4.6 WILDLIFE

4.6.1 Introduction

This section describes potential impacts to wildlife resources associated with the construction and operation of the proposed Project and connected actions and discusses potential mitigation measures that would avoid or minimize the potential impacts. The information, data, methods, and/or analyses used in this discussion are based on information provided in the 2011 Final Environmental Impact Statement (Final EIS) as well as new circumstances or information relevant to environmental concerns that have become available since the publication of the Final EIS, including the proposed reroute in Nebraska. The information provided here builds on the information provided in the Final EIS and, in many instances, replicates that information with relatively minor changes and updates. Other information is entirely new or substantially altered from that presented in the Final EIS. Specifically, the following items have been substantially updated from the 2011 document and the 2013 Draft Supplemental EIS related to impacts to wildlife resources:

- A new section (see Section 4.6.2, Impact Assessment Methodology) was added to explain the assessment methodology used to evaluate potential wildlife resources impacts associated with the proposed Project.
- Revised important wildlife areas are listed to reflect the route modifications with specific emphasis on changes to the route through Nebraska.
- The discussion has been expanded on potential impacts to big game animals, small and medium game animals, and non-game animals.

The following information, data, methods, and/or analyses have been substantially updated from the 2013 Draft Supplemental EIS:

- A summary section has been added;
- Habitat acreages have been revised to reflect route and ancillary facility updates;
- Subsections have been added to Section 4.6.3.4, Non-Game Animals, to discuss potential impacts to non-game mammals, raptors and other non-game migratory birds, reptiles, amphibians, and invertebrates; and
- In response to public and agency comments, text has been revised throughout the section as appropriate.

Summary

Potential impacts to wildlife associated with construction of the proposed Project and connected actions could include the following:

- Habitat loss, alteration, and fragmentation;
- Direct mortality during construction and operation (e.g., vehicle collisions, power line/power pole collisions);

- Indirect mortality because of stress or avoidance of feeding due to exposure to construction and operations noise (e.g., low-level helicopter or airplane monitoring overflights), and from increased human activity;
- Reduced breeding success from exposure to construction and operations noise and from increased human activity;
- Reduced survival or reproduction due to decreased availability of edible plants, reduced cover, and increased exotics and invasives; and
- Increased predation (e.g., nest parasitism, creation of predator travel corridors, and poaching).

Big game animals could be affected by both short-term and long-term impacts such as habitat loss and fragmentation, physiological stress, and loss of food. Potential impacts on small and medium game animals include nest or burrow destruction or abandonment and resultant loss of young, loss of foraging habitat, and loss of cover habitat. Impacts on small game bird species include habitat loss, alteration, and fragmentation. Small mammals, reptiles, amphibians, and non-flying insects could be trapped or blocked from movement across the pipeline, their nests/burrows may be damaged or destroyed, and reduced vegetative cover could increase predation. Raptors and other migratory birds may have reduced breeding success due to direct and indirect impacts during the breeding season.

To reduce potential construction- and operations-related effects where habitat is crossed, a Construction, Mitigation, and Reclamation Plan (CMRP) (see Appendix G) would be implemented. Measures to minimize adverse effects to wildlife habitats, including shelterbelts, windbreaks, and living snow fences, are identified in the CMRP. Pipeline construction would be conducted in accordance with required permits.

Connected actions include the Bakken Marketlink Project, the Big Bend to Witten 230-kilovolt (kV) Transmission Line, and electrical distribution lines and substations. The potential impacts to wildlife associated with the Bakken Marketlink Project facilities would likely be similar to those described for the proposed Project route in that area. During construction and operation, some of the electrical lines, transmission lines, and associated structures would require avian-safe conservation measures as required by the U.S. Fish and Wildlife Service (USFWS) in their 2013 Biological Opinion to minimize bird collisions as well as raptor and corvid (e.g., crows, ravens, magpies) predation of eggs and young.

4.6.2 Impact Assessment Methodology

The impacts of the proposed Project on wildlife resources have been evaluated using a combination of quantitative and qualitative assessments of the potential direct and indirect impacts to species and their habitat through literature review and consultation with regional biologists, to include the following:

- Calculation of the distance to nearby raptor nests and the effects that construction may have to this resource[1];

[1] Raptor nests were used due to the availability of data on raptor nests, as well as their large size, which allows them to be aerially surveyed.

- Evaluation of the effects of the proposed Project on hunting;
- Calculation of the miles and acreage of habitats and important wildlife habitat potentially impacted; and
- Qualitative evaluation of the potential direct and indirect impacts to wildlife and their habitats resulting from the proposed Project's construction and operation activities.

4.6.3 Potential Impacts

Construction of the proposed Project could have direct and indirect as well as temporary (short-term and long-term) and permanent impacts on wildlife resources. Direct impacts could occur due to vegetation removal or conversion, obstructions to movement patterns, or the removal of native habitats that may be used for foraging, nesting, roosting, or other wildlife uses (Barber et al. 2010). Indirect impacts to wildlife are difficult to quantify and are dependent on the sensitivity of the species, individual, type and timing of activity, physical parameters (e.g., cover, climate, and topography), and seasonal use patterns of the species (Berger 2004). Short-term impacts on wildlife would occur during construction and may extend beyond construction activities. Some disturbed habitat may not be returned to former levels of functionality for up to 3 years following restoration efforts (Braun 1998), but long-term impacts on wildlife could extend through the life of a project and possibly longer for those habitats that require many decades to be restored (Harju et al. 2010). Permanent impacts would result from construction of aboveground facilities that convert natural habitat to land used for pipeline operations, and where operational maintenance of the right-of way (ROW) permanently alters vegetation characteristics (Braun 1998).

The proposed Project could affect wildlife resources through the following:

- Habitat loss, alteration, and fragmentation;
- Direct mortality during construction and operation (e.g., vehicle collisions, power line/power pole collisions);
- Indirect mortality because of stress or avoidance of feeding due to exposure to construction and operations noise (e.g., low-level helicopter or airplane monitoring overflights), and from increased human activity;
- Reduced breeding success from exposure to construction and operations noise as well as from increased human activity;
- Reduced survival or reproduction due to decreased availability of edible plants, reduced cover, and increased presence of exotic and invasive plants; and
- Increased predation (e.g., nest parasitism, creation of corridors used by predators, and poaching).

Construction of the proposed Project would result in disturbance of about 15,296 acres of various habitat types, including approximately 9,071 acres of grasslands and rangelands, 45 acres of upland forested habitat, and 724 acres of wetland and shrub habitats, including 66 acres of woody wetlands (see Table 3.6-1). The proposed Project route would cross areas considered important habitats used by wildlife (see Table 4.6-1). Encompassing both public and private

lands, these areas include wetland and conservation easements, important bird areas (IBAs), river valleys, and state wildlife areas.

