellular coverage in more areas of the park, increasing the ability to communicate and perform essential park operations.

The administrative workload associated with this alternative would be determined primarily by the volume and complexity of future WCF applications. Since they are each considered on a case-by-case basis, and there is no specific set of guiding thresholds, there could be a substantial increase in administrative workload as additional applications are considered, suitability determinations are made, environmental analysis is completed, and installations, upgrades and WCF alterations are made. Case by case consideration of applications would have long-term, moderate adverse impacts to NPS administrative workload.

Scientific monitoring devices would be evaluated case-by-case, which could lead to more and different types of scientific monitoring equipment being approved and installed. As this equipment typically is used to gather information to promote and benefit park resources, impacts to park resource operations would be long-term, minor, and beneficial. However, case by case consideration of applications and permitting would have long-term minor, adverse impacts to NPS administrative workload.

Impacts to backcountry operations would be negligible. Cell phone coverage is not expected to be approved for Yellowstone's backcountry because it would interfere with wilderness mandates and NPS policy; however, small backcountry areas are expected to have cell phone coverage as a result of spillover from increased coverage in developed areas.

The no-action alternative would have combined long-term, minor to moderate beneficial impacts on park operations.

**Cumulative Impacts.** Under the no-action alternative, projects listed in the cumulative scenario in the introduction of this chapter, combined with other past, present, and reasonably foreseeable future actions, would contribute to cumulative impacts to park operations and maintenance. The impacts on park operations resulting from these past, present and future actions, in combination with the long-term minor-to-moderate adverse impacts under the no action alternative, would result in long-term moderate adverse impacts to park operations.

**Conclusion.** The combined impacts to park operations under the no action alternative are expected to be long-term, minor to moderate, and beneficial. Cumulative impacts to park operations under the no-action alternative would be long-term, moderate, and adverse. Cumulative impacts combined with impacts from the no action alternative would result in long-term minor beneficial impacts to park operations.

## **IMPACTS OF ALTERNATIVE B: REDUCTION IN WIRELESS SERVICES**

**Analysis.** Under Alternative B, with the removal of WCFs at the Old Faithful and Grant Village developed areas and Mt. Washburn and Bunsen Peak sites, the ability of Yellowstone staff to use cell phones for emergency services and other operations would be reduced, resulting in long-term moderate adverse impacts to park operations.

The NPS two-way radio system would continue to function at its current capabilities. Upgrades for radio improvements would occur as needed; there would be no new installations of WCF repeaters. Long-term, minor, adverse impacts to park operations would occur (approximately 93% of the park is currently covered with the existing two-way radio system).

Scientific monitoring devices would be reduced and focused primarily on life-health safety, resulting in a long-term, minor, adverse impact to park resource operations.

Administrative workload would be reduced in the long run as WCFs are removed from the park and associated maintenance would also be reduced. New applications, when received, would be easier to evaluate and a higher percentage would be rejected due to the more restrictive thresholds established under Alternative B. Rejected WCF applications would not result in workload associated with environmental analysis or formal agreements, resulting in long-term moderate beneficial impacts.

Cell phone coverage would be reduced under Alternative B as spillover into the backcountry would be reduced with the removal of WCFs at the Old Faithful and Grant Village developed areas and Mt. Washburn and Bunsen Peak sites, which would result in long-term, minor adverse impacts on park operations.

Alternative B would have combined long-term, minor to moderate adverse impacts on park operations.

**Cumulative Impacts.** Cumulative impacts under Alternative B are expected to be similar to the no action alternative, resulting in long-term, moderate adverse impacts to park operations. The impacts on park operations resulting from these past, present and future actions, in combination with the long-term moderate adverse impacts under Alternative B, would result in long-term, minor adverse impacts to park operations.

**Conclusion.** The combined impacts to park operations under Alternative B are expected to be long-term, moderate, and adverse. Cumulative impacts to park operations under Alternative B would be long-term, moderate, and adverse. Cumulative impacts combined with impacts from Alternative B would result in long-term minor adverse impacts to park operations.

### **IMPACTS OF ALTERNATIVE C: LIMITED INCREASE IN WIRELESS (PREFERRED ALTERNATIVE)**

**Analysis.** Under the preferred alternative, increased cell phone coverage in the Lake developed area, and the increase in cell phone coverage at both Tower-Roosevelt and Canyon developed areas as a result of changes in the Mt. Washburn cell antennas, would provide long-term minor beneficial impacts as park staff would have cellular coverage in more areas of the park, increasing the ability to communicate and perform essential park operations.

The NPS two-way radio system could be upgraded as needed, resulting in a long-term, minor beneficial impact to park operations (approximately 93% of the park is currently covered with the existing two-way radio system).

Implementation of the proposed Yellowstone volcano monitoring plan, upgrade of the Bechler RAWS, and guidelines for installing new scientific monitoring devices, which could lead to more effective and less intrusive types of scientific monitoring equipment being installed, would result in long-term, minor, and beneficial impacts to park operations.

