National Park Service
U.S. Department of the Interior
Grand Teton National Park
Moose, Wyoming

Meadow Road Paving Improvements
Environmental Assessment

June 2020

Estimated Lead Agency Total Costs Associated with Developing and Producing This EA – $80,000

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CHAPTER 1: PROPOSAL AND NEED FOR ACTION

The National Park Service (NPS) is considering requests received from property owners of the Meadows subdivision (neighborhood) to pave an access route known as Meadow Road located within the administrative boundary of Grand Teton National Park. The unpaved road, approximately one mile in length, is located about 1.5 miles north of the Jackson Hole Airport Road. Meadow Road provides year-round access from U.S. Highway 26/89/191 west to residences within the subdivision, which sits between the park boundary and the east bank of the Snake River (figure 1).

Meadow Road, which was constructed before the establishment of the park, is the sole access route to and from the residential subdivision. Through the 1950 Act that established Grand Teton National Park, the NPS provides regulated access for the movement of persons and property to or from private lands located within and outside of the park's administrative boundaries (16 USC 406d–2). The NPS has determined the singular purpose of the access route known as Meadow Road is to provide property owners and residents access to the subdivision. The access route does not provide an official visitor or administrative park use or service.

This environmental assessment (EA) is intended to provide decision-makers and the public an informed analysis of the potential environmental impacts from paving the access route. The NPS is not authorizing the paving of Meadow Road at the present time. The NPS will decide whether to authorize the paving at such time as the property owners of the Meadows subdivision choose to proceed with the paving of the road either unanimously as individuals or as a single, formal entity authorized under Wyoming law to make binding decisions on behalf of all property owners in the subdivision. If an NPS decision results in authorization to pave the access route, the NPS would be actively involved in engineering design reviews, issuance of authorization(s), and other related actions requiring federal oversight to ensure impacts to the park resources described in this EA are avoided or minimized.

The need for the paving of Meadow Road is based solely on correspondence the NPS has received from property owners of the Meadows subdivision beginning in 2015 and continuing through the EA public scoping period from June 26 to July 25, 2019. Rationale for the need is provided below:

- **Improve emergency access:** Several residents of the Meadows subdivision commented during the 2019 public scoping period that paving Meadow Road would substantially decrease the amount of time needed for emergency vehicles to access residences.

- **Accommodate increased traffic levels:** In 2015, traffic levels on Meadow Road averaged about 300 trips per day. Traffic rates are generally quite a bit higher in the summer months, as many of the residents primarily occupy the subdivision during these months. Based on 2015 traffic levels, Meadow Road could be categorized as a Major Local Road in accordance with the Teton County Land Development Regulations. Based on Teton County Geographic Information System imagery there appeared to be 37 residences (or built parcels) within the subdivision. However, there are enough vacant

parcels in the subdivision that at some point traffic volumes could potentially exceed 500 trips per day, which is the threshold for a Minor Collector road under Teton County regulations. From 2001 to 2013, only three private property parcels in the subdivision were developed for residential purposes, which translates to a growth rate of 0.7 percent. Extrapolating this growth rate forward and assuming traffic growth follows residential trends, the traffic volumes would remain below 500 trips per day for the foreseeable future (Valley West Engineering 2015).

Meadow Road is continuing to see increased traffic as more people develop homes and choose to live year-round in the subdivision. Local traffic, construction and maintenance workers, and delivery drivers put a noticeable amount of stress on the unpaved road.

- **Decrease road maintenance costs:** Significant funds are expended every year by the residents for the maintenance of the roadway. This maintenance program has been applied on an annual basis, typically in late May or early June when the existing road surface has dried. The road can become quite rough in the late fall and in the spring after snowmelt has occurred. Potholes become prevalent throughout the travel lanes, especially in areas with poor drainage. Paving the road would achieve a better level of service and avoid significant annual maintenance costs (Valley West Engineering 2015).

IMPACT TOPIC RETAINED FOR FURTHER ANALYSIS

The following topic is carried forward for further analysis in this EA and is discussed in further detail below:

- Greater Sage-grouse

IMPACT TOPICS DISMISSED FROM FURTHER ANALYSIS

The following topics are dismissed from further analysis in this EA for the reasons provided.

Shrubland Vegetation Community

The proposed project area is located entirely within a mixed-shrubland vegetative community of sagebrush-antelope bitterbrush (*Artemisia* spp. – *Purshia tridentata* mixed shrubland) and sparse cottonwood below the bench (NPS-USGS 2005). The shrubland community is widespread throughout this part of Wyoming and forms large, homogenous stands throughout the valley of Jackson Hole. Especially conspicuous on the valley bottoms, this vegetation is also found on the foothills and mid-elevation mountain slopes. The plant components of this community include big sagebrush (*Artemisia tridentata* var. *vaseyan*a), low sagebrush (*Artemisia arbuscula*), bitterbrush (*Purshia tridentata*), and rabbitbrush (*Ericameria nauseosus*) with a diverse, mixed understory of forbs (asters, buckwheats; Asteraceae, Polygonaceae) and short- to medium-height cool season grasses that are adapted to the short growing season and precipitation patterns of the area.