Table 4.6-1 Important Wildlife Habitats within or near the Proposed Project Area

Milepost	Name	Ownership and Description	Pipeline Miles Affected
	Montana		
4-5	U.S. Fish and Wildlife Service Wetland Easement	Private	0.8
26-68	North Valley Grasslands IBA	Private 45%, Bureau of Land Management 43%, State 11%, Tribal 1%	42.9
49-71	Cornwell Ranch Conservation Easement (proposed—overlaps IBA)	Montana Fish, Wildlife, and Parks	21.5
83	Milk River Valley	Montana Department of Natural Resources	~0.2
90	Missouri River Valley	Montana Department of Natural Resources	~1.0
196	Yellowstone River Valley	Montana Department of Natural Resources and Private	~0.5
Various	Conservation Reserve Programs	Private	9.4
	South Dakota		
367-368	Mckenna/School And Public Lands Easement	The Nature Conservancy	~0.5
426	Cheyenne River Valley	na[a]	~0.7
537	White River Valley	na[a]	~0.2
Various	State Wildlife Areas	South Dakota Game, Fish, and Parks	20.7
Various	Conservation Reserve Program	Private	8.4
	Nebraska		
602-623	Keya Paha River Valley	Various	22.4
623-628	Niobrara River Valley	Various	5.7
677-688	Verdigris/Bazile	Various	11.4
760-764	Loup River Valley	Various	5.2
778-847	Rainwater Basin	Various	69.5
Various	Conservation Reserve Program	Private	3.9
741-744	Hosford Conservation Easement	Private	dnc[a]
823-824	Ducks Unlimited, Inc. (Wetlands America Trust)	Private	dnc[a]

Source: Schneider et al. 2011, National Audubon Society 2012, Keystone 2012a, Nebraska Land Trust 2013.

[a] dnc = does not cross. Pipeline is near the conservation easement but does not cross it.

Fragmentation of wildlife habitat would result from the proposed Project. Fragmentation is the splitting of a large continuous expanse of habitat into numerous smaller patches of habitat with a smaller total habitat area and isolation within a matrix of habitats that are unlike the original (Wilcove et al. 1986; Fahrig 2003). Habitat loss generally has adverse effects on biodiversity; fragmentation typically has a lower magnitude effect (relative to habitat loss) that may be either beneficial or adverse (Fahrig 2003). The effects of habitat fragmentation would be dependent on many variables including original habitat structure, landscape context, predator communities, and susceptibility to nest parasitism (Tewksbury et al. 1998). Habitat fragmentation effects would typically be most pronounced in forested and shrubland habitats, and would generally be reduced for pipeline corridors because their widths could be narrowed in sensitive habitats,

vegetative cover would be re-established in temporary working areas, and there would be minimal human disturbance during operation (Hinkle et al. 2002). During construction, however, pipelines could be significant barriers to wildlife movements (Hinkle et al. 2002). After construction, pipeline corridors could be used by coyote, deer, raccoon, and many other species for travel, as well as by predators (including raptors) to capture prey. The following are wildlife habitat fragmentation issues relevant for pipeline construction and operation:

- Reduction in patch size of remaining available habitats;
- Creation of edge effects;
- Creation of barriers to movement;
- Intrusion of invasive plants, animals, and nest parasites;
- Facilitation of predator travel and capture of prey;
- Habitat disturbance; and
- Intrusion of humans (Hinkle et al. 2002).

Pipeline construction would remove vegetation, including native grasses, shrubs, and trees, creating an unvegetated strip over the proposed pipeline trench and the adjacent construction areas. Subsequent revegetation may not provide habitat features comparable to pre-Project habitats, and restoration of wetlands in arid and semi-arid regions is not always successful (Federal Energy Regulatory Commission 2004). Removal of vegetation increases the potential for the establishment and spread of noxious weeds and other invasive plants that have little use or value for wildlife and that displace native plants, resulting in degraded wildlife habitat. Freshly seeded grasses can attract domestic livestock and wildlife and are often preferentially grazed. Grazing of the ROW prior to the development of a self-sustaining vegetative cover could inhibit revegetation and extend the time to re-establish habitat linkages across the ROW. The proposed pipeline ROW would be maintained free of trees, resulting in long-term alteration of wildlife habitat structure and value. Approximately 21 acres of upland forest and 30 acres of woody wetland would be converted to non-wooded habitat due to ongoing ROW maintenance.

Constructing the proposed pipeline could present a significant temporary physical barrier to wildlife movement. The open trench and welded pipeline sections stored along the construction ROW prior to burial could block both large and small animals from travel and feeding areas across the construction ROW. Small animals could also become trapped in open trench sections. In addition, operation of heavy equipment could create behavioral barriers to wildlife as they travel and feed because animals may avoid areas with active construction activity.

After construction, the proposed pipeline ROW, unblocked temporary access roads, and permanent access roads could experience an increase in human activity, especially within remote sections of the proposed Project route. This could potentially lead to increased wildlife disturbance; increased direct wildlife mortality from vehicle-animal collisions, as well as legal and illegal killing of wildlife; and indirect mortality and reduced reproduction due to displacement, increased stress, and increased predation (Madson 2006; Montana Board of Oil and Gas Conservation 1989; Wyoming Game and Fish Department 2004; Canfield et al. 1999; Claar et al. 1999; Hickman et al. 1999; Hamann et al. 1999; Maxell and Hokit 1999).

Some rangeland habitats crossed by the proposed Project route have not been extensively fragmented by road and transmission line networks, and exist as expanses of open mosaics of grasslands, shrublands, and croplands interrupted by forested draws (a large tract of land covered with trees and underbrush). Fragmentation may be more consequential in shrublands than grasslands, as species dependent on sagebrush cover would become more exposed when crossing the proposed pipeline corridor. Additionally, sagebrush is slow growing, and regeneration along the proposed pipeline route may be inhibited by increased foraging during the establishment of this species. Fragmentation of native grasslands would generally be considered short term until sufficient herbaceous cover is re-established to allow small mammals, amphibians, and reptiles to cross without exposure. Fragmentation-related issues applicable to wildlife habitat types crossed by the proposed Project route are summarized in Table 4.6-2.