An increase in administrative workload would occur under Alternative C in both the long and short term. New applications will be considered for WCFs at the Lake developed area and, in the short-term, extensive work could take place at the Bunsen Peak, Elk Plaza and Mt Washburn sites. Each change comes with an associated administrative workload as NPS employees process applications,

alter agreements and oversee work, resulting in long and short term, minor to moderate adverse impacts.

Impacts to backcountry operations would be negligible. The small backcountry areas that currently have spillover cell phone coverage from developed areas would not be expected to change appreciably.

The preferred alternative would have combined long-term, minor beneficial impacts on park operations.

**Cumulative Impacts.** Cumulative impacts under the preferred alternative are expected to be similar to the no action alternative, resulting in long-term, moderate adverse impacts to park operations. The impacts on park operations resulting from these past, present and future actions, in combination with the long-term minor beneficial impacts under the preferred alternative would result in short- and long-term moderate adverse impacts to park operations.

**Conclusion.** The combined impacts to park operations under the preferred alternative are expected to be long-term, minor, and beneficial. Cumulative impacts to park operations under the preferred alternative would be long-term, moderate, and adverse. Cumulative impacts combined with impacts from the preferred alternative would result in long-term minor adverse impact to park operations.

#### **IMPACTS OF ALTERNATIVE D: SUBSTANTIAL INCREASE IN WIRELESS SERVICES**

**Analysis.** Under Alternative D, increased cell phone coverage in the Lake developed area, at the Madison, Norris, Bridge Bay, Tower, and Fishing Bridge campgrounds, and along park roads, would result in long-term moderate beneficial impacts as park staff would have cellular coverage in more areas of the park, increasing the ability to communicate and perform essential park operations.

The NPS two-way radio system could be upgraded as needed, resulting in long-term, minor beneficial impacts to park operations (approximately 93% of the park is currently covered with the existing two-way radio system).

Implementation of the proposed Yellowstone volcano monitoring plan, upgrade of several RAWs, and guidelines for installing new scientific monitoring devices, which could lead to more and different types of scientific monitoring equipment being installed, would result in long-term, minor, and beneficial impacts to park operations.

The administrative workload associated with this alternative would be determined primarily by the volume and complexity of future WCF applications. The alternative calls for a substantial increase in WCFs, following a specific set of guiding thresholds, and there could be a substantial increase in administrative workload as additional applications are considered, suitability determinations made, environmental analysis completed, and installations, upgrades and WCF alterations are made. Major increase in wireless services and applications would have long-term moderate adverse impacts to NPS administrative workload.

Addition of WiFi Internet services to most developed areas and campgrounds would result in long-term, minor, beneficial impacts to park operations as law enforcement rangers would have the ability to use computers in emergency services vehicles for background checks and to connect with medical information.

Impacts to the backcountry operations would be negligible. The small backcountry areas that currently have spillover cell phone coverage developed areas would not be expected to change significantly.

Alternative D would have combined long-term, minor to moderate beneficial impacts on park operations.

**Cumulative Impacts.** Cumulative impacts under Alternative D are expected to be similar to the no action alternative, resulting in long-term, moderate adverse impacts to park operations. The impacts on park operations resulting from these past, present and future actions, in combination with the long-term minor to moderate beneficial impacts under Alternative D, would result in long-term, negligible to minor beneficial impacts to park operations.

**Conclusion.** The combined impacts to park operations under Alternative D are expected to be long-term, minor to moderate, and beneficial. Cumulative impacts to park operations under Alternative D would be long-term, moderate, and adverse. Cumulative impacts combined with impacts from Alternative D would result in long-term, negligible to minor beneficial impact to park operations.

## Visitor Use and Experience

### Guiding Regulations and Policies

The *NPS Management Policies 2006* state that enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks and that the NPS is committed to providing appropriate, high-quality opportunities for visitors to enjoy the parks (Section 1.4.3).

### Methodology and Assumptions

The purpose of this impact analysis is to determine if the placement of WCFs (including for cell phone coverage, scientific monitoring, NPS two-way radio system, and wireless Internet coverage) in the park is compatible or in conflict with the purpose of the park, its visitor experience goals, and the direction provided by the *NPS Management Policies*. Thus, these policies and goals were integrated into the impact thresholds. To determine impacts, the current and past uses of an area were considered and the potential effects of facility placement on visitor experience analyzed. This analysis is qualitative, as the exact location of potential future WCFs is not known.

The primary impacts analyzed in this section include the impact on visitor experience, both positive and negative, of providing cell phone coverage to park visitors, providing WiFi Internet access to park visitors, installing scientific equipment with a wireless component, and maintaining the NPS two-way radio system. During scoping, both noise and social impacts from cell phone use in geyser basins and wilderness were singled out as important impacts. While impacts to viewsheds from the visual presence of the facility could detract from the visitor experience, these potential impacts are analyzed in the next section, *Visual Quality, including Viewsheds*.