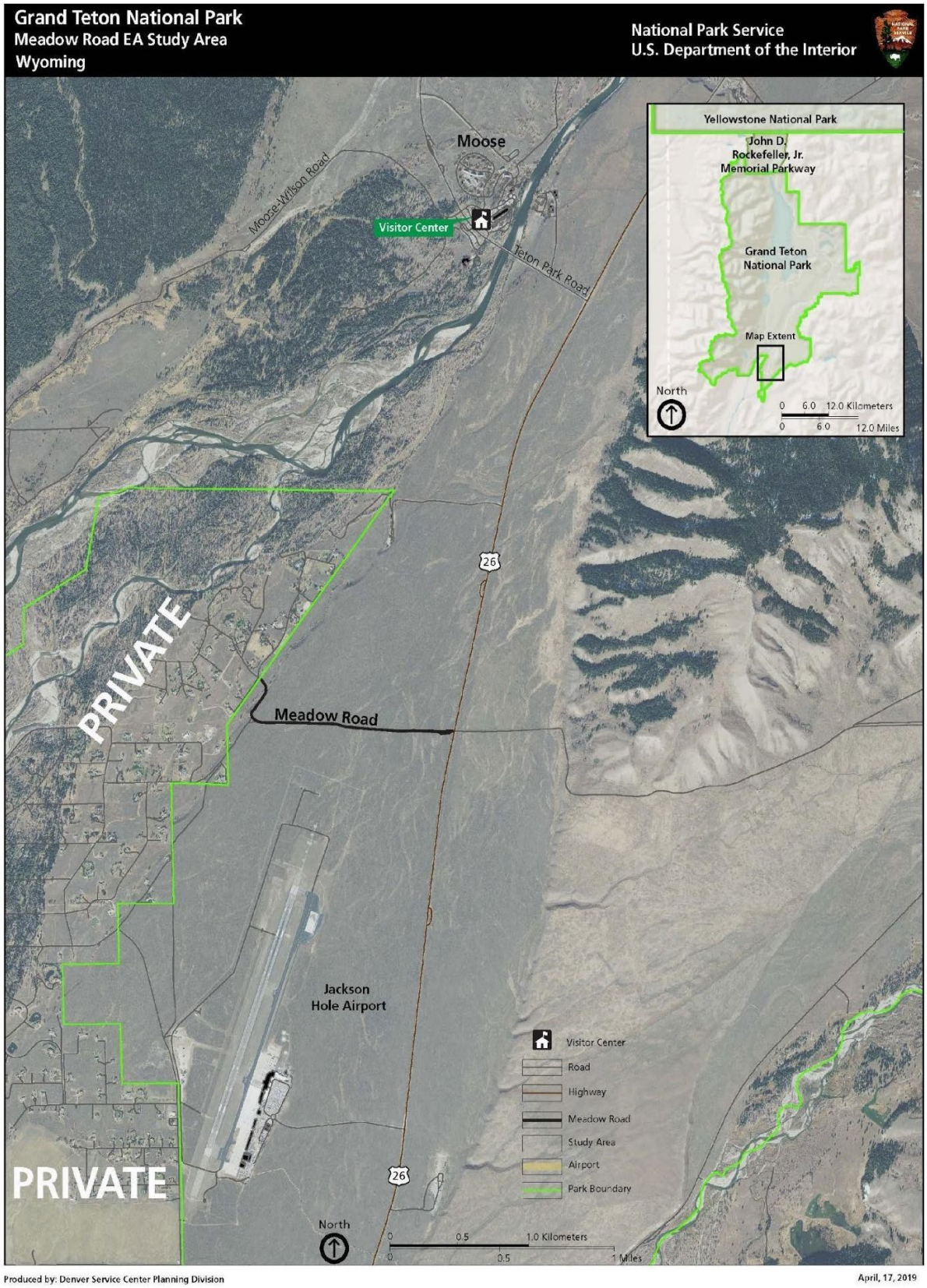

FIGURE 1. MAP OF PROJECT LOCATION

A variety of road maintenance actions have altered, and would continue to alter, the vegetation along the road corridor. Road maintenance activity would continue within the road prism as well as within the approximately 8-foot margin on either side of the road. Road maintenance would continue to move excess mud, gravel (under the no-action alternative), and snow (spoils) away from the road corridor and onto the road margins. Vegetation, primarily individual plants immediately adjacent to the road corridor, would continue to be disturbed by piled snow (and gravel under the no-action alternative), maintenance vehicles and soil chemistry changes resulting from exposure/absorption to substances applied for dust suppression (no-action alternative) and de-icing. All of these actions influence plant species presence and abundance, depending on their tolerance for these substances. Combined, these practices would continue to affect species composition by maintaining opportunities for native and nonnative pioneer plant species (the first species that grow after a disturbance) within the road shoulders and inhibiting maturation of the native woody sagebrush-antelope bitterbrush plant community naturally found here.

Under the proposed action, there would be temporary impacts to vegetation within the existing road shoulders during construction. Vegetation immediately adjacent to the road corridor (within the previously disturbed shoulders) would be removed in the process of tying roadside slopes into the existing grade and the cleaning and regrading of ditches where needed. These roadside areas would be re-seeded with a park-approved native seed mix.

Following construction, there would not be an appreciable alteration of present vegetative community types or a noticeable change in the current distribution and abundance of native and nonnative plant species in the area, and given the extent of sagebrush shrubland habitat that currently exists in the area surrounding the road, this topic was dismissed from further analysis.

Federally Listed Threatened and Endangered Species

An official federal species list was obtained through the U.S. Fish and Wildlife Service's (USFWS) Information for Planning and Consultation (IPaC) website and provides a record of USFWS managed resources listed under the Endangered Species Act (USFWS accessed 23 August 2019; consultation code 06E13000-2019-SLI-0068). The record identified five threatened, endangered, or candidate species with the potential to occur in the proposed project area, and they are outlined in table 1. Additional NPS internal consultation took place with a park wildlife biologist on several occasions, and reviews were undertaken of the park's natural history observations, the Cornell Laboratory of Ornithology Birds of North America database (Rodewald [ed.] 2015), and the Wyoming Game and Fish Department's State Wildlife Action Plan (State of Wyoming 2017; SWAP).

Table 1. Federally Listed Threatened, Endangered, or Candidate Wildlife Resources Occurring or Potentially Occurring in Grand Teton National Park

Common Name *Scientific Name*	Federal Status	Habitat Affinity	Rationale for Exclusion (Limiting Factors)
Vascular Plants: Whitebark pine *Pinus albicaulis*	Candidate	High elevation forests (8,200 feet).	Proposed project area is lower in elevation (6,400 feet), mixed shrubland community. Forest type does not exist in project area.
Birds: Yellow-billed cuckoo *Coccyzus americanus*	Threatened	Dense riparian forest vegetation.	Proposed project area is predominantly upland mixed shrubland community. Preferred dense vegetation riparian conditions and forest do not exist in project area. May use proposed project area as a travel corridor.
Mammals: Canada lynx *Lynx canadensis*	Threatened	Mixed conifer forest (spruce-fir; lodgepole) with diverse understory structure (downed trees, bouldered slopes, persistent spring snow).	Species avoids open habitat. Preferred forested vegetation structure for denning or foraging not found in project area. May use proposed project area as a corridor between patches of favorable habitat.
Mammals: Grizzly bear *Ursus arctos horribilis*	Threatened	Mixed coniferous forest and rangeland habitats. Grass-shrub openings in forested canopy or grass-shrubland margins of forested areas preferred for foraging, denning, cover.	Optimal habitat for denning, cover, and foraging not found in proposed project area. May use proposed project area as a travel corridor.
Mammals: North American wolverine *Gulo luscus*	Proposed threatened	Various forests types of lodgepole pine, spruce, Douglas fir, or expansive wet meadow and alpine habitat with rock escarpments and talus.	Optimal habitat not found in proposed project area. Require expansive habitat for home ranges; are negatively correlated with roads and other forms of habitat fragmentation. Although unlikely, may use proposed project area as a travel corridor.

Given that the proposed project area is outside of the known elevational and climatic range for whitebark pine, the NPS has determined that the proposed project would have "*no effect*" on whitebark pine.

As noted in table 1, though unlikely, yellow-billed cuckoo, Canada lynx, grizzly bear, and North American wolverine could potentially travel through the proposed project area. However, the project area does not contain suitable habitat or sufficient expanses of preferred habitat for nesting, denning, and cover (yellow-billed cuckoo, Canada lynx, wolverine, grizzly bear), and therefore if passing through, they are unlikely to linger given the area's lack of topographical diversity and/or preferred habitat. During construction, the use of heavy machinery could result in temporary indirect effects on these species as a result of temporary displacement from intermittent increased noise and the presence of construction workers. Any such disruption would be temporary (about one week during construction) in duration, and upon completion of all proposed activities, noise levels would return to current conditions. Construction activities would only occur during daylight hours, and therefore there would be no disturbance to wildlife traveling through the region at night. Any potential disturbance would not be measurable and would be discountable (extremely unlikely to occur). Therefore, the NPS has determined that the proposed project "*may affect, but is not likely to adversely affect*" yellow-billed cuckoo, Canada lynx, grizzly bear, and North American wolverine.

The park engaged in consultation with the U.S. Fish and Wildlife Service on August 28, 2019. The park will continue consultation with the U.S. Fish and Wildlife Service to obtain concurrence with the park's determination. If additional species with the potential to occur within the proposed project area are listed as endangered or threatened, the NPS will reinitiate consultation with the U.S. Fish and Wildlife Service on potential effects to any newly listed species.

Migratory Birds

Migratory birds include raptors, songbirds, and shorebirds that breed in North America and migrate to Mexico, Central America, or South America for the winter. Peak migration periods generally occur in May and then again from September through early October. Nesting and brood rearing typically occur from late May through July.

The proposed project area was reviewed for suitable habitat for migratory birds (USFWS 2019a; accessed 18 March 2019). As noted previously, the proposed project area is located within a sagebrush dominated community, which is widespread throughout the park. Most of the birds that are associated with sagebrush dominated communities are protected by the Migratory Bird Treaty Act.

Table 2 lists those migratory bird species that the U.S. Fish and Wildlife Service identified as potentially occurring within the proposed project area (USFWS accessed 23 August 2019; consultation code 06E13000-2019-SLI-0068). Preferred habitat and limiting factors are derived from summarized peer-reviewed information available through species accounts on the Cornell Laboratory's Birds of North America (Rodewald [ed.] 2015) and the U.S. Forest Service's Fire Effects Information System (USFS 2019), with respect to the specific geographical location of the proposed project area.

Given the absence of nesting habitat, preferred foraging habitat, or absence of breeding records within the proposed project area for any of the migratory bird species listed here, the topic of migratory birds is dismissed from further analysis.