Table 4.6-2 Habitat Types and Related Fragmentation Issues

Habitat Type	Breaking Large Habitat into Smaller Areas	Hindered Movements	Nest Parasitism	Facilitated Predator Travel and Prey Capture	Disturbance-Construction Maintenance	Human Intrusions
Cultivated Crop		x		x		
Grassland/Pasture	x	x	x	x	x	x
Upland Forest	x	x	x	x	x	x
Open Water	x	x		x	x	x
Woody Wetland	x	x	x	x	x	x
Shrub-Scrub	x	x	x	x	x	x
Emergent Herbaceous Wetland	x	x	x	x	x	x
Wildlife Type Affected	Birds, small mammals	Mammals, amphibians, reptiles	Birds	Birds, small mammals	Birds, mammals, amphibians, reptiles, invertebrates	Birds, mammals, amphibians, reptiles

Sources: Hinkle et al. 2002, Inglefinger 2001, Miller et al. 1998, Vander Haegen 2007

Review of state land cover mapping produced for the U.S. Geological Survey's (USGS) Gap Analysis Program (USGS 2011) indicates that the proposed Project could potentially contribute to increased fragmentation of several contiguous areas (≥0.2 mile) of native grassland, shrubland, or forestland that would be crossed by the Project route within the important wildlife habitats identified in Table 4.6-1. Fragmentation may result in altered wildlife communities as animals adapted to exploiting edge habitats increase (e.g., raptors, coyotes, scavengers), and animals requiring large contiguous habitats are displaced (e.g., elk, mule deer, mountain lion). The severity of fragmentation-induced effects on wildlife communities depends on factors such as sensitivity of the animal; seasonal habitat use, type, and timing of construction activities; and physical habitat parameters such as topography, cover, forage, and climate (Miller et al. 1998).

Loss of shrublands and wooded habitats would be long term (from 5 to 20 years or more) within reclaimed areas of the construction ROW. Due to the linear nature of the ROW, these long-term habitat losses represent a small total area of locally available habitat and therefore are expected to have limited long-term impacts on wildlife populations (see Tables 3.6-1 and 4.6-2).

Total habitat loss due to pipeline construction would likely be small in the context of available habitat, both because of the linear nature of the proposed Project and because restoration would follow construction. During restoration, the area would be reseeded as directed by the landowner or land management agency, such that in some instances areas of native vegetation could be converted to non-native species. Such conversion could reduce suitable or preferred habitat for wildlife. If disturbance involved important remnant habitat types, habitat loss could be locally significant.

Other than maintenance and pipeline inspections, normal operations of the proposed pipeline would generally result in negligible effects on wildlife. Direct impacts from maintenance activities, such as physical pipeline inspections or pipeline repair that would require digging up the pipeline, would be the same as those for construction. Some adverse effects to wildlife due to noise generated at pump stations may occur. High noise levels potentially could mask wildlife communications that are used to attract mates and defend territories. A recently published study suggests that road noise can reduce use of an area by migratory birds by as much as 25 percent (McClure et al. 2013). It is likely that noise generated from construction activities and noise generated from pump stations would follow a similar pattern. Increased noise and activity levels during construction and development could result in nest abandonment and decreased reproductive success if such activity occurs during the breeding season (Bureau of Land Management [BLM] 2000). Additionally, vibration detected in the soils surrounding roadways has been shown to cause certain invertebrates to ascend to soil surfaces allowing them to become prey to birds (U.S. Department of Transportation 2004). Potential impacts associated with accidental release of crude oil, hazardous materials, or crude oil during construction and operation of the proposed Project are addressed in Section 4.13, Potential Releases. Appropriate federal and state wildlife management agencies would be consulted prior to initiation of maintenance activities beyond standard inspection procedures.

4.6.3.1 Big Game Animals

The primary big game species occurring in the proposed Project area include white-tailed deer (*Odocoileus virginianus*), elk (*Cervus canadensis*), mule deer (*Odocoileus hemionis*), bighorn sheep (*Ovis canadensis*), and pronghorn antelope (*Antilocapra americana*). Gray wolf (*Canis lupus*) may also be present in Montana and mountain lion (*Puma concolor*) may also be present in Montana and South Dakota. Impacts to big game animals may be both short term and long term, such as habitat loss and fragmentation, physiological stress, and loss of food sources.

For big game animals, construction activities could result in increased agitation, physiological stress, and use of sub-optimal habitat. Animals can become physiologically stressed when energy expenditures increase due to alarm or behavioral avoidance (Lutz et al. 2011). These responses are often attributed to interactions with humans or activities associated with human presence such as traffic and noise. Physiological stress diverts time and energy away from critical activities such as foraging and resting, both of which are important to maintain or improve fitness (Gill et al. 1996, Frid and Dill 2002).

Construction of the proposed Project may alter migration routes and displace wildlife from preferred habitats (Sawyer et al. 2006) by creating barriers that hinder migration and use of these habitats (Sawyer et al. 2009).

Construction of permanent aboveground facilities would result in the permanent loss of undeveloped habitat for big game animals. Approximately 285 acres of undeveloped habitat (113 acres in Montana, 90 acres in South Dakota, 67 acres in Nebraska, and 15 acres in Kansas) would be permanently lost due to the construction of permanent aboveground facilities. This loss of habitat would constitute a very small percentage of available habitats within the four states and would not likely affect big game populations in the proposed Project area.

Construction of the proposed Project could impact hunter success rates within the Project area. Hunting could be adversely affected due to construction activities occurring during hunting seasons, primarily due to the displacement of big game animals from construction and noise disturbance. Once the proposed pipeline is constructed, harvest rates could potentially increase after construction because of increased access by hunters using the pipeline ROW to access remote areas (Comer 1982). In addition, big game animals that use a cleared ROW (e.g., for traveling or feeding) could be more likely to be hunted than animals in forested habitat. Increased hunting along cleared ROWs in the fall hunting season has been documented elsewhere (Crabtree 1984).

4.6.3.2 Small and Medium Game Animals

Potential impacts on small and medium game animals include nest or burrow destruction or abandonment and loss of young, foraging habitat, and cover habitat. Displacement of small and medium game animals from disturbance areas would be short term, as animals would be expected to return following completion of construction and reclamation activities. Small mammals could fall into and become trapped in the open trench during pipeline construction, potentially resulting in injury or mortality. Burrowing animals would be expected to return and recolonize the ROW after construction, although compacted areas such as temporary workspaces may become less suitable habitat (Lauzon et al. 2002). Disturbed areas through native prairie habitats also were found to be used less often by ground squirrels following construction of a gas pipeline, suggesting that soil compaction and vegetation cover/height may make habitat less suitable for several years after construction (Lauzon et al. 2002). Some badger (*Taxidea taxus*) and ground squirrel (*Spermophilus* spp.) burrows would likely be destroyed during construction if they occur within the construction ROW. During operation, badgers and ground squirrels may be attracted by the warmth generated by the pipeline, especially during fall, winter, and spring months. The heat generated by the proposed pipeline would warm the soils within the proximity of the pipeline (see Appendix S, Pipeline Temperature Effects Study). Differences from surrounding soil temperature at the surface would be largest during spring. The pipeline could increase soil temperatures at the burial depth near the pipeline by as much as 40 degrees Fahrenheit (°F) and at a depth of 6 inches by as much as 10 to 15°F, (see Appendix S, Pipeline Temperature Effects Study).