## Intensity Level Definitions

The following thresholds for evaluating impacts on visitor experience were defined:

- Negligible:** Visitors would likely be unaware of impacts associated with construction, operation, and maintenance of WCFs, and visitors would be unaffected by the ability to use cell phones or wireless Internet. Visitors would likely be unaware of scientific monitoring equipment. There would be no noticeable change in visitor use and experience or in any defined indicators of visitor satisfaction or behavior.
- Minor:** Changes in visitor use and/or experience would be slight and detectable, but would not appreciably limit or enhance critical characteristics of the visitor experience. Visitor satisfaction would remain stable.
- Moderate:** A few critical characteristics of the existing visitor experience would change, and the number of visitors engaging in a specified activity would be altered. Some visitors

participating in that activity or visitor experience might be required to pursue their choices in other available local or regional areas. Visitor satisfaction at the park would begin to either decline or increase.

**Major:** A number of critical characteristics of the existing visitor experience would change and/or the number of participants engaging in an activity would be greatly reduced or increased. Large numbers of visitors overall who desire to continue using and enjoying that activity or visitor experience would be required to pursue their choices in other available local or regional areas. Overall visitor satisfaction would markedly decline or increase.

**Duration:** Short-term impacts would last during facility construction, typically one to two months. Long-term impacts would occur throughout the life of the facility, taking into consideration operation and maintenance of the facility.

### IMPACTS OF ALTERNATIVE A: NO ACTION

**Analysis.** Under the no-action alternative, applications for WCFs would be considered within any portion of Yellowstone National Park on a case-by-case basis. Replacement or upgrade of WCFs would occur as needed, but no comprehensive plan would guide efforts. Theoretically, there would be no imposed limit on the number of WCFs that could be constructed in the park. However, each facility would be required to complete the NEPA process and follow siting guidelines before construction.

For those visitors that feel cellular service and wireless Internet service enhances their experience, impacts would be long-term, minor to moderate beneficial as they enjoy existing and possibly increasing cell phone coverage and wireless Internet connections as an important enhancement of their visitor experience. For those visitors that feel cellular service and wireless Internet service detract from their experience, impacts would be long-term, minor to moderate, and adverse as the noise/social impact from wireless devices could create a noticeable impact to visitor experience that causes a change in visitor satisfaction. Some visitors might choose to pursue their activities in other available local or regional areas; these impacts will likely be most noticeable in geyser basins/boardwalks and in the lobbies of historic hotels. Impacts to visitor experience from scientific resource monitoring and implementation of the NPS two-way radio system would be negligible. Most visitors will be unaware that wireless monitoring devices are installed. There would be no noticeable change in visitor use and experience due to scientific monitoring devices. Impacts to the backcountry, or wilderness visitor experience, where solitude and natural sounds are more expected, would be negligible. Cell phone coverage is not expected to be approved for Yellowstone's backcountry because it would interfere with wilderness mandates and NPS policy; however, small backcountry areas are expected to have cell phone coverage as a result of spillover from coverage in developed areas. Alternative A would have a long-term, minor to moderate effect, both beneficial and adverse, on visitor use and experience.

**Cumulative Impacts.** Past, present, and reasonably foreseeable actions occurring within the park could include an increase in cell phone service in developed areas, campgrounds, and along roads; it is unlikely that WCFs to provide cell phone coverage or wireless Internet connections would be installed in recommended wilderness because these sites and services would conflict with wilderness mandates and NPS policy. The cumulative effects of this alternative coupled with other actions would result in long-term minor to moderate adverse and beneficial cumulative impacts to visitor use and experience.

**Conclusion.** Under the no action alternative, there would be long-term, minor to moderate adverse and beneficial impacts as various user groups are impacted differently from the presence and use of WCFs in various areas of Yellowstone National Park. Cumulative impacts under the no-action alternative would be long-term, minor to moderate, adverse and beneficial.

## IMPACTS OF ALTERNATIVE B: REDUCTION IN WIRELESS SERVICES

**Analysis.** Essential wireless services for life, health, and safety would be provided, and the number of WCFs would be reduced in the park. Cell phone service would be removed at Old Faithful, Grant Village, Canyon, and Tower-Roosevelt developed areas. Cell phone service would remain in the Gardiner-Mammoth area. Cell phone antennas would be removed from Bunsen Peak and added to Elk Plaza. All equipment and the power transmission line to the summit of Bunsen Peak would be removed, with the exception of the passive reflector which will remain necessary for commercial phone and data service.