Table 2. Migratory Bird Species Known to or Potentially Occur in the Proposed Project Area

Common Name *Scientific Name*	Preferred Habitat	Limiting Factors
Bald eagle *Haliaeetus leucocephalus*	Hunt, roost, nest near bodies of water.	Absence of nesting habitat and density of large trees within the proposed project area. Preferred sites tend to be traditional roost sites, often clumps of mature deciduous trees in riparian areas protected from human disturbance and proximate to foraging opportunities. May fly through project area; unlikely to linger.
Cassin's finch *Carpodacus cassinii*	Generally open, mature coniferous forests of interior western mountains. May breed in open sagebrush with scattered junipers.	Prefer open forested sites or open shrub landscapes with vertical features (i.e., junipers). The project area does not contain open forested sites, and the sagebrush shrub habitat within the project area lacks vertical features (i.e., junipers) and therefore does not provide breeding or nesting habitat.
Clark's grebe *Aechmophorus clarkii*	Large lakes and suitable wetlands.	Absence of preferred habitat in proposed project area. Preferred habitat does not exist in the proposed project area.
Golden eagle *Aquila chrysaetos*	In Wyoming, primarily nest and forage in grassland, shrubland or riparian habitats with vertical features. Avoids urban and agricultural areas.	Absence of nesting habitat in proposed project area. Prefer open habitats with vertical features (trees, cliffs, cuestas) for roosting, perching, and/or nesting. The sagebrush shrubland within the project area does not contain vertical features.
Long-billed curlew *Numenius americanus*	Short- or mixed-grass prairie habitat.	Absence of preferred habitat in proposed project area. Avoids habitat with trees, high shrub density, or dense grassy vegetation.
Olive-sided flycatcher *Contopus cooperi*	Coniferous forest with snags near natural openings (meadows, rivers, canyons) or human-made openings (forest harvest units).	Absence of preferred habitat in proposed project area. Preferred habitat does not exist in the proposed project area.
Rufous hummingbird *Selasphorus rufus*	Montane meadows and disturbed areas with suitable wildflower communities to support nectar foraging.	Migratory in Wyoming; not known to breed in the park. Prefers habitats with high probability for nectar foraging, which the proposed project area does not have.

Other Wildlife Species and Habitats

The park provides habitat for a wide variety of fish and wildlife, including at least 260 bird species, 60 mammal species, 12 native fish species, six species of amphibians, four species of reptiles, and an unknown number of invertebrate species. The State of Wyoming has a list of Species of Greatest Conservation Need with a native species status of 1 or 2 (highest need for conservation) that may be present within the park, including: common loon (*Gavia immer*), trumpeter swan (*Cygnus buccinator*), bald eagle (*Haliaeetus leucocephalus*), long-billed curlew (*Numenius americanus*), peregrine falcon (*Falco peregrinus*), Brewer's sparrow (*Spizella breweri*), golden eagle (*Aquila chrysaetos*), greater sage-grouse (*Centrocercus urophasianus*), Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*), short-eared owl (*Asio flammeus*), great gray owl (*Strix nebulosi*), American pika (*Ochotona princeps*), bighorn sheep (*Ovis canadensis*), moose (*Alces alces*), northern river otter (*Lontra canadensis*), western toad (*Anaxyrus boreas*), and Columbia spotted frog (*Rana luteiventris*). These wildlife species populations are either (a) not expected to occur within the project areas because of the lack of preferred habitat, or (b) not expected to be affected by project actions because activities would follow the conservation (mitigation) measures provided in chapter 2. By following the conservation measures, disturbances from activities may temporarily (during field activities) affect individuals, but these temporary disturbances would not have a noticeable effect on wildlife populations.

Road paving and maintenance activities could result in indirect effects on other wildlife species as a result of temporary displacement from intermittent increased noise and the presence of construction activities. Any such disruption from field activities would be temporary in duration (during activities) and upon completion of all proposed activities, noise levels would return to current conditions. Road paving and maintenance activities would only occur during daylight hours, and therefore there would be no disturbance to wildlife traveling through the targeted management area at night.

By following the conservation measures, disturbances from project activities may temporarily (about one week during construction activities) affect individuals, but these temporary disturbances would not have a noticeable effect on wildlife populations.

Public Safety

Beyond the occasional reporting of actions needed to address deteriorating road conditions, the NPS has not received any notification of personal injury or property damage incidents from the normal and routine use of Meadow Road in its unpaved condition. Paving or applying other hardening materials to a road results in a smoother driving surface, which can increase ride comfort and the potential for faster driving speeds (Bagdade et al. 2012). However, stopping distance is inversely related to the force of friction between the road surface and a vehicle's tires. Under similar weather conditions, a longer stopping distance is typically required on a gravel road surface than on an asphalt surface (Dissanayake and Liu 2009). The current 25-mile-per-hour (mph) posted speed limit would remain under both alternatives and the existing road alignment, which includes existing lines of site limitations through the sagebrush flat and a descent down the bench with abrupt turns as the road approaches the subdivision, would remain unchanged. These road features would likely discourage the potential for excessive

driving speeds along Meadow Road if the road is paved. Short-term (about two weeks in duration) paving improvement activities, as described under alternative 2, would be planned, scheduled, and implemented to avoid potential adverse impacts on public safety.

Because of the absence of reporting safety-related incidents from using the current unpaved road surface (alternative 1), maintaining the existing posted speed limit and using the existing road alignment features to aid in controlling excessive speeds (alternative 1), and ensuring short-term construction-related impacts on public safety would be avoided (alternative 2), public safety is dismissed from further analysis.

Private Property Access

The occasional maintenance of Meadow Road in its unpaved condition (alternative 1) usually requires road or single lane closures. These closures have the potential to adversely affect private property access to the subdivision. To minimize these effects, closures are announced in advance. Under alternative 2, potential adverse impacts on private property owners accessing their properties would be minimized by planning, scheduling, communicating, and implementing road paving activities, which avoid road closures in both lanes simultaneously and limit the duration of a single lane closure period to 15 minutes or less. Because of advanced planning and communicating Meadow Road maintenance and improvement actions, private property access is dismissed from further analysis.

Visitor Use and Experience

Few park visitors use Meadow Road, which is likely because no visitor destinations exist or are promoted at the end of this road and the signage near the highway junction indicating that the road is private. Those that do travel the road beyond the parking area typically turn around at a suitable location once it is recognized they have entered or will soon enter private property. Park visitors who travel along the highway occasionally use the parking area as an informal scenic turnout. These visitors tend to stay within or close by their vehicles and do not usually travel on foot away from the parking area. From late October through early December, the park implements an Elk Reduction Program in years when it's determined to be necessary, which allows individuals with a valid Wyoming elk hunting license and a park permit to harvest elk (NPS 2017a). During this time, the informal parking area at the turnoff for Meadow Road is occasionally used for short rest periods and/or to interact with others. Besides home and property access, some of the subdivision residents use the road to recreate, including walking and bicycle riding. In addition, commercial vehicles travel the road to make deliveries and provide services to the neighborhood. Because of this informal and limited visitor use, this topic is dismissed from further analysis.

Archeological Resources

In 2007, NPS archeologists conducted an intensive inventory of the Meadow Road corridor, which consisted of a systematic and detailed field inspection that encompassed the area of potential effect for this proposed project. This type of inventory is also known as a Class III cultural resource inventory. Approximately 100 acres were surveyed at that time, with the survey extending to about 30 feet on either side of the road centerline. Four pre-contact archeological

sites were identified consisting primarily of small lithic scatters of tested quartzite cobbles, quartzite flakes and several pieces of fire-cracked rock. The lithic material extended on both sides of the road corridor. An isolated artifact consisting of an obsidian projectile point base (Early Plains Archaic) was also identified. None of the identified sites or artifacts were considered eligible for the National Register of Historic Places. These previously identified sites would be avoided by restricting construction and road maintenance to the existing previously disturbed road prism. The NPS has sent consultation letters to associated tribes (see Ethnographic Resources below for details) and the Wyoming State Historic Preservation Office. The state historic preservation office concurred with the NPS determination of "no historic properties affected" in a July 2, 2019, response letter.

Ethnographic Resources

The NPS defines ethnographic resources as any "site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it" (NPS 1998).

Although previously identified archeological sites are not National Register-eligible, the NPS recognizes that they may hold cultural importance to the park's 24 associated tribes. In June 2019, the NPS sent letters to the 24 associated tribes regarding the proposed action. From the initial letters, the NPS received a "no adverse effect" on traditional cultural properties determination from the Northern Cheyenne Tribe. On October 30, the NPS provided a subsequent request for input via email to the associated tribes. From this request, the Northern Arapaho Tribe responded with a "no adverse effect" determination on traditional cultural properties and included a request to be notified if any properties, features, or remains are discovered. The Shoshone – Bannock Tribes responded with an interest in coordinating on the proposed action. The Confederated Tribes of the Umatilla Indian Reservation requested additional information regarding the archeological surveys and site protection measures. As of the release of this EA, the NPS is awaiting responses from other interested tribes.

Previously identified archeological sites would be avoided and the project would not affect the ability of tribal members to access these resources for cultural or traditional purposes.

Historic Structures / Cultural Landscapes

Based on evidence provided by historic topographic maps (USGS 1945 and 1951), Meadow Road appears to have derived from an early ranch road that provided access to the Gray Ranch (later known as the 3 Bar H Ranch) before the expansion of Grand Teton National Park in 1950.The ranch complex, which was located outside of and west of the park boundary, no longer exists. Since this period, the alignment of Meadow Road has not been altered apart from surface treatments that began by the 1980s. The Gray Ranch land has since been developed into a private residential subdivision, changing the function and associated cultural landscape of the road.