For animals that use tree and shrub habitats for cover, food, and nesting, losses of these habitat types would be long term because the permanent ROW would be maintained free of trees and large shrubs. An estimated 111 acres of forested habitats (upland forested and woody wetlands) would be affected by construction of the proposed Project, of which an estimated 51 acres would be maintained as herbaceous vegetation. Those areas falling within the construction ROW would be cleared of trees and brush to provide access for construction equipment. Woody vegetation along the permanent ROW would be cleared periodically in order to maintain accessibility for pipeline integrity surveys. Differences in vegetation cover between the ROW and the

surrounding landscape could act as a barrier for some animals, such as the North American porcupine (*Erethizon dorsatum*) and tree squirrels, while acting as a travel corridor for others, such as coyotes (*Canis latrans*) and raccoons (*Procyon lotor*).

4.6.3.3 Waterfowl and Game Birds

Most waterfowl and game birds nest on the ground, although a few notable species such as wood ducks (*Aix sponsa*), mergansers (*Mergus* spp.), and mourning doves (*Zenaida macroura*) nest in trees. Direct impacts on small game bird species could include nest or burrow abandonment (such as snow burrows used by grouse), loss of eggs or young, or mortality. Habitat loss, alteration, and fragmentation could occur until vegetation is re-established. After revegetation, the habitat could still be degraded due to the spread of noxious and invasive species, noise, and human presence. For species that use tree and shrub habitats for cover, forage, and nesting, losses of these habitats would be long term because trees and shrubs would require from 5 to 20 years or more to re-establish and the permanent ROW would be maintained free of trees and large shrubs. Migratory waterfowl could be attracted to the pipeline corridor during early spring if it becomes snow-free earlier than surrounding habitats. Communication towers at pump stations (generally 33 feet tall and no more than 190 feet tall) could be a collision hazard to waterfowl and game birds especially if located near foraging and nesting habitats. Conversely, towers could provide vantage perches and artificial nesting habitat, depending on their configurations, for predators such as raptors, common ravens, (*Corvus corax*) or crows (*Corvus brachyrhynchos*), which may prey on ground nesting upland game birds.

Sharp-tailed grouse (*Tympanuchus phasianellus*) inhabit native prairies and nest in grasslands. This species has disappeared from large portions of its historical range, primarily due to habitat loss or degradation resulting from agricultural practices, livestock overgrazing, and habitat succession. Breeding habitats are vulnerable to disturbance as these birds gather to breed in leks (areas where birds congregate and conduct courtship displays to attract mates). Nesting may be concentrated within several miles of active leks. Sharp-tailed grouse are also vulnerable to displacement by the creation of roads and power lines and reductions in habitat suitability due to fragmentation. The proposed pipeline would cross at least 16 known sharp-tailed grouse leks through Montana and South Dakota. Additional leks may be located in Nebraska along the proposed route, and surveys will be conducted to identify their potential locations (Keystone 2012b).

4.6.3.4 Non-Game Animals

Potential impacts to non-game animals are grouped for discussion into non-game mammals, raptors and other non-game migratory birds, reptiles, amphibians, and invertebrates. These groups are discussed below:

Non-Game Mammals

Potential impacts to non-game mammals include nest or burrow destruction or abandonment, and loss of young, foraging habitat and cover habitat. Displacement of non-game mammals from disturbance areas would be short term, as animals would be expected to return following completion of construction and reclamation activities. Small non-game mammals could fall into and become trapped in the open trench during pipeline construction, potentially resulting in injury, increased predation, and mortality. Burrowing animals would be expected to return and

recolonize the ROW after construction, although compacted areas, such as temporary workspaces, may become less suitable habitat (Lauzon et al. 2002). Soil compaction and vegetation cover/height may make habitat less suitable for several years after construction (Lauzon et al. 2002). Small and medium non-game mammal burrows would likely be destroyed during construction if they occurred within the construction ROW. During operation, mammals such as burrowing rodents may be attracted by the warmth generated by the pipeline, especially during fall, winter, and spring months. The heat generated by the proposed pipeline would warm the soils within the proximity of the pipeline (see Appendix S, Pipeline Temperature Effects Study). Differences from surrounding soil temperature at the surface would be largest during spring. The pipeline could increase soil temperatures at the burial depth near the pipeline by as much as 40°F and at a depth of 6 inches by as much as 10 to 15°F, (see Appendix S, Pipeline Temperature Effects Study).

For non-game mammals that use tree and shrub habitats for cover, food, and nesting, losses of these habitat types would be long term because the permanent ROW would be maintained free of trees and large shrubs. An estimated 111 acres of forested habitats (upland forested and woody wetlands) would be affected by construction of the proposed Project, of which an estimated 51 acres would be maintained as herbaceous vegetation. Those areas falling within the construction ROW would be cleared of woody vegetation to provide access for construction equipment. Woody vegetation along the permanent ROW would be cleared periodically in order to maintain accessibility for pipeline integrity. Differences in vegetation cover between the ROW and the surrounding landscape could act as a barrier for non-game mammals, while acting as a movement corridor for others, such as coyotes and raccoons. Removal of trees from the construction ROW and extra workspaces in woodlots, riparian areas, and shelterbelts could also lead to the destruction of bat roosting habitats.

Raptors and Other Non-Game Migratory Birds

Construction could cause direct and indirect impacts to raptors and migratory birds. Raptors and migratory birds could be affected if proposed Project construction overlapped with nesting seasons of birds in the Project area. Indirect impacts could be associated with increased human presence and noise from construction activity close enough to disturb nesting birds. Additionally, construction activity near active nests during incubation or brood rearing could result in nest abandonment; overheating, chilling, or desiccation of unattended eggs or young, causing nestling mortality; premature fledging; or ejection of eggs or young from the nest (USFWS 2007).

Migratory birds, including Birds of Conservation Concern, and their active nests are protected under the Migratory Bird Treaty Act (MBTA) (see discussions below). Removal of trees from the construction ROW and extra workspaces in woodlots, riparian areas, and shelterbelts could lead to the destruction of raptor and owl nests, migrant bird nests, and great blue heron (*Ardea herodias*) habitat. About 28 large stick nests were found inside the survey area, which covered the area within about 0.25 to 1 mile of the proposed Project centerline in Montana and South Dakota. Nest and rookery surveys in Nebraska will be conducted and results provided. If any of these nests or rookeries were located within the construction ROW, and if any nests were occupied when trees were cut, the nests, eggs, or young would be lost. Because many large raptors reuse their nest trees, loss of trees where nesting had previously occurred would require pairs to find new nest trees. If suitable new nest trees were not available within their established territory, new territories would need to be established. Establishing a new territory and/or finding

new nest trees would increase energy demands during nesting and could lead to reduced or lost reproduction in subsequent years (USFWS 2007). Losses of tree and shrub habitats used by migratory birds for cover, forage, and nesting would be long term because 5 to 20 years or more would be required to re-establish trees and shrubs. The permanent ROW would be maintained free of trees and large shrubs.