For those visitors that feel cellular service and wireless Internet service enhances their experience, impacts would be long-term, minor to moderate and adverse with a reduction of cell phone coverage and wireless Internet connections, which are an important part of their visitor experience. For those visitors that feel cellular service and wireless Internet service detract from their experience, impacts would be long-term, minor to moderate and beneficial as the noise/social impact from wireless devices would be reduced. Some visitors might choose to pursue their activities in other available local or regional areas. Impacts to visitor experience from scientific resource monitoring and implementation of the NPS two-way radio system would be negligible. Under this alternative, a reduction in scientific monitoring equipment is proposed. Most visitors would be unaware that wireless resource monitoring devices are installed. Impacts to the backcountry, or wilderness visitor experience, where solitude and natural sounds are more expected, would be minor beneficial. Cell phone coverage is not proposed for Yellowstone's backcountry and most of the existing "spillover" from coverage in developed areas would be eliminated as WCFs for cell coverage are removed from most areas. Alternative B would have a long-term, minor to moderate effect, both beneficial and adverse, on overall visitor use and experience.

**Cumulative Impacts.** Past, present, and reasonably foreseeable actions occurring within the park would include a decrease in cell phone service in developed areas, campgrounds, and along roads and a decrease in wireless spillover coverage into recommended wilderness. The cumulative effects of this alternative coupled with other actions would result in long-term, minor to moderate adverse and beneficial cumulative impacts to visitor use and experience.

**Conclusion.** Under Alternative B, there would be long-term, minor to moderate adverse and beneficial impacts as various user groups are impacted differently from the presence and use of WCFs in various areas of Yellowstone National Park. Cumulative impacts under the no-action alternative would be long-term, minor to moderate, adverse and beneficial.

## IMPACTS OF ALTERNATIVE C: LIMITED INCREASE IN WIRELESS (PREFERRED ALTERNATIVE)

**Analysis.** A limited increase in wireless service would likely occur because applications for new WCFs would be considered for the Lake developed area using temporary or permanent infrastructure and equipment. In addition, wireless Internet access would be available to visitors in many hotels and stores throughout the park. There would be a slight increase in scientific monitoring equipment throughout the park.

For those visitors that feel cellular service and wireless Internet service enhance their experience, impacts would be long-term, minor to moderate and beneficial as they enjoy increased cell phone coverage and wireless Internet connections as an important part of their visitor experience. For those visitors that feel cellular service and wireless Internet service detract from their experience, impacts would be long-term, minor to moderate and adverse as the noise/social impact from wireless devices, including the new use of cell phones in the Lake area, could create a noticeable impact to visitor use that causes a change in visitor satisfaction. Some visitors might choose to pursue their activities in other available local or regional areas; these impacts will likely be most noticeable in geyser basins/boardwalks and in the lobbies of historic hotels. Impacts to visitor experience from scientific

resource monitoring and implementation of the NPS two-way radio system would be negligible. Impacts to the backcountry, or wilderness visitor experience, where solitude and natural sounds are more expected, would be negligible. Cell phone coverage is not proposed for Yellowstone's backcountry because it would interfere with wilderness mandates and NPS policy; the backcountry areas that have cell phone coverage as a result of "spillover" from coverage in developed areas will not increase appreciably over current conditions. Overall, Alternative C would have a long-term, minor-to-moderate effect, both beneficial and adverse, on overall visitor use and experience.

**Cumulative Impacts.** Past, present, and reasonably foreseeable actions occurring within the park would include an increase in cell phone service in the Lake area and the availability of wireless Internet to visitors in several major developed areas. Cell phone service and wireless Internet connections are not expected to be available in campgrounds, along roads, or in the park's recommended wilderness, except as minimal spillover from approved, developed area coverage. The cumulative effects of this alternative coupled with other actions would result in long-term, minor to moderate adverse and beneficial cumulative impacts to visitor use and experience.

**Conclusion.** Under the preferred alternative, there would be long-term, minor to moderate adverse and beneficial impacts as various user groups are impacted differently from the presence and use of WCFs in various areas of Yellowstone National Park. Cumulative impacts under the no action alternative would be long-term, minor to moderate, adverse and beneficial.

#### **IMPACTS OF ALTERNATIVE D: SUBSTANTIAL INCREASE IN WIRELESS SERVICES**

**Analysis.** A substantial increase in wireless service would likely occur because applications for new WCFs would be considered for the Lake developed area using temporary or permanent infrastructure and equipment. Also, new applications would be considered for WCFs that provide seasonal cell coverage at the Norris, Madison, Bridge Bay, Tower, and Fishing Bridge campgrounds through construction of new facilities. This alternative would provide for cell coverage along major roads using antennas on existing power line poles and/or additional cell towers. Visitors would have access to wireless Internet throughout most developed areas when proposed WiMax (area wide WiFi coverage) access is installed. There would be a slight increase in scientific monitoring equipment, including new gauging stations installed on the upper Yellowstone River and the Bechler River.