While Meadow Road itself has not been evaluated for National Register of Historic Places eligibility, all isolated historic and archeological features associated with the road documented in previous cultural resource inventories have been deemed not eligible for listing in the National Register of Historic Places by the Wyoming State Historic Preservation Office. Additionally, the Grand Teton National Park Historic Transportation Survey (Mehls 1995) details the criteria required for Grand Teton National Park road eligibility in the National Register of Historic Places. Roads that are listed in the National Register of Historic Places are significant under Criteria A and C for their relationship to transportation for recreational purposes or for exhibiting engineering features exemplary of mid-20th century construction techniques. This document further explains that roads whose function has changed, roads that do not have significant engineered features, and roads that are not of exceptional significance or primary routes are ineligible for the National Register of Historic Places.

While Meadow Road is more than 50 years old and has remained relatively unaltered in its current alignment, it has not been considered a primary route within the park, and its function has changed substantially over time. The current graded and maintained road does not reflect the early period of historic use as a ranch road. In addition, the road is not within the viewshed of any other nearby historic structures or cultural landscapes. Because the road is not identified as a historic structure or cultural landscape feature, the topic of structures and cultural landscapes is dismissed for the purposes of analysis in this EA.

Viewsheds

Park visitors would potentially observe ongoing road maintenance (alternative 1) and paving activities (alternative 2) from three primary vantage points along the highway: Albright View Overlook about 0.6 miles north of Meadow Road, Sleeping Indian Overlook about 0.75 miles south of Meadow Road, and the informal turnout/parking area near the highway on the east end of Meadow Road. These viewshed impacts observed by park visitors would occur along most of the road's length from the highway to the end of the bench before the road curves and drops down into the Meadow Road subdivision. Residents and other individuals of the subdivision would observe the same road maintenance or paving activities as park visitors beginning where the road curves and drops down the bench and ending at the park boundary near the four-way intersection at the entrance to the subdivision.

Ongoing road maintenance activities would have short-term (about one to three days in duration) and recurring (about three times per year) adverse effects on the Meadow Road viewshed. Airborne particles resulting from vehicular use of the road in its unpaved condition would occasionally (when conditions are dry) be visible from all three of these primary vantage points. The proposed paving activities, including the use of heavy equipment would have one discrete short-term (about one week in duration) adverse effect on the Meadow Road viewshed. Changes to the viewshed resulting from paving Meadow Road would not be discernible from the Albright View and Sleeping Indian overlooks because the road surface would not be visible from these areas. Changes to the viewshed resulting from paving the road would potentially have long-term (one or more years) and diminishing (perceptions and knowledge of the road being previously unpaved) effects on individuals at the Meadow Road turnout/parking area and

on residents and others of the subdivision where the segment of road below the bench to the park boundary is visible. Since these adverse effects on the viewshed under both alternatives are not substantial, this topic is dismissed from further analysis.

Water Resources

Meadow Road is predominantly located on a geological bench feature containing a dry upland sagebrush shrubland vegetation community that rises above the subdivision and the Snake River (see figure 1). Although the Snake River lies to the west of the subdivision, the singular surface water feature within the proposed project area is a seasonally flowing irrigation ditch (from the Snake River) that crosses under the road through a culvert at the base of the bench before the road exits the park boundary. The proposed project would not impact water quality or quantity to the irrigation ditch, as the construction would be limited to the current road surface and shoulders (road prism). No other natural water resources or natural water features are in or near the proposed project area. There are no proposed actions to the culvert through which the ditch flows, and implementation of best management practices would ensure there were no impacts to water quality.

The area of soil disturbance would be limited to the proposed project area and require the use of temporary fencing to control erosion during construction. The proposed project would replace about 2.67 acres of the existing permeable gravel base with an impervious paved surface; however, best management practices and design features implemented during past road maintenance activities (existing ditches and culverts) and continued in alternative 2, would reduce water runoff from the paved surface into the irrigation ditch, such that there would be no measurable impacts on water quality.

CHAPTER 2: ALTERNATIVES

Two alternatives, a no action and an action, are carried forward for evaluation in this EA.

ALTERNATIVE 1 – NO ACTION

Under the no-action alternative, the current road surface, configuration, and maintenance cycle would continue into the foreseeable future. The unpaved road would remain at a width of about 20 feet (figure 2), including two 10-foot travel lanes with approximately 4 inches of crushed gravel surfacing on the roadway. Informal road shoulders would remain on both sides of the road, measuring approximately 8 feet on each side. These informal shoulders have been heavily disturbed by road maintenance activities over the years. Existing drainage features, including roadside ditches, a stormwater outlet, and graded areas for stormwater release would remain in place in their current condition. The road would continue to receive visitation by park visitors accessing park lands. Periodic road maintenance such as grading, maintaining existing roadside ditches and drainage features, and adding crushed gravel to the road surface would continue.

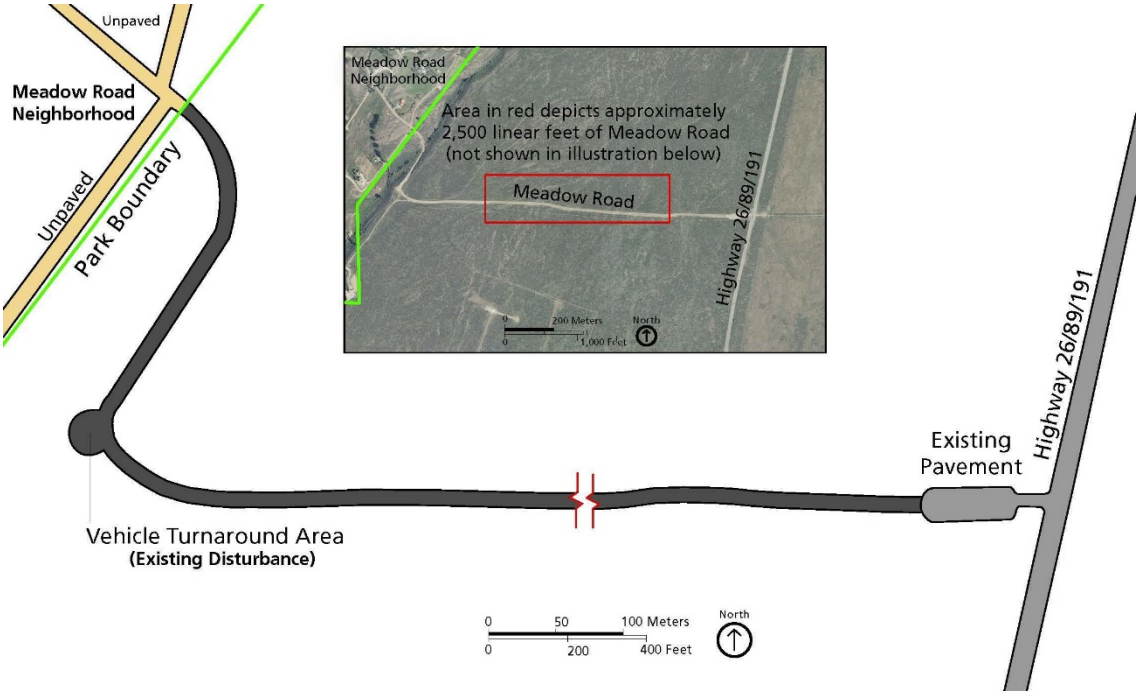

FIGURE 2. ALTERNATIVE 1: NO ACTION

ALTERNATIVE 2 - PAVED ROAD FROM END OF EXISTING PARKING AREA TO PARK BOUNDARY (PROPOSED ACTION AND NPS PREFERRED ALTERNATIVE)

Prior to construction, the proposed project area would be surveyed for rare and/or sensitive and nonnative plants to understand and prepare for the impacts of ground disturbing activities. Additionally, the park would be provided with an estimation of projected disturbed areas in

order to formulate the required revegetation and nonnative plant management materials, scheduling, and resources to appropriately restore disturbed areas.