Habitat fragmentation caused by changes in vegetation cover within the pipeline ROW through large blocks of forest, shrub-steppe, and grassland habitats would generally have the greatest effect on raptors and migrant songbirds (Hinkle et al. 2002, Vander Haegen 2007, Miller et al. 1998). The severity of fragmentation-induced effects on migratory birds would depend on factors such as sensitivity of the animal, seasonal habitat use, type, and timing of construction activities, and physical habitat parameters such as topography, cover, forage, and climate. Forest-nesting songbird abundance, diversity, and reproduction rates all become depressed as a result of fragmentation associated with linear developments (Jalkotzy et al. 1997). Habitat fragmentation leads to the creation of more edge habitat, which in turn increases the susceptibility of nesting birds and other animals to predation because many predators concentrate their search efforts along habitat edges (Montana Department of Natural Resources and Conservation 1979). Predators such as coyotes, badgers, foxes, crows, jays, ravens, and others may use the cleared ROW for foraging, leading to reduced reproduction and survival for many birds in proximity to the ROW. Nest parasitism by brown-headed cowbirds (*Molothrus ater*) resulting in fewer young birds fledging successfully has been documented to increase when shrub habitat is fragmented (Vander Haegen 2007).

Habitats crossed by access roads and aboveground facilities could contribute to both temporary and long-term fragmentation. Bird community composition and productivity have been shown to change next to recreational trails in grassland and forest ecosystems. Birds are less likely to nest near trails in grasslands, and nest predation is greater near trails in both grassland and forests (Miller et al. 1998). Based on these findings, it is likely that bird behavior would be similar near access roads and aboveground facilities. Densities of sagebrush-obligate songbirds have been shown to decline within 100 meters of natural gas pipeline access roads, even under light traffic volumes (fewer than 12 vehicles per day), while horned lark (*Eremophila alpestris*) abundance has been shown to increase within 100 meters of roads (Inglefinger 2001).

The MBTA (Title 16 of the United States Code 703-712) prohibits the taking of any migratory bird or any part, nest, or egg, except as permitted by regulation. The MBTA was enacted in 1918; a 1972 agreement supplementing one of the bilateral treaties underlying the MBTA had the effect of expanding the scope of the Act to cover bald eagles and other raptors. Implementing regulations define *take* under the MBTA as "pursue, hunt, shoot, wound, kill, trap, capture, possess, or collect" (USFWS 2007).

The Bald and Golden Eagle Protection Act (16 United States Code 668-668c), enacted in 1940, and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from take of bald eagles, including their parts, nests, or eggs. The Act provides criminal and civil penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle . . . [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The Act defines *take* as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." *Disturb* means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available: 1) injury to an eagle; 2) a decrease in its

productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or 3) nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior. In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that injures an eagle or substantially interferes with normal breeding, feeding, or sheltering habits and causes, or is likely to cause, a loss of productivity or nest abandonment (USFWS 2007).

The 1988 amendment to the Fish and Wildlife Conservation Act mandates that the USFWS "identify species, subspecies, and populations of all non-game migratory birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act of 1973." As a result of this mandate, the USFWS created the Birds of Conservation Concern list. Bird species considered for inclusion on the list include non-game birds, game birds without hunting seasons, subsistence-hunted non-game birds in Alaska; and Endangered Species Act candidate, proposed endangered or threatened, and recently delisted species. The Birds of Conservation Concern includes some non-MBTA-protected species because their conservation status and efforts are of concern to the USFWS. The goal of this list is to prevent or remove the need for additional Endangered Species Act bird listings by implementing proactive management and conservation actions and coordinating consultations in accordance with Executive Order 13186. Birds of Conservation Concern are considered a subset of the MBTA-protected species and receive the same consideration and protection afforded to species under MBTA. Migratory raptor species in the proposed Project area are generally considered sensitive and in need of specialized protective measures (USFWS 2007).

Nest and rookery surveys were conducted in 2008, 2009, and 2010 on the Final EIS route. Additional nest surveys on the route through Montana and South Dakota were conducted in 2010, 2011, and 2012. Surveys for the Nebraska route that has changed from the route evaluated in the Final EIS have been conducted and results will be provided. These surveys assist in identifying where construction may affect active nests (and, in the case of burrowing owls, cause direct impacts on nests and nesting habitat) and where buffer zones may be required by state and federal agencies for specific species (Montana Fish, Wildlife, and Parks [MFWP], BLM, USFWS) (Table 4.6-3).

Table 4.6-3 General Spatial Buffer Restrictions and Nesting Seasons for Raptors Potentially Present in the Project Area

Species	Spatial Buffer (Miles)	Nesting Season
Osprey (*Pandion haliaetus*)	0.5	April 1–August 31
Bald Eagle (*Haliaeetus leucocephalus*)	0.5-1.0	January 1–August 31
Northern Harrier (*Circus cyaneus*)	0.5	April 1–August 15
Sharp-shinned Hawk (*Accipiter striatus*)	0.5	March 15–August 31
Cooper's Hawk (*Accipiter cooperii*)	0.5	March 15–August 31
Northern Goshawk (*Accipiter gentilis*)	0.5	March 1–August 15
Broad-winged Hawk (*Buteo platypterus*)	NA[a]	NA[a]
Swainson's Hawk (*Buteo swainsoni)*	0.5	April 1–August 31
Red-tailed Hawk (*Buteo jamaicensis*)	0.5	March 15–August 15
Ferruginous Hawk (*Buteo regalis*)	0.5	March 1-August 1
Rough-legged Hawk (*Buteo lagopus*)	NA[a]	NA[a]
Golden Eagle (*Aquila chrysaetos*)	0.5	January 1–August 31

Species	Spatial Buffer (Miles)	Nesting Season
American Kestrel (*Falco sparverius*)	0.125	April 1-August 15
Merlin (*Falco columbarius*)	0.5	April 1–August 31
Gyrfalcon (*Falco rusticolus*)	NA[a]	NA[a]
Peregrine Falcon (*Falco peregrinus*)	1.0	February 1–August 31
Prairie Falcon (*Falco mexicanus*)	0.25	April 1-August 31
Barn Owl (*Tyto alba*)	0.25	February 1–September 15
Eastern Screech-Owl (*Megascops asio*)	0.25	Varies
Great Horned Owl (*Bubo virginianus*)	0.25	December 1–September 31
Snowy Owl (*Bubo scandiacus*)	0.25	May 1–September 31
Burrowing Owl (*Athene cunicularia*)	0.25	March 1–August 31
Barred Owl *(Strix varia*)	0.25	February 1–August 31
Long-eared Owl (*Asio otus)*	0.25	February 1–August 15
Short-eared Owl (*Asio flammeus*)	0.25	March 1–August 1
Northern Saw-whet Owl (*Aegolius acadicus*)	0.25	March 1-August 31

Source: USFWS 1999; USFWS 2007; Cornell Lab of Ornithology 2011

[a] This species does not nest within the proposed Project area; NA = not applicable.