For those visitors who feel that cellular service and wireless Internet service enhances their experience, impacts would be long-term, moderate and beneficial as they enjoy increased cell phone coverage and wireless Internet connections as an important part of their visitor experience. For those visitors that feel cellular service and wireless Internet service detract from their experience, impacts would be long-term, moderate and adverse as the noise/social impact from wireless devices could create a noticeable impact to visitor use that causes a change in visitor satisfaction. With increasing coverage for cell phones along major park roads, campgrounds, and developments, and with area-wide coverage of wireless Internet available to visitors in developed areas, some visitors choose to pursue their activities in other available local or regional areas; these impacts will likely be most noticeable in geyser basins/boardwalks, along nature trails, and in the lobbies of historic hotels. Impacts to visitor experience from implementation of the NPS two-way radio system would be negligible. Impacts to visitor experience from scientific resource monitoring would be long-term, minor, and adverse as the new gauging stations installed along the upper Yellowstone and Bechler rivers could be noticed and impact visitors, especially since backcountry visitors expect to encounter primarily natural sights and sounds. Alternative D would have long-term, moderate effects, both beneficial and adverse, on overall visitor use and experience.

**Cumulative Impacts.** Past, present, and reasonably foreseeable actions occurring within the park would include an increase in cell phone service in developed areas, campgrounds, and along roads; WCFs to provide cell phone coverage or wireless Internet connections will not be installed in recommended wilderness because these sites and services would conflict with wilderness mandates and NPS policy; however, new scientific monitoring equipment will be installed in recommended

wilderness, and gauging stations on the upper Yellowstone and Bechler rivers will be visible from high-use trails. The cumulative effects of this alternative coupled with other actions would result in long-term, minor to moderate, adverse and beneficial cumulative impacts to visitor use and experience.

**Conclusion.** Under Alternative D, there would be long-term, minor to moderate adverse and beneficial impacts as various user groups are impacted differently from the presence and use of WCFs in various areas of Yellowstone National Park. Cumulative impacts under Alternative D would be long-term, minor to moderate, adverse and beneficial.

## Visual Quality including Viewsheds

### Guiding Regulations and Policies

Reference Manual 53 guides action on proposals for wireless telecommunication sites. NPS Management Policies (2006) consider scenic views and visual quality as highly valued characteristics.

### Methodology and Assumptions

Scenic preservation and views has been very important to national parks for many reasons. During the early 20th century, after Yellowstone was already a park, there were many pressures to treat the parks like the national forests. Scenery became a more deliberate part of legislation and policy. It is in the 1916 mandate, and in later policies stated that constructing roads, trail, buildings and other improvements, particular attention must be devoted to the harmonizing of these improvements with the landscape.

Analyses of the potential intensity of impacts to the visual quality of the landscape were derived from the available information on viewsheds and from the park staff's observations of the effects on visual quality from previous infrastructure installations, rights of way and construction activities. Adverse effects are defined as any human-made feature that occurs within the park's natural vistas. It is possible that exemplary architecture acceptable in these vistas (e.g. the Madison Museum, the Old Faithful Inn, etc.) would enhance visual quality. Proponents would follow the guidelines for siting communication installations recommended in this document so that the installation harmonizes with or blends into the landscape to the greatest extent possible.

## Intensity Level Definitions

The magnitude of effect is then based on the number of park visitors that will view the effect, the amount of time their view would be affected and the number of locations where the vista would be affected. The following thresholds were used to describe the magnitude of effects on visual resources:

<b>Negligible</b>	Impacts to the visual quality of the landscape are barely detectable, and/or will affect very few visitors.
<b>Minor</b>	Impacts to the visual quality of the landscape would be slight but detectable, visible to a relatively small number of visitors and confined to a small portion of the surrounding area.
<b>Moderate</b>	Impacts to the visual quality of the landscape would be readily apparent and/or will affect many visitors, but would not preclude enjoyment of adjacent views by a majority of the visitors. Visitors would likely be able to express an opinion about the impacts.
<b>Major</b>	Impacts to the visual quality of the landscape would be significantly adverse, affect a majority of visitors or affect a large portion or all of the surrounding area. Visitors would likely express a strong opinion about the impacts.

**Duration:** Short-term effects would be less than one year. Long-term effects would continue beyond one year.

### **IMPACTS OF ALTERNATIVE A: NO-ACTION ALTERNATIVE**

**Analysis.** Under the no action alternative, no plan would be formally adopted to guide wireless communication in Yellowstone National Park and new proposals for WCFs would be evaluated on a case-by-case basis. There would be few limitations on what type of systems might be implemented in the park.

Because there would be no WCS plan and siting guidelines established for WCFs, impacts from proposed WCF service an infrastructure would have long-term, minor to moderate adverse impacts to visual quality; for example, the cell tower at Old Faithful would be visible from a wide range of vantage points and would continue to impact scenic resources. In addition, hikers to the summits of Mt. Washburn and Bunsen Peak would continue to see an assortment of WCF clutter relating adversely impacting their backcountry experience. Additional WCFs that might be approved on a case-by-case basis in the future would result in long-term, moderate, adverse impacts to visual quality.

**Cumulative Impacts.** Past, present, and reasonably foreseeable actions occurring within and near the park would include an increase in WCFs in gateway communities, highways, residential developments, and some mountaintops, resulting in a long-term, minor adverse impact to visual quality. The cumulative effects of this alternative with other actions would result in long-term moderate adverse cumulative impacts to the park's visual quality and viewsheds.