During construction activities, the existing road surface would be paved to a width of 20 feet (two 10-foot travel lanes), with up to 8 feet of unpaved shoulder on each side of the roadway where needed (figure 3). Prior to paving, the road profile would be raised slightly in three to four sagging areas with crushed gravel. Existing ditches and ditch lead outs that divert runoff away from the road would be cleaned out, regraded where necessary, and reutilized. Pavement would consist of 2 to 2.5 inches of asphalt over 6 inches of crushed base. The approximately 4 inches of existing road base would remain in place and be supplemented with approximately 2 inches of new crushed base (from a commercial source outside the park) that would be blended into the existing gravel base, bladed to establish a consistent thickness and crown, and then recompacted prior to paving. Because of the additional surface material, there would be an increase in road elevation, and some grading would occur both along roadside slopes that would be tied into the existing grade and within the existing roadside drainage ditches. The previously disturbed areas alongside the existing roadway would be cleaned and regraded to provide room for an adequate shoulder and to improve drainage. All of this work would remain within the previously disturbed shoulders. The reutilized ditch lead outs, and regraded areas would be revegetated using an appropriate and park-approved native seed mix and would be complemented by park approved nonnative, invasive plant management, controls, and treatments, as necessary. Proposed actions such as pavement overlay and road drainage features, would be designed and constructed to avoid impacts on the irrigation ditch culvert crossing and irrigation surface water. If design changes are needed, supplemental analysis may be required.

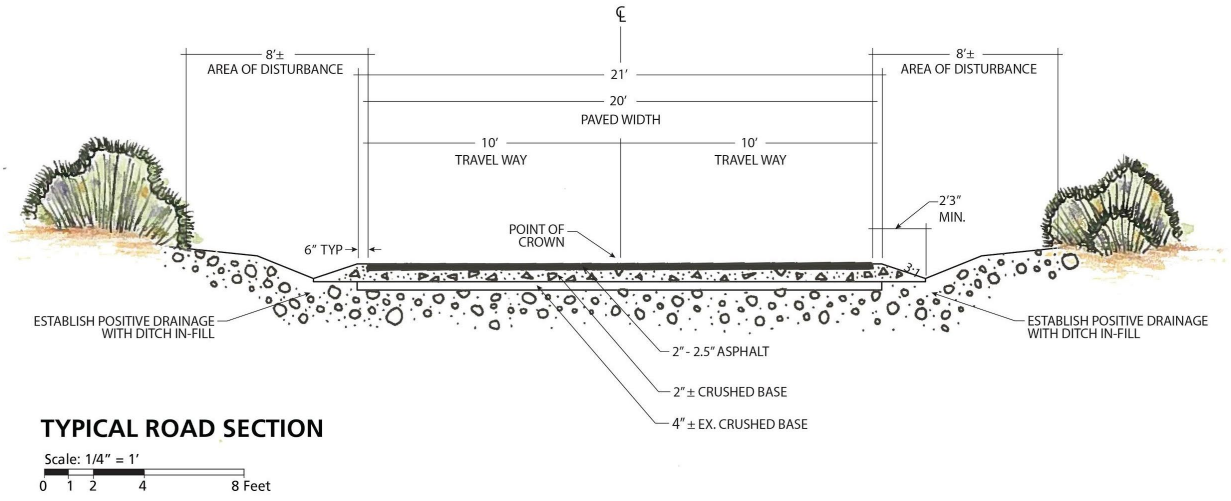

Figure 3. Typical Cross Section of Road

If a staging area is necessary, it would be located at the eastern portion of the proposed project area within the existing paved parking lot at the junction of Meadow Road and U.S. Highway 26/89/191. It is anticipated that construction would be completed in the mid- to late-summer months (July 1 – September 30). Heavy equipment would likely be used during construction,

including, for example, a dump truck, loader, grader, and road roller needed to haul and distribute gravel, compact the surface, and apply pavement.

Periodic road maintenance, which consists of maintaining existing roadside ditches and drainage features, would continue. The paved informal parking area would remain as-is.

ALTERNATIVES CONSIDERED AND DISMISSED

The NPS considered formalizing and expanding the parking lot at the entrance to Meadow Road from the highway or adding a new turn-around/parking area along the road near the western boundary of the park. These options were considered but dismissed because the area does not provide access to any park visitor amenities, trailheads, or facilities. Suitable viewing and parking areas are available to the north (Albright View Overlook) and south (Sleeping Indian Overlook) of Meadow Road.

MITIGATION MEASURES AND BEST MANAGEMENT PRACTICES

The following mitigation measures and best management practices would minimize the degree and/or extent of adverse impacts and would be implemented during the proposed project and are intended to be carried through during project development and implementation.

Traffic Control

- Develop and enforce a park-approved traffic control plan for use during construction to minimize disruption to residents and visitors and to ensure the safety of the public, park employees, and residents.

- Ensure traffic delays do not exceed 15 minutes (unless approved by park management). Notify residents in advance if longer delays are expected.

Road Construction and Maintenance

- Identify and define construction zones with construction tape, snow fencing, or other material prior to any construction activity. Use the zone to confine activity to the minimum area required for construction. Ensure construction activities, including material staging and storage, do not occur beyond the construction zone fencing.

- Ensure any temporary construction fencing complies with wildlife friendly fencing standards. Consult with the park's natural resource branch for assistance with specifications and appropriate design.

- Provide the park's Public Affairs Officer with project schedules and periodic updates of project work as soon as this information is known to minimize impacts to park operation's access.

- To minimize air and sound pollution associated with construction activities, limit warm up, cool down, and idling of construction equipment to the minimum duration recommended in the equipment owner's manual, taking into consideration ambient temperatures and other factors.
- Require motorized construction vehicles and equipment have properly functioning mufflers.
- Ensure all traffic enforcement and wayfinding signs meet NPS and park design standards.
- Ensure the location of all potential utility lines in work areas are field located and marked prior to work to avoid disturbance conflict.
- Control dust during construction by minimizing soil exposure, truck watering, and using other dust prevention methods.
- Keep all project zones trash free at all times.

Communications

- Inform contractors (construction workers and supervisors) about the special sensitivity of park values, regulations, and appropriate housekeeping.
- Require all construction personnel to attend a briefing on proper food/attractant storage and bear safety presented by a qualified member of the park's bear management team or their designee at least two weeks prior to the desired start date.
- Inform all contractors and subcontractors of the penalties for illegally collecting artifacts or intentionally damaging archeological sites or historic properties.
- Report all wildlife-vehicle collisions to Teton Interagency Dispatch as soon as possible.
- Report any human-bear conflicts to Teton Interagency Dispatch Center immediately. Report any bear sightings to the park’s Bear Management Office within 24 hours.

Erosion Control

- To minimize soil loss/erosion at the project site, implement erosion control best management practices including protection measures such as sediment traps, silt fences, erosion check screens/filters, or jute mesh, if necessary, to prevent the loss of soil.
- For sage-grouse, any topsoil removed from the site should be stored in suitable stockpiles to protect from loss or contamination during activities. Avoid mixing soil horizons during storage and replacement. Topsoils are to be replaced to original conditions.

Archeology

- In the event any unknown archeological resources are inadvertently discovered, notify the park's Cultural Resources Branch staff immediately upon discovery. All work within 600 feet of the discovery would be halted immediately and the site secured from further disturbance. Work within the discovery area would continue only after obtaining consent from Cultural Resources Branch staff. This consent may require adherence to site-specific protection measures that are developed in consultation with the Wyoming State Historic Preservation Office and interested tribes.

Vegetation

- Coordinate all project work with park vegetation specialists regarding invasive nonnative plant (weed) treatments, revegetation requirements, costs, and scheduling. To facilitate revegetation and nonnative invasive plant management, provide park with project documents and an estimate of potential ground disturbance at least four weeks prior to the start of construction. Within one month of completion of the project, provide the park natural resources staff with the as-built dimensions of the disturbed areas.

- Coordinate plant surveys for rare and/or sensitive, invasive, and nonnative species prior to ground-disturbing activities and during growing seasons when these species could be identified. NPS-authorized and appropriate invasive weed control measures will be implemented to monitor and mitigate impacts within the first three years (minimum) of construction. These control measures would include a combination of NPS-authorized manual, cultural, and chemical treatments.

- Ensure all vehicles and equipment on the job site are free of mud, dirt, and plant material using a method such as pressure washing prior to transport. Obtain inspection and verbal approval from the park resource management representative or delegated representative prior to offloading any construction equipment.

- Ensure materials used are clean of weeds and dirt debris before entering the park either by selecting a weed-free product, or if a material source fails an inspection, cooking material such as sand and gravel to 300°F. For larger rock and rip-rap, the rock can be separated from smaller dirt materials and washed prior to entering the park.

- Limit construction within the existing shoulders to the smallest area possible to reduce disturbance to soil and native plants and reduce the potential for the introduction and/or spread of nonnative invasive plants.