Based on nest surveys conducted to date, known areas where construction activities may coincide with raptor nesting on rock outcrops or clay ridges include:

- One inactive unidentified hawk (*Buteo* sp.) nest, Valley County, Montana;
- One active red-tailed hawk (*Buteo jamaicensis*) nest, Prairie County, Montana;
- One inactive unidentified hawk nest, Prairie County, Montana;
- Four inactive unidentified hawk nests, Fallon County, Montana;
- Three inactive ferruginous hawk (*Buteo regalis*) nests, Harding County, South Dakota; and
- One inactive unidentified hawk nest, Tripp County, South Dakota.

Additional discussion of impacts to federal threatened, endangered, proposed, and candidate species; species under consideration; BLM sensitive species; state threatened and endangered species; and species of conservation concern is provided in Section 4.8, Threatened and Endangered Species and Species of Conservation Concern.

Reptiles

Potential impacts to reptiles include nest or burrow destruction or abandonment, and loss of young, foraging habitat, and cover habitat. Reptile burrows would likely be destroyed during construction if they occur within the construction ROW. If timing of the open trench coincides with migration of snakes to their hibernation sites, large numbers of snakes could become trapped within the open trench. Trapped reptiles that may not be noticed by construction crews would likely not survive if they became trapped. Displacement of reptiles from disturbance areas would be short term, as reptiles would be expected to return and recolonize the ROW after construction, although compacted areas such as temporary workspaces may become less suitable habitat. Erosion control blankets—especially those supported by fine, non-biodegradable, monofilament meshes—could entangle and entrap snakes, lizards, and other reptiles. Ripping for construction through rock outcrops that may provide hibernacula (winter hibernation locations) for snakes could destroy all or portions of these habitats.

Indirect impacts may occur such as soil compaction and vegetation cover/height may make habitat less suitable for several years after construction (Lauzon et al. 2002). During operation, reptiles may be attracted by the warmth generated by the pipeline, especially during fall, winter, and spring months. Changes in vegetation cover and structure over the maintained ROW could inhibit movements of reptiles. Reduction in riparian shrubs and trees could reduce riparian habitat function as a movement corridor for reptiles. Differences in vegetation cover between the ROW and the surrounding landscape could act as a barrier for reptiles, while acting as a movement corridor for predators. Communication towers at pump stations may provide vantage perches and artificial nesting habitat for raptors, ravens, or crows, which may prey on reptiles.

Amphibians

Potential impacts to amphibians include direct mortality and loss of young and habitat. Amphibian burrows would likely be destroyed during construction if they occurred within the construction ROW. If timing of the open trench coincides with migration of amphibians to their hibernation and breeding sites, large numbers of amphibians could become trapped within the open trench. Trapped amphibians that may not be noticed by construction crews would likely not survive if they became trapped. Displacement of amphibians from disturbance areas would be short term, as amphibians would be expected to return and recolonize the ROW after construction, although compacted areas such as temporary workspaces may become less suitable habitat. Erosion control blankets—especially those supported by fine, non-biodegradable, monofilament meshes—could entangle and entrap frogs, salamanders, and other amphibians. Ripping for construction through rock outcrops which may provide hibernacula (winter hibernation locations) for amphibians could destroy all or portions of these habitats.

Indirect impacts may occur such as soil compaction and vegetation cover/height may make habitat less suitable for several years after construction (Lauzon et al. 2002). Amphibians may be attracted by the warmth generated by the pipeline, especially during fall, winter, and spring months. This could increase some amphibian mortality by triggering early emergence in burrowing amphibians when prey are scarce and cold air temperatures cause emergent adult mortality; elevated temperatures could also increase metabolic rates such that overwintering burrowing amphibians starve prior to emergence, and they could also cause drying of soils, causing burrowing amphibians to desiccate. Changes in vegetation cover and structure over the maintained ROW could inhibit movements of amphibians. Reduction in riparian shrubs and trees could reduce riparian habitat function as a movement corridor for amphibians. Differences in vegetation cover between the ROW and the surrounding landscape could act as a barrier for amphibians, while acting as a movement corridor for predators. Communication towers at pump stations may provide vantage perches and artificial nesting habitat for raptors, ravens, or crows, which may prey on amphibians.

Invertebrates

Direct impacts to invertebrates could occur as a result of proposed Project construction during vegetation clearing, site grading, and trench excavation. These activities could result in temporary habitat loss, potential alteration of suitable habitat to unsuitable habitat and temporary habitat fragmentation where the pipeline is not already located next to other utilities. Construction related activities could also result in the potential direct mortality to eggs, larvae, and adults through construction vehicle traffic and exposure during excavation. Erosion control

blankets—especially those supported by fine, non-biodegradable, monofilament meshes—could entangle and entrap invertebrates.

Indirect impacts may also affect invertebrates, such as the potential for artificial lighting to disrupt invertebrate feeding behavior and increase mortality through predation. Most normal construction would take place during the daylight hours, and construction areas would use artificial lighting infrequently. Activities that could potentially require artificial lighting include critical pipeline tie-ins, horizontal directional drill (HDD) crossings, and certain work required after sunset due to weather, safety, or other requirements. HDD crossings may require 24-hour operation until the crossing is completed. Communication towers at pump stations may provide vantage perches and artificial nesting habitat for raptors, ravens, or crows, which may prey on invertebrates. Some invertebrates are sensitive to soil moisture and die quickly when desiccated (Bedick et al. 2006). During construction, soil moisture may be reduced across the ROW as the site is prepared by removing topsoil and grading. Equipment operations within the ROW could compact the substrate. During reclamation, subsoil and topsoil would be de-compacted and vegetation cover would be re-established within both the temporary and permanent ROW. Subsoil and topsoil compaction would be relieved by discing, or chiseling using a disc or harrow pulled by a tractor.

During operation, the heat generated by the proposed pipeline would warm the soils within the proximity of the pipeline (see Appendix S, Pipeline Temperature Effects Study). This could increase some invertebrate mortality by triggering early emergence of burrowing invertebrates at a time when prey are scarce and cold air temperatures could cause emergent adult mortality; elevated temperatures could also increase metabolic rates such that overwintering burrowing invertebrates could starve prior to emergence, and they could also cause drying of soils, causing burrowing invertebrates to desiccate (Bedick et al. 1999).