**Conclusion.** Under the no action alternative, there would be long-term, moderate adverse impacts to visual quality and viewsheds. Cumulative impacts under the no-action alternative would be long-term, moderate, and adverse. Because there would be no major, adverse impacts to visual quality and viewsheds whose conservation is necessary to fulfill purposes identified in Yellowstone's establishing legislation; key to the natural and cultural integrity of the park; and identified as a goal in other park or NPS planning documents; there would be no impairment to this resource. Implementation of Alternative A would not result in any unacceptable impacts and is consistent with §1.4.7.1 of *NPS Management Policies* (2006).

### **IMPACTS OF ALTERNATIVE B: REDUCTION IN WIRELESS SERVICES**

**Analysis.** Implementing Alternative B would reduce existing impacts to visual quality. Cellular communication infrastructure would be removed from the Old Faithful, Mt. Washburn, and Grant areas. Cell phone antennas would be relocated from Bunsen Peak to Elk Plaza. All equipment and the power transmission line to the summit of Bunsen Peak would be removed, with the exception of the passive reflector. This action would eliminate a portion of the existing man-made features from the landscapes in those locations. This alternative would result in long-term, moderate, beneficial impacts to visual quality and viewsheds.

**Cumulative Effects.** Past, present, and reasonably foreseeable actions occurring within and near the park would be similar to the no action alternative. The cumulative effects of this alternative with other actions would result in long-term minor beneficial cumulative impacts to the park's visual quality and viewsheds.

**Conclusion.** Under this alternative, there would be long-term, moderate beneficial impacts to visual quality and viewsheds. Cumulative impacts under Alternative B would be long-term, minor, and beneficial. Because there would be no major, adverse impacts to visual quality and viewsheds whose conservation is necessary to fulfill purposes identified in Yellowstone's establishing legislation; key to the natural and cultural integrity of the park; and identified as a goal in other park or NPS planning

documents; there would be no impairment to this resource. Implementation of Alternative B would not result in any unacceptable impacts and is consistent with §1.4.7.1 of *NPS Management Policies* (2006).

### **IMPACTS OF ALTERNATIVE C: LIMITED INCREASE IN WIRELESS (PREFERRED ALTERNATIVE)**

**Analysis.** Implementing the Preferred Alternative would result in a limited increase of permanent WCF infrastructure in the park and an associated increase in cellular coverage in some areas. A new facility will be constructed somewhere in the Lake area following the guidelines set forth in Chapter Two; impacts from this additional WCF would be long-term, negligible to minor and adverse, affecting a small number of visitors in only a few locations.

The existing cell tower at Old Faithful would be relocated to a site near the water treatment plant when it is feasible. A viewshed analysis (figs. 16 and 17) has shown that the visibility of the tower could be reduced from 78 percent to 59 percent within the area that most visitors frequent. The removal of obsolete equipment from the top of Bunsen Peak and the relocation of cellular equipment to Elk Plaza will make a slight improvement to the area viewshed. Similarly, the relocation of antennas from the fire lookout on Mt. Washburn to a nearby stand alone tower will slightly improve the viewshed. Relocation and removal of wireless infrastructure would result in long-term, minor to moderate, beneficial impacts.

Under the Preferred Alternative, new research monitoring sites would be installed in the park. These structures will be located so that they are unlikely to be seen by hikers on maintained trails. The installation of this equipment would result in a long-term, negligible to minor adverse impact on visual quality.