- To minimize potential effects to plants, locate staging and stockpiling areas in previously disturbed sites, away from visitor use areas to the extent possible. Return all staging and stockpiling areas to pre-construction conditions following project completion. Limit parking of construction vehicles to these staging areas, existing roads, and previously disturbed areas.

- For revegetation in roadside corridors, use a seed mix composed of native species that has been approved by the park.
- Herbicide applications within existing rights-of-ways and reclamation areas are to be carried out in accordance with regulations and labels. Coordination with weed control districts is encouraged.

Wildlife

- All project activities must comply with Grand Teton National Park's Superintendent's Compendium (NPS 2019).
- Avoid construction activities before 8 a.m. and after 6 p.m. during the elk rutting and migration period (typically from September 1 to December 1 or as recommended by park biologists).
- Construction activities will be limited to between 30 minutes after sunrise and 30 minutes prior to sunset to avoid disturbance to wildlife.
- For living and working in bear country, ensure that all bear attractants are attended at all times. Store unattended attractants securely inside a building, a bear-resistant food storage locker (if available), in a hard-sided vehicle with doors locked and windows closed or in an Interagency Grizzly Bear Committee approved portable bear-resistant food storage canisters; or dispose attractants properly in a bear-resistant garbage receptacle. Do not leave unsecured attractants (i.e., not in a canister) unattended. Bear "attractants" include food, drinks, garbage, cooking utensils, dirty / soiled pots/pans/plates, stoves, grills (charcoal or gas), empty or full coolers, storage containers with food or previously holding food (except approved bear-resistant canisters), beverage containers, pet food/bowls, and any odorous items that may attract a bear such as toiletries.
- Provide for proper storage and disposal of materials that may be toxic to wildlife. All potentially toxic attractants, including petroleum products, must be stored or disposed of in such a way that they are not available to bears.
- Separate construction debris from human food garbage and dispose of it in dumpsters that can be closed at night.
- For sage-grouse nesting activities, limit construction activities to the time frame between July 1 and September 30 to limit disturbance.
- For sage-grouse, vegetation removal should be limited to the minimum disturbance required by the project and limited to between July 1 and March 14 in areas that are within 4 miles of an occupied sage-grouse lek.

Reclamation activities should re-establish native grasses, forbs and shrubs, and should be the standard prescribed in the State of Wyoming Greater Sage-Grouse Core Area Protection Executive Order 2015-4, Attachment E.

- Encourage drivers traveling on Meadow Road to follow the posted 25-mph speed limit to minimize the potential of vehicles colliding with sage-grouse.

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CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the greater sage-grouse environment and analyzes the direct and indirect impacts the alternatives would have on sage-grouse habitat and population within 3 miles of the project area. This chapter also describes and analyzes the cumulative impacts of other federal and nonfederal actions on sage-grouse within the project area.

CUMULATIVE IMPACT ANALYSIS OVERVIEW

Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions" (40 CFR 1508.7). To determine the cumulative impacts, it was necessary to examine past, present, and reasonably foreseeable future actions at Grand Teton National Park. Cumulative impacts are considered for the two alternatives (i.e., no-action alternative and the action alternative). The following actions were identified for the purpose of conducting the cumulative effects analysis.

Present Actions

- Fiber optic line installation: A telecommunications right-of-way permit has been issued for the installation of a new fiber optic line in an existing telephone right-of-way near the west end of the park boundary and adjacent to the road. Installation of the fiber optic line is expected to take place in the fall of 2019.

Future Actions

- Continued residential development outside of the park boundary within the Meadow Subdivision.

- Sage-grouse habitat restoration: The proposed project area also lies within 3 miles of planned greater sage-grouse habitat restoration to be undertaken by Grand Teton National Park (NPS 2017b). This plan is a habitat conservation effort that is largely focused on supporting greater sage-grouse populations and is the collaborative result of Wyoming state and local working groups that initiated conservation planning efforts focusing on guidelines for conserving sage-grouse populations through application of consistent management guidelines and strategies.

GREATER SAGE-GROUSE

Affected Environment

The greater sage-grouse is North America's largest grouse, characterized by a plump, round body, small head, and long tail. This ground-dwelling upland bird inhabits expanses of suitable sagebrush habitat ranging in elevation from 4,000 to more than 9,000 feet (Girard 1937). The greater sage-grouse (*Centrocercus urophasianus*; sage-grouse) is a species that was determined

by the U.S. Fish and Wildlife Service as warranted for protection under the Endangered Species Act in 2010, but the action of protection at that time was precluded by higher priorities (USFWS 2015). In 2015, after further review, the U.S. Fish and Wildlife Service determined that the sage-grouse no longer warranted listing, largely because of implementation of federal and state land use conservation plans across 90 percent of current sage-grouse habitat. In 2015, the governor of Wyoming issued Executive Order 2015-4, which is Wyoming's primary regulatory mechanism designed to protect greater sage-grouse and their habitat (updated in 2017 and 2019; now Wyoming Executive Order 2019-3). The NPS cooperates with the Wyoming Game and Fish Department to implement avoidance, minimization, or compensatory mitigation measures designed to enhance the management and protection of greater sage-grouse and its habitat on federally managed public lands within the state of Wyoming.

Leks (or lek sites) for greater sage-grouse are defined as generally open areas such as meadows, low sagebrush zones, ridgetops, and old lake beds surrounded by dense sagebrush cover that potentially provide the full scope of biological requirements needed for successful brood rearing and survivability across all seasons (including winter), and are not limited to areas where courtship displays specifically take place (WAFWA 2015).

The Upper Snake River Basin Working Group (2014) reports that no reliable method exists for estimating the sage-grouse population in the Jackson Hole area; however, the number of males counted provides reasonable data to suggest that the long-term trend, despite lek persistence here, suggests a declining sage-grouse population, and further suggests that this population could be at risk of local extirpation from typical annual fluctuations in population size or random stochastic events. Within the Jackson Hole area, five relatively high-use areas are interspersed throughout the valley. Meadow Road is located within one of these high-use sage-grouse areas (USRWG 2014). The road is located approximately 0.5 mile away from the Airport lek and approximately 2 miles from the Airport Pit lek; these leks are monitored by park staff on an annual basis (J. Stephenson pers. comm. 2019-08-23). Winter habitat has not been observed in this area.

Breeding activity begins in March. Soon after breeding, females disperse to nesting areas characterized by relatively dense, tall, mature sagebrush stands (Holloran and Anderson 2004; Connelly et al. 2000). Early brood rearing habitat is typically close to nesting sites (Gates 1985); nesting and brood rearing activity in relation to the previously-described leks are known to have been established adjacent to the road (USRWG 2014). Brood rearing occurs from June to mid-July. As the summer progresses, hens and their young will also use relatively open sagebrush stands that have good grass and forb cover for foraging. As sagebrush habitats desiccate over time, sage-grouse usually move to more mesic sites (Connelly et al. 2000; Gates 1985).

Greater sage-grouse populations throughout the West, including Wyoming, have declined by an average of 33% since 1985 (Braun 1998). Evidence from several studies suggest that the effects associated with habitat fragmentation and loss across much of the species' range is the primary cause of the decline (USFWS 2013, summarized), and affects the quality of sage-grouse habitat and their persistence on the landscape (as summarized in Fedy et al. 2014; Wisdom et al. 2011). In addition to the characteristic sagebrush habitat evident within the project area, a number of man-made features contribute to the current footprint of fragmentation within this area,

including Meadow Subdivision and other nearby subdivisions, U.S. Highway 26/89/191, the Jackson Hole Airport, Teton Park Road (paved), and other related facilities, roads, and trails, and associated infrastructure (ditches, fences, transmission lines). A variety of other structures and informal roads and trails are also scattered throughout the area.

To determine greater sage-grouse habitat associations over Wyoming landscapes, Fedy et al. (2014) analyzed roads across sage-grouse habitat from standardized aerial photographs. In this study, the roads were categorized into five classes using U.S. Census Feature Class Codes, and were then correlated with greater sage-grouse presence with relation to their classification. To briefly summarize from this study, roads classed as 1 and 2 are Interstate highways and some U.S. or state highways, respectively. Class 3 roads are state and some county highways (paved). Roads classified as 4 are "sedan clearance" roads that have periodic maintenance and may be paved or unpaved (see next paragraph), and class 5 represents unpaved roads for high clearance vehicle use.