4.6.3.5 Mitigation Measures

The proposed pipeline has been carefully designed to avoid most state, federal, and local managed habitat. To reduce potential construction- and operations-related effects where habitat is crossed, procedures outlined in the proposed Project CMRP (Appendix G) would be implemented. Measures to minimize adverse effects to wildlife habitats, including shelterbelts, windbreaks, and living snow fences, are identified in the CMRP. Pipeline construction would be conducted in accordance with required permits. The following measures to minimize impacts to wildlife, as identified in the CMRP or as required by the USFWS, state, or other federal agency, would be implemented:

- Immediate removal of shavings produced during pipe bevel operations to ensure that livestock and wildlife do not ingest this material.
- Collect and remove litter and garbage that could attract wildlife from the construction site at the end of the day's activities.
- Prohibit feeding or harassment of livestock or wildlife.
- Prohibit construction personnel from having firearms or pets on the construction ROW.
- Ensure all food and wastes are stored and secured in vehicles or appropriate facilities.
- Reseed disturbed native range with native seed mixes after topsoil replacement.

- If site-specific conditions warrant, and if agreed to by the landowner, the Contractor would apply amendments (i.e., fertilizer and soil pH modifier materials and formulations) commonly used for agricultural soils in the area and in accordance with written recommendations from the local soil conservation authority, land management agencies, or landowner. Amendments would be incorporated into the normal plow layer as soon as possible after application.
- TransCanada Keystone Pipeline, LP (Keystone) would work with landowners to discourage intense livestock grazing of the construction ROW during the first growing season by utilizing temporary fencing or deferred grazing, or increased grazing rotation frequency. Where forested areas would be reclaimed, Keystone would request landowners to discourage intensive grazing in the construction ROW during the first five growing seasons.
- Control unauthorized off-road vehicle access to the construction ROW through use of signs, slash and timber barriers, pipe barriers, boulders, or planted conifers or other appropriate trees or shrubs in accordance with landowner or manager request.
- To prevent unauthorized access, and to the extent permitted by landowners, Keystone would secure/lock temporary gates when construction activities are not occurring. Also to the extent permitted by landowners, Keystone would make reasonable efforts to restrict access to the pipeline corridor via access roads after construction to minimize increased human use in formerly inaccessible areas.
- Develop and implement a conservation plan, in consultation with the USFWS, consistent with the MBTA and the Bald and Golden Eagle Protection Act and consistent with provisions of Executive Order 13186 by providing avoidance and mitigation measures for migratory birds and bald and golden eagles and their habitats within the states where the proposed Project would be constructed, operated, and maintained.
- Develop construction timing restrictions and buffer zones, such as those described in Tables 4.6-3 and 4.6-4, through consultation with regulatory agencies for the proposed Project.
- If construction would occur during the April 15 to July 15 grassland ground-nesting bird season, complete nest-drag surveys to determine the presence or absence of nests on federal lands located in Phillips County, Montana.
- If construction would occur during the raptor nesting season during January to August, complete pre-construction surveys to locate active nest sites to allow for appropriate construction scheduling and buffer restrictions.

Table 4.6-4 Seasonal Timing Restrictions[a] and Buffer Distances for Big Game Animals, Game Birds, Snakes, Wading Birds, and Raptors

Animal and Habitat Type	State	Buffer Distance	Seasonal Timing Restrictions[b]
White-tailed deer–winter range	Montana	NA[c]	December 1 to March 31 (MFWP) & December 1 to May 15 (BLM)
Mule deer–winter range	Montana	NA	December 1 to March 31 (MFWP) & December 1 to May 15 (BLM)
Antelope–winter range	Montana	NA	December 1 to March 31 (MFWP) and December 1 to May 15 (BLM)
Snakes–hibernacula	Montana	NA	October 1 to May 1 (MFWP)
Sharp-tailed Grouse–active lek and nesting habitat	Montana South Dakota	0.25 mile (MFWP & BLM)	March 1 to June 15
Rookeries–Great Blue Herons or Double Crested Cormorants	Montana	0.31 mile (MFWP)	May 1 to July 31 (MFWP)
Raptors and Herons–active nests and rookeries	Entire ROW	0.5 mile (MFWP) 0.25 mile no surface occupancy (MWFP & BLM) 0.5 mile timing limitations (BLM)	March 1 to August 1 (MFWP) March 1 to July 31 (BLM) February 1 through August 15 (USFWS)

[a] Timing restrictions for federal threatened, endangered, proposed and candidate species, species under consideration, BLM sensitive species, state threatened and endangered species, and species of conservation concern are discussed in Section 4.8, Threatened and Endangered Species and Species of Conservation Concern.
[b] BLM restrictions only apply to federal lands, MFWP restrictions apply throughout Montana, and USFWS restrictions apply nationwide.
[c] NA = not applicable

In Montana, the proposed Project would employ the wildlife mitigation measures included in Appendix A, Governor Approval of the Keystone XL Project in Nebraska, to the Environmental Specifications developed for the Project by the Montana Department of Environmental Quality (MDEQ) (see Appendix N, Supplemental Information for Compliance with MEPA). In South Dakota, the proposed Project would employ mitigation measures to satisfy the conditions that were developed by the South Dakota Public Utility Commission and attached to its Amended Final Decision and Order, Notice of Entry HP09-001. Additional wildlife mitigation measures would include the following:

- In Montana, conduct surveys of sharp-tailed grouse leks prior to construction using approved methods to detect lek locations that could be seen from the construction ROW (MDEQ and MFWP).
- From March 1 to June 15, prohibit construction and routine maintenance activities within 0.25 mile of an active sharp-tailed grouse lek that could be seen from the construction ROW (MDEQ, MFWP, and BLM).
- Avoid construction and reclamation activities within 0.62 mile of active raptor nests between March 15 and July 15 (MDEQ and MFWP).
- Avoid great blue heron rookeries by at least 500 feet (MDEQ and MFWP).

- Minimize tree clearing through a narrowing of the construction ROW and final centerline location near certain stream crossings to minimize impacts to bats and other wildlife associated with riparian habitats (MDEQ and MFWP).
- Within winter ranges for pronghorn and mule deer in Montana, develop construction timing restrictions after November 15 in consultation with MFWP biologists based on the severity of winter conditions (MDEQ and MFWP).
- To protect small animals from entanglement, do not use erosion materials that incorporate plastic netting with openings less than 2 inches across (MDEQ and MFWP).

4.6.4 Additional Mitigation

No additional mitigation measures are recommended or required. However, additional mitigation may be required by local, state, or federal permitting agencies during their permitting processes.

4.6.5 Connected Actions[2]

4.6.5.1 Bakken Marketlink Project

The Bakken Marketlink Project facilities would be located within private land currently used as pastureland and hayfields. A survey indicated that there were no listed species, listed species habitat, raptors, waterbodies, or wetlands observed on the property.

4.6.5.2 Big Bend to Witten 230-kV Transmission Line

Upgrades to the power grid in South Dakota to support power requirements for pump stations would include construction of a new 230-kV transmission line and a new substation. Federal and state permit applications for this project would be reviewed and acted on by other agencies, including the Rural Utilities Service. Those agencies would conduct detailed environmental reviews of the Big Bend to Witten Transmission Line Project. Construction and operation impacts on wildlife would be the same as, or similar to, the distribution lines discussed below; however, it is likely that the poles for the 230-kV line would be larger and that the area disturbed around the installation site would likely be larger.