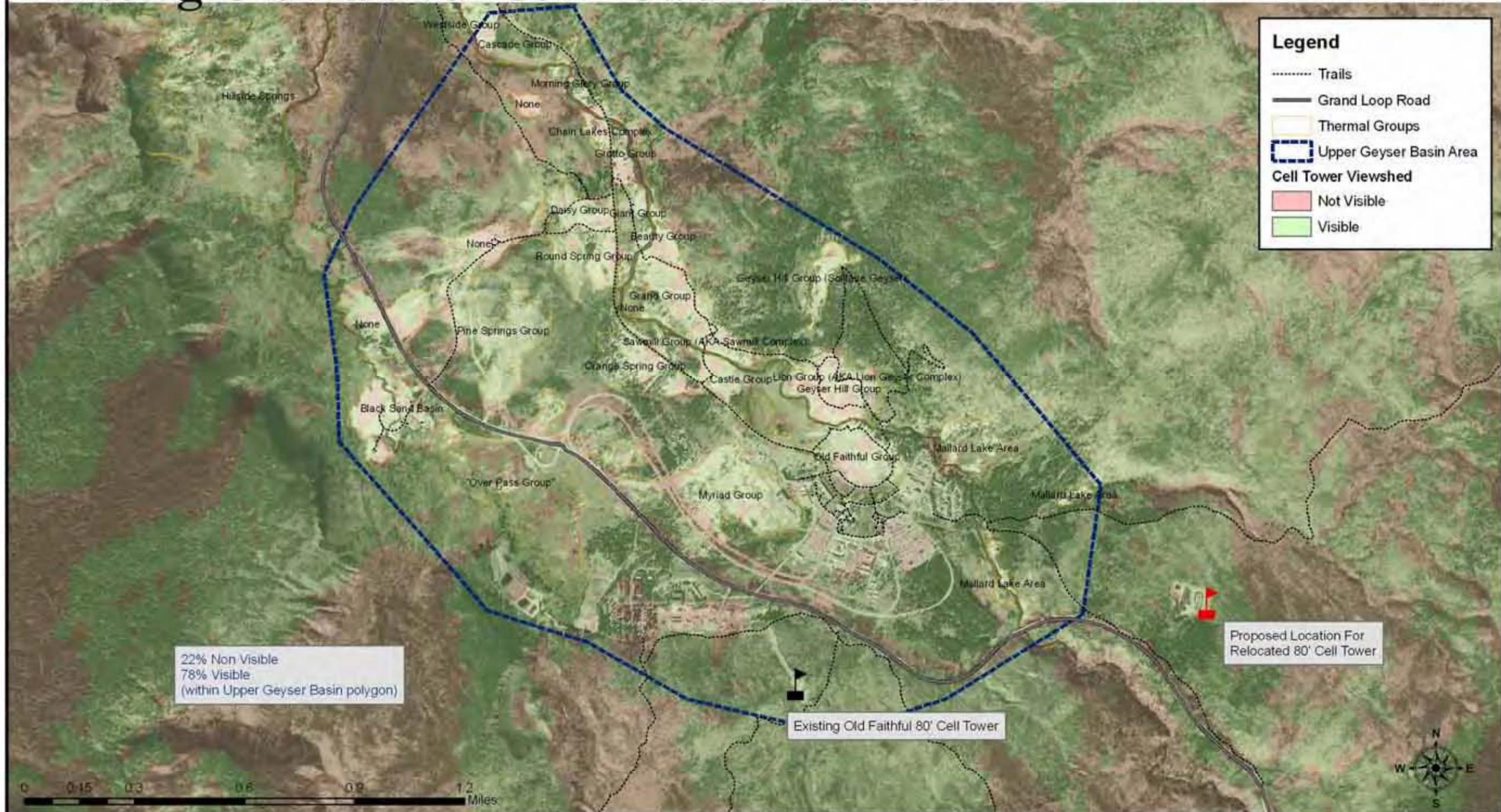
The combined impacts from the Preferred Alternative would be long-term, minor, and beneficial.

**Cumulative Effects.** Past, present, and reasonably foreseeable actions occurring within and near the park would be similar to the no action alternative. The cumulative effects of this alternative with other actions would result in long-term minor beneficial cumulative impacts to the park's visual quality and viewsheds.

**Conclusion.** Under this alternative, there would be long-term, minor beneficial impacts to visual quality and viewsheds. Cumulative impacts under the Preferred Alternative would be long-term, minor, and beneficial. Because there would be no major, adverse impacts to visual quality and viewsheds whose conservation is necessary to fulfill purposes identified in Yellowstone's establishing legislation; key to the natural and cultural integrity of the park; and identified as a goal in other park or NPS planning documents; there would be no impairment to this resource. Implementation of Alternative C would not result in any unacceptable impacts and is consistent with §1.4.7.1 of *NPS Management Policies* (2006).