The road classification most closely describing the current state of Meadow Road is class 4, which is "local, neighborhood, and rural road." In a rural area, this is a road that is "[...] used for local traffic, usually has a single lane of traffic in each direction, or is a short-distance road connecting the smallest towns. The road may or may not have a state or county route number. Scenic park roads, unimproved or unpaved roads, and industrial roads are also included in this category" (CFCC description, U.S. Census Bureau). Additionally, with respect to the characteristics of Meadow Road as an unpaved road (surface texture, geometry, width), traffic speeds are likely to be fairly self-regulating for lower speeds (Bagdade et al. 2012). The current posted speed limit on Meadow Road is 25 miles per hour.

Unpaved class 4 and class 5 roads were found to be associated with positive sage-grouse nesting association, and this association is found to be characteristic of Meadow Road. This positive nesting association is less likely correlated with the presence of the road itself and more with the amount of foraging habitat that the presence of a road shoulder provides for nesting and brood rearing birds (Fedy et al. 2014; Wisdom et al. 2011). To clarify, the architecture of the road, combined with the road maintenance and road shoulder activities and the increased water run-off from the road, typically discourages establishment of sagebrush alongside the road, meanwhile providing the grass and forb cover preferred by brood rearing sage-grouse and their young for foraging. However, the presence of preferred forage adjacent to the road unintentionally puts sage-grouse at some risk for vehicle collisions. This is similar to observations for the Jackson airport greater sage-grouse leks described above: vegetation management adjacent to runways typically involves removal of sagebrush through mowing, leaving in its place the grass and forb cover preferred for foraging, and inadvertently puts sage-grouse at risk for collisions with airplanes. At Jackson airport, wildlife hazard management plans have been put into place to reduce the number of sage-grouse-airplane collisions there (JAC WHMPWG 2014).

Though quantifying direct road mortality (vehicle collisions) for smaller wildlife species is confounding because scavenger behavior is believed to negatively impact the ability of researchers to accurately detect wildlife mortality on roads (Dean and Milton 2003; Antworth et al. 2005), park staff maintain counts for sage-grouse mortality on roads, which are likely the

result of vehicle collisions, and have high confidence in the counts. From 1991 to the present, the park confirms 14 total sage-grouse mortality counts on park roads: nine reported for U.S. Highway 26/89/191 (paved, speed limit 55 mph during the day); one on Gros Ventre Junction Road to Kelly, Wyoming (paved, speed limit 45 mph), one on the road to the Jackson Hole airport that exits from U.S. Highway 26/89/19 (paved, speed limit 35 mph), and three on Grand Teton Park Road between the Moose entrance station and South Jenny Lake (paved, speed limit 35 - 45 mph). No mortality to sage-grouse has been documented for Meadow Road from 1991 to the present (J. Stephenson, pers. comm. 2019-10-16).

Impacts of Alternative 1 – No Action

Under alternative 1, there would be no new direct or indirect impacts, and Meadow Road would remain unpaved. Continued road maintenance activities would enable the persistence of a grass and forb plant community within the road shoulders that opportunistically provide forage for sage-grouse hens and broods during the nesting and brood rearing seasons. Mature sagebrush communities beyond the road shoulder would remain undisturbed. The varying surface characteristics of the road could continue to influence lower vehicle speeds and limit the potential for sage-grouse vehicle collisions. Vehicle use of the road would continue to present a slight disturbance (i.e., noise, presence, movement) and collision risk to individual sage-grouse present in the area of the road. Overall, alternative 1 would continue to have little effect on the current distribution of sage-grouse and its habitat within the proposed project area.

Cumulative Effects

There would be no new direct or indirect effects on greater sage-grouse from the No-Action alternative; therefore, there can be no contribution to cumulative effects to this species or its local population.

Impacts of Alternative 2 — Paved Road from End of Existing Parking Area to Park Boundary (Proposed Action and NPS Preferred Alternative)

Under alternative 2, Meadow Road would be transformed into a smooth impervious surface providing a smoother, more predictable driving experience. The paved characteristic of a road, combined with other attributes (open, flat landscape, clear conditions, low vehicle density) may encourage higher speeds (Bagdade et al. 2012). Vehicular traveling noise, speed, and presence on hardened roads can also add effects that include flushing, hyper-vigilance, and area avoidance (Jackson 2000) for the sage-grouse, and contribute to a subtle, yet lowered fitness level as more time is spent deploying defense mechanisms than is spent on foraging and/or caring for their young.

The spatial and telemetry analysis of sage-grouse and sage-grouse habitat described in Fedy et al. (2014) indicate that the level of behavioral avoidance by sage-grouse to roads increases in relation to the level of improvement the roads have undergone (i.e., two-track, dirt or gravel road, paved higher use roads, etc.). The analysis suggests that sage-grouse demonstrate avoidance of paved roads across seasons, even if otherwise suitable habitat is present, and that

the distance of avoidance increases as roads become larger and/or more frequently used. This avoidance results in a contraction of habitat availability, even though the habitat itself has not changed in terms of cover.

Under alternative 2, there would be no new ground disturbance beyond the existing road prism (which includes the road shoulders), and the existing physical footprint of sage-grouse habitat fragmentation (continued presence of Meadow Road) would remain the same as in alternative 1. Impacts from future maintenance would be the same as described under alternative 1. Noise and human activity associated with paving the road may displace individual sage grouse from the area for the one week duration of construction. Additionally, roadside vegetation disturbance activities necessary to tie the raised road elevation into the existing grade and to clean and improve existing drainage ditches, would have temporary (about 2 years) effects on sage-grouse who may forage on this roadside vegetation. This temporary effect may extend to a long-term effect (beyond two years) because of the road being paved, which could lead to sage-grouse avoiding the foraging habitat along the road.

Based on the local sage-grouse mortality data previously described in the Affected Environment section (J. Stephenson, pers. comm. 2019-10-16), it is projected that a sage-grouse mortality rate of one to three individuals over an approximate 30-year period could occur on Meadow Road from vehicle collisions if the road is paved. This projection is based on the number of sage-grouse struck and killed on similar paved roads with vehicle speeds ranging between 25 and 45 mph.

In consultation with Wyoming Executive Order 2019-3, the NPS submitted details on the proposed action to the Wyoming Game and Fish Department (WGFD) to analyze the effects of the proposed project to the area population level (Density/Disturbance Calculation Tool. The Wyoming Game and Fish Department performed the analysis and responded that given the proposed road improvement activity would take place within the existing footprint of disturbance, and no activity would occur between March 15 - June 30, the State considers this to be a *de minimus* activity (i.e., negligible); therefore, the proposed activity would not have effects at the local population level. The Wyoming Game and Fish Department also recommended maintaining and enforcing the current speed limit of 25 mph on Meadow Road to minimize the risk of vehicle collisions for sage-grouse, given the road's proximity to two occupied sage-grouse leks. (WGFD 2019).

Although there is a potential increased risk of individual sage-grouse mortality (about one to three individuals over a 30-year period) from vehicles traveling at or greater than the posted 25 mph speed limit on Meadow Road and there is a potential for sage-grouse to avoid using foraging habitat along the paved road, long-term impacts on individual sage-grouse over an approximate 30-year period is not expected to have a substantial adverse effect on sage-grouse at the local population level.

Cumulative Effects

The installation of an underground fiber optic line would not alter the current footprint of the road corridor, and the current sage-grouse habitat fragmentation would remain the same. This installation would result in temporary and limited removal of roadside vegetation in spot locations or along one side of the road in the case of utility placement, which would impact areas of potential opportunistic foraging for individual sage-grouse in the project area. However, mitigation measures would be implemented to avoid disturbance to any individual nesting and brooding sage-grouse.

Increases in vehicle traffic related to the continued residential development of the Meadows subdivision (an increase of about 200 current average daily traffic (ADT) to about 300 projected ADT), combined with the presence of a paved surface that may encourage higher vehicle speeds above the 25 mph posted speed limit, is not likely to increase the projected sage-grouse mortality rate of one to three individuals over an approximate 30-year period. This conclusion is based on the ADT on Grand Teton Park Road and Jackson Hole Airport Road (see previous analysis regarding sage-grouse vehicle collision mortality on these higher speed roads), which is estimated to be at least four times or greater than the ADT of Meadow Road, which is about 200 to300 vehicles during the summer months.

Implementation of the sage-grouse habitat restoration plan would establish or reestablish brood rearing habitat one mile south of Jackson Hole airport (J. Stephenson pers. comm. 2019-04-08, NPS 2017b; USRWG 2014; JAC WHMPWG 2014). Though it is uncertain whether or when the sage-grouse will occupy the restored habitat, it is expected that the restoration will have a positive effect on the conservation of local sage-grouse populations, as well as conservation of sage-grouse habitat availability and continuity.