The transmission poles along the line would be a maximum of 115 feet tall with an average span of approximately 800 feet and there are no guy wires proposed. Lengths of vegetation communities crossed by the preferred route are presented in Table 4.5-4. The preferred route would cross approximately 76 miles of habitat. Over 99 percent of impacts to habitat occur to grassland/pasture, developed land, and agricultural lands. The transmission line route would cross the White River and several smaller streams. Transmission line crossings of the larger rivers would likely increase collision hazard for migrant and breeding waterfowl at these locations, as discussed below. Collision and electrocution impacts on birds resulting from construction of the 230-kV transmission line would be reduced through implementation of the same mitigation measures discussed below for power distribution lines to pump stations.

[2] Connected actions are those that 1) automatically trigger other actions which may require environmental impact statements, 2) cannot or will not proceed unless other actions are taken previously or simultaneously, 3) are interdependent parts of a larger action and depend on the larger action for their justification.

4.6.5.3 Electrical Distribution Lines and Substations

Electrical distribution line construction and operation would require clearing of trees and shrubs, and maintaining vegetation under the power lines in an herbaceous state. Power distribution lines and substations constructed to provide power for the proposed Project pump stations could affect wildlife resources through the following:

- Habitat loss, alteration, and fragmentation;
- Direct morality during construction;
- Direct mortality due to collision with or electrocution by power distribution lines;
- Stress or avoidance of feeding due to exposure to construction and operations noise, and from increased human activity;
- Loss of breeding success from exposure to construction and operations noise, and from increased human activity; and
- Reduced survival and reproduction for ground nesting birds due to the creation of perches for raptors and corvids (e.g., crows, ravens, magpies) in grassland and shrubland habitats.

Preliminary siting information indicates that approximately 378 miles of new electric distribution lines would be necessary to power pump stations along the proposed pipeline ROW for the Project (see Section 2.1.12.3, Electrical Distribution Lines and Substations) in Montana, South Dakota, Nebraska, and Kansas. Wildlife habitats potentially affected by construction and operation of distribution lines in Montana and South Dakota include 200 miles of grassland/rangeland, 48 miles of cropland, less than 1 mile of upland forest, 4 miles of wetland and water, 12 miles of scrub-shrub, and 36 miles of developed land. The final locations for electric distribution lines through Nebraska and Kansas have not yet been determined but they would likely impact croplands and grassland/rangelands.

The power distribution lines to Pump Stations 9 and 10 would cross the Milk River and associated oxbows and wetlands in Phillips County, Montana, and are expected to present a collision hazard for waterfowl. The power distribution line to Pump Station 9 would cross approximately 15 miles of the Glaciated Prairie Sage-Steppe IBA. This IBA encompasses an expanse of largely unbroken sage brush shrub-steppe and prairie grassland supporting the greater sage-grouse, a species of global concern (Montana Audubon 2008). The power distribution line to Pump Station 10 would cross approximately 19 miles of the North Valley Grasslands IBA and may impact survival and reproduction for ground nesting grassland birds; and approximately 2 miles of the Charles M. Russell National Wildlife Refuge, an IBA that supports 15 birds of global conservation concern (Montana Audubon 2008). Other power distribution line routes would also cross smaller rivers and streams that are likely to attract raptors and migratory birds. Raptor nest surveys of power line routes for Pump Stations 9 to 20 identified 13 active raptor nests within 1 mile of proposed power line routes. Six of these nests occurred within 0.5 mile of a proposed power line route.

Power distribution lines across riparian and wetland habitats provide perches that facilitate eagle, hawk, corvids, and falcon predation on waterfowl, shorebirds, and ground nests. Newly constructed power distribution lines across grasslands, shrublands, croplands, and pastures that are used by grassland nesting songbirds and grouse could be used as vantage perches by raptors, facilitating predation on these ground-nesting birds. Location of poles across grassland and

shrubland habitats would reduce habitat suitability for ground-nesting birds, potentially resulting in functional habitat loss and population declines through site avoidance. New electric power distribution line segments would increase the collision potential for migrating and foraging birds. Factors influencing collision risk are related to the avian species, the environment, and the configuration and location of lines. Species-related factors include habitat use, body size, flight behavior, age, sex, and flocking behavior. Heavy-bodied, less agile birds—or birds within large flocks, as is typical of migrating sandhill cranes—may lack the ability to quickly negotiate obstacles, making them more likely to collide with overhead lines. Environmental factors influencing collision risk include weather, time of day, lighting and line visibility, land use practices that may attract birds (such as grain fields), and human activities that may flush birds (such as nearby roadways). Power distribution line-related factors that influence collision risk include the configuration and location of the line, conductor, ground wire, and guy wire diameter, and line placement with respect to other structures or topography (Avian Power Line Interaction Committee [APLIC] and USFWS 2005).

Birds are electrocuted by power distribution lines principally because of two factors: 1) environmental factors such as topography, vegetation, available prey, and other behavioral or biological factors that influence avian use of power poles; and 2) inadequate separation between energized conductors or energized conductors and grounded hardware that provide two points of contact (APLIC and USFWS 2005). Raptors and corvids are opportunistic and may use power poles for nesting sites, vantages for territorial defense, or vantages for hunting. Power poles and lines may provide perches for hunting that offer a wide field of view above the surrounding terrain (APLIC and USFWS 2005). Collision and electrocution impacts on birds resulting from construction of distribution lines would be reduced by mitigation requirements imposed by state and federal regulatory agencies (such as the conservation measures in the 2013 USFWS Biological Opinion), including the following:

- Incorporate Avian Protection Plan Guidelines (APLIC and USFWS 2005) into the routing, design, and operation of the electrical distribution lines to reduce likelihood for collision and electrocution mortality of migratory birds, which could include:
  - Routing to avoid construction of new lines in high-use bird areas to avoid areas with grouse leks, brood-rearing habitat, and habitats that support wintering raptors;
  - Reduction of the risk of collisions by burying new power lines over short segments where they cross known flight paths of birds, especially next to wetland areas and near grouse leks; and
  - Reduction of the risk of collisions by using marking techniques to increase visibility of overhead wires to birds.
- Incorporate standard, avian-safe designs, as outlined in *Suggested Practice for Avian Protection on Power Lines* (APLIC and USFWS 2006, APLIC and USFWS 2005), into the design of electrical distribution lines in areas of identified avian concern to prevent electrocution, including:
  - Use of a minimum 60-inch separation between energized conductors/hardware and grounded conductors/hardware to protect eagles;
  - Increased separation where necessary to achieve adequate separation for types of birds involved;

- Covering energized parts and/or grounded parts to provide incidental contact protection for birds; and
- Application of perch management techniques where appropriate.

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