# Existing Old Faithful Cell Tower Viewshed



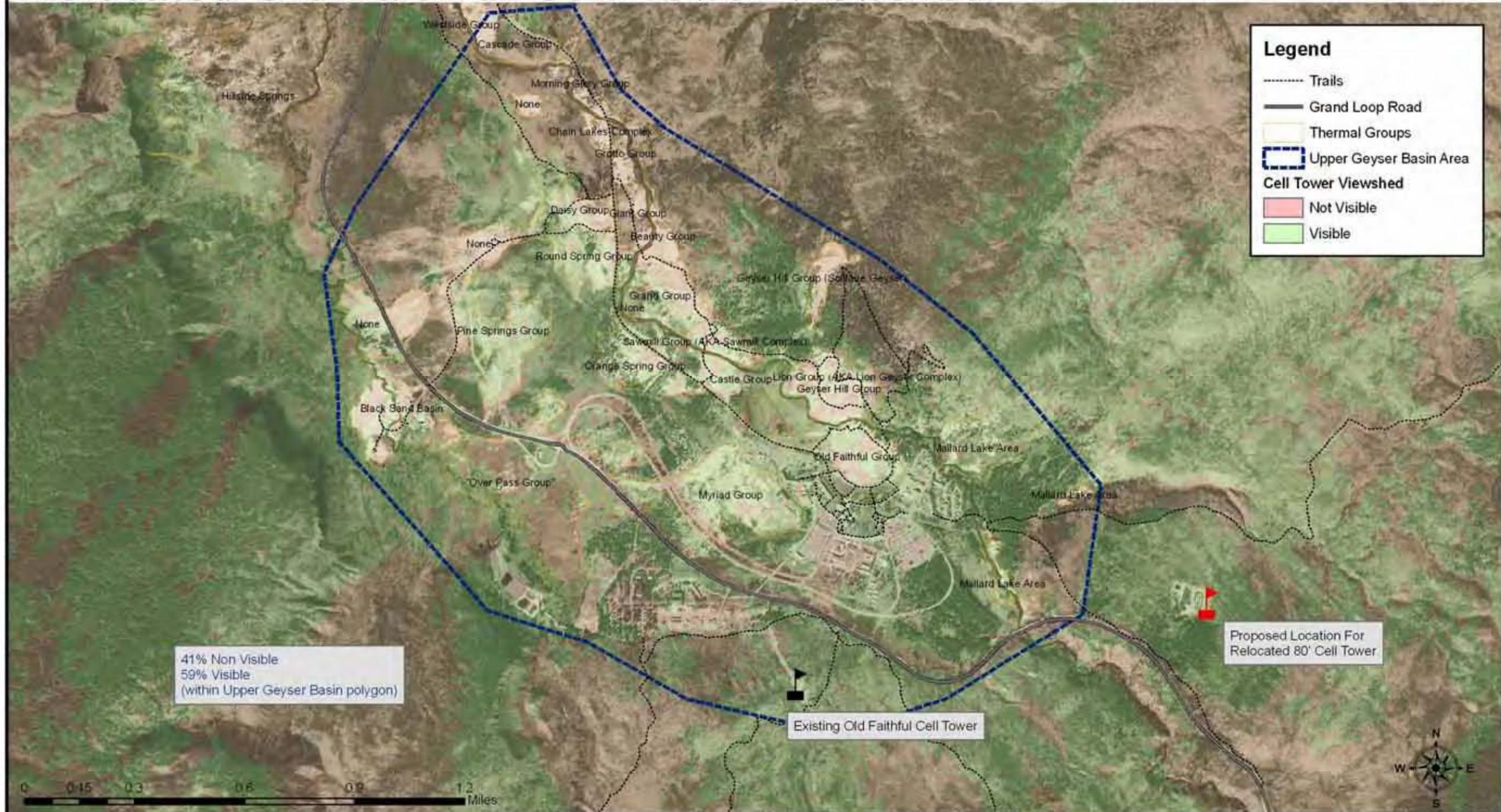
22% Non Visible  
78% Visible  
(within Upper Geyser Basin polygon)

Proposed Location For Relocated 80' Cell Tower

Existing Old Faithful 80' Cell Tower



# Relocated Old Faithful Cell Tower Viewshed



41% Non Visible  
59% Visible  
(within Upper Geyser Basin polygon)

Proposed Location For  
Relocated 80' Cell Tower

Existing Old Faithful Cell Tower

## IMPACTS OF ALTERNATIVE D: SUBSTANTIAL INCREASE IN WIRELESS SERVICES

**Analysis.** Implementing Alternative D would involve an increase in wireless communications infrastructure across a wide range of areas in the park. This alternative allows the opportunity to provide cellular service for all developed areas, along the entire Grand Loop Road, along all five entrance roads and at all campgrounds over 100 spaces. Given the existing topography park-wide and the requirement for proponents to follow the guidelines proposed in this document, the system could not provide coverage using only a few installations on the highest points. It is reasonable to assume that a large network of antenna sites with associated equipment would be proposed around the park over time. The existing cell tower at Old Faithful would be camouflaged to reduce its visibility when feasible. The removal of obsolete equipment from the top of Bunsen Peak and the relocation of cellular equipment to Elk Plaza will make a slight improvement to the area viewshed. Similarly, the relocation of antennas from the fire lookout on Mt. Washburn to a nearby stand alone tower will slightly improve the viewshed. These actions would result in long-term, moderate, adverse impacts to visual quality.

Under the Alternative D, new research monitoring sites would be installed in the park. These structures will be located so that they are unlikely to be seen by hikers on maintained trails. The installation of this equipment would result in a long-term, minor adverse impact on visual quality.

The combined impacts from Alternative D would be long-term, moderate, and adverse.

**Cumulative Effects.** Past, present, and reasonably foreseeable actions occurring within and near the park would be similar to the no action alternative. The cumulative effects of this alternative with other actions would result in long-term, moderate adverse cumulative impacts to the park's visual quality and viewsheds.

**Conclusion.** Under this alternative, there would be long-term moderate adverse impacts to visual quality and viewsheds. Cumulative impacts under the Alternative D would be long-term, moderate, and adverse. Because there would be no major, adverse impacts to visual quality and viewsheds whose conservation is necessary to fulfill purposes identified in Yellowstone's establishing legislation; key to the natural and cultural integrity of the park; and identified as a goal in other park or NPS planning documents; there would be no impairment to this resource. Implementation of this alternative would not result in any unacceptable impacts and is consistent with §1.4.7.1 of *NPS Management Policies* (2006).