As previously described, the direct and indirect impacts of alternative 2 would result in negative effects on greater sage-grouse individuals from avoiding the foraging habitat along the paved road and from a projected loss of one to three individuals over a 30-year period due to potential vehicle collisions. When these effects are combined with other present and reasonably foreseeable future impacts, the total cumulative impact on greater sage-grouse would continue to be adverse. The incremental impacts of alternative 2 would contribute slightly to, but would not substantially change, the impacts that are already occurring.

CHAPTER 4: CONSULTATION AND COORDINATION

LIST OF AGENCIES CONSULTED

1. Wyoming State Historic Preservation Office (National Historic Preservation Act section 106 consultation)
2. U.S. Fish and Wildlife Service (Endangered Species Act section 7 consultation)
3. Wyoming Game and Fish Department (State of Wyoming Sage Grouse Executive Order 2019-3 consultation)

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REFERENCES

Antworth, R.L., D.A.Pike, and E.E. Stevens
2005 Hit and run: effects of scavenging on estimates of roadkilled vertebrates. Southeastern Naturalist 4:647–656.

Bagdade, J. D. Nabors, Hugh McGee, R. Miller, R Retting (Vanasse Hangen Brustlin, Inc. (VHB)
2012 Speed Management: A Manual for Local Rural Road Owners. Report No. FHWA-SA-12-027. Report to Federal Highway Administration, Office of Safety, Washington, D.C.

Braun, C.E.
1998 Sage-grouse declines in western North America: What are the problems? Proc. of Western Assoc. of Fish and Wildlife Agencies 78:139–156.

Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun
2000 "Guidelines to manage sage-grouse populations and their habitats." Wildlife Society Bull. 28(4): 67-985.

Dean, W.R.J., and S. Milton
2003 The importance of roads and road verges for raptors and crows in the Succulent and Nama-Karoo, South Africa. Ostrich 74:181–186

Dissanayake, S. and Litao Liu
2009 Speed Limit-Related Issues on Gravel Roads. A Cooperative Transportation Research Program Between: Kansas Department of Transportation, Kansas State University, and University of Kansas. March. Available on the Internet at: https://pdfs.semanticscholar.org/cf2a/224f8d0f2a3143c74e3641d0d6805e59c86a.pdf

Fedy, B.C., K. E Doherty, C. Aldridge, M. O'Donnell, J.L. Beck, B. Bedrosian, D. Gummer, M. Holloran, G.D. Johnson, N.W. Kaczor, C.P. Kirol, C.A. Mandich, D. Marshal, G. McKee, C. Olson, A.C. Pratt, C.C. Wanson, B. Walker
2014 Habitat Prioritization across large landscapes, multiple seasons, and novel areas: an example using greater sage-grouse inWyoming. Wildlife Monographs 190:1-30.

Gates, R.J.
1985 Observations of the formation of a sage-grouse lek. Wilson Bull. 97:219-221.

Girard, G. L.
1937 Life history, habits and food of the Sage Grouse, *Centrocercus urophasianus* Bonaparte. Univ. Wyoming, Laramie. Publ. 3.

Holloran, M.J., and S.H. Anderson
2004 Greater sage-grouse seasonal habitat selection and survival in Jackson Hole, Wyoming." Wyoming Game and Fish Department, Job Completion Report.

Jackson, S.D.
2000 Overview of Transportation Impacts on Wildlife Movement and Populations. pp. 7-20 *in* Messmer, T.A. and B. West (eds) Wildlife and Highways: Seeking Solution s to an Ecological and Socio-economic Dilemma. The Wildlife Society.

Mehls, S.F. and C.D. Mehls. 1995. Survey Report: Grand Teton National Park Historic Transportation Survey. 31 pages.

NPS (NPS)
1998 Director's Order 28: *Cultural Resource Management*. Approved by Robert Stanton, June 11. Available on the Internet at: https://www.nps.gov/policy/DOrders/DOrder28.html
2017a Elk Management Reduction Program. Description posted on Grand Teton National Park's website at: https://www.nps.gov/grte/planyourvisit/elkreduction.htm. Last updated August 14, 2017.
2017b Jackson Hole Airport Wildlife Hazard Management Plan. Grand Teton National Park, Moose, Wyoming. 38 pages.
2019 Superintendent's Compendium. Grand Teton National Park and John D. Rockefeller, Jr. Memorial Parkway. 44 pages. Available on the Internet at: https://www.nps.gov/grte/learn/management/upload/2019-Compendium-FINAL-access.pdf

NPS (NPS) and U.S. Geological Survey (USGS)
2005 Grand Teton National Park 2002-2005 Vegetation Mapping Project Final Report. NPS-USGS Vegetation Mapping Program. U.S. Department of the Interior. Denver, Colorado.

Rodewald, P. (Editor)
2015 The Birds of North America: https://birdsna.org. Cornell Laboratory of Ornithology, Ithaca, New York.

Jackson Hole Airport Wildlife Hazard Management Plan Working Group (JAC WHMPWG)
2014 Attachment A: Greater sage-grouse habitat restoration plan in support of a wildlife hazard management plan for the Jackson Hole Airport. NPS, USDA Wildlife Services, Wyoming Game and Fish Department, Craighead-Beringia South, Mead & Hunt Inc., Wyoming Wildlife Consultants, LLC. Finalized March 2014.

U.S. Forest Service (USFS)
2019 Fire Effects Information System (FEIS). Accessed March 2019. https://www.feis-crs.org/feis/

United States Geological Survey (USGS)
1945 Topographic map of Grand Teton National Park and part of Jackson Hole National Monument: Teton County, Wyoming. Available on the Internet at: https://uwdigital.uwyo.edu/islandora/object/wyu%3A120856
1951 Topographic map of the Grand Teton National Park: Teton County, Wyoming. Available on the Internet at: https://uwdigital.uwyo.edu/islandora/object/wyu%3A138668

Upper Snake River Basin Sage-Grouse Local Working Group (USRWG)
2014 Upper Snake River Basin Sage-Grouse Conservation Plan. Document archived with the State of Wyoming Game and Fish Department at https://wgfd.wyo.gov/WGFD/media/content/PDF/Habitat/Sage%20Grouse/SG_USR_CONSERVPLAN.pdf. 137 pages.

U.S. Fish and Wildlife Service (USFWS)
2013 Greater sage-grouse (*Centrocercus urophasianus)* conservation objectives: final report. Denver, Colorado. February 2013.
2015 Greater Sage-Grouse 2015 Not Warranted Finding Under the Endangered Species Act. U.S. Fish and Wildlife Service Mountain-Prairie Region news release, September 2015. 2 pp.
2019a Birds of Conservation Concern Information. Retrieved 18 March 2019.
2019b Updated list of threatened and endangered species that may occur in [the] proposed project location, and/or may be affected by your proposed project. Consultation Code 06E13000-2019-SLI-0068. 23 August 2019.

Valley West Engineering PC
2015 Meadow Road Improvement Project Design Report. Jackson, Wyoming. (Owner: Meadow Road Association, Moose, Wyoming). 6 pages.

Western Association of Fish and Wildlife Agencies (WAFWA)
2015 Beginner's Guide to Greater Sage-Grouse. Notes from the Lek. Greater Sage-grouse Conservation Primer Series, Primer No. 1. 2 pages.

Wisdom, M.J. C.W. Meinke, S.T. Knick, and M.A. Schroeder
2011 Factors associated with extirpation of sage-grouse. pp 451-472*in* S.T. Knick and J.W. Connelly (eds.). Greater Sage-Grouse: Ecology and Conservation of and Landscape Species and its habitats. Studies in Avian Biology (vol. 38). University of California Press, Berkeley, California.

Wyoming Game and Fish Department (WGFD)
2017 State Wildlife Action Plan 2017. Cheyenne, Wyoming. 1693 pages.
2019 Wyoming Game and Fish Department letter to the NPS. Analysis and response to project information submitted by the NPS to comply with Wyoming Executive Order 2015-4. 26 September 2019.
2 pages.

Wyoming, Office of the Governor, State Executive Department

2015 Greater Sage-grouse Core Area Protection Executive Order 2015-4. (Replaces WY EO 2011-5 and 2013-3). 29 July 2015. 45 pages.

2019 Greater Sage-grouse Core Area Protection Executive Order 2019-3. (Replaces 2015-4 and 2017-2) 21 August 2019. 58 pages.

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