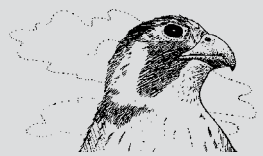
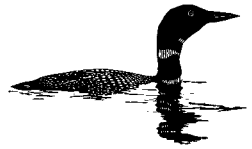


Appendix C.6. Selected Species of Concern

This section contains information about the recommended subdivision design standards for selected Species of Concern.

Species of Concern are native wildlife species that are at risk due to declining population trends, threats to their habitats, restricted distribution, and/or other factors. Montana Fish, Wildlife & Parks and the Montana Natural Heritage Program jointly designate Montana Species of Concern, which is not a statutory or regulatory classification. Rather, these designations provide information that can help resource managers and others make proactive decisions regarding species conservation. A current Species of Concern list can be obtained at: **http://mtnhp.org/SpeciesOfConcern/?AorP=a**.



Common Loon (*Gavia immer*)

Habitat Requirements

Common Loons have three primary needs for breeding: nesting sites, nursery areas, and foraging areas. In Montana, Common Loons generally do not nest on lakes smaller than 13 acres in size or over 5,000 feet in elevation (Skaar 1990). Small islands are preferred for nesting, but herbaceous shoreline areas (especially promontories) are also selected for nesting (Skaar 1990). The highest nest success in Montana was observed on lakes less than 60 acres in size, with only one Common Loon pair territory situated in a complex of quality feeding lakes (Paugh 2006). Nursery areas are important to protect. These areas are typically shallow, sheltered areas within a Common Loon territory with abundant insects and small fish that provide a secure location to raise loon chicks (Hammond 2009).

Typical Locations in Montana

Common Loons occur throughout Montana, but breeding is generally confined to the northwestern corner of the state; they rarely overwinter in the state (see Figure C.6-1). About 200 loons, including about 62 nesting pairs, use the state on an annual basis (Hammond 2009).

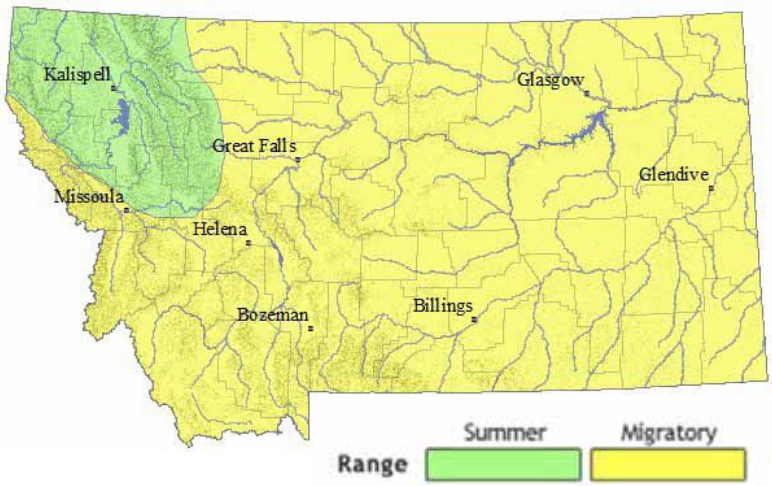


Figure C.6-1. *Map showing the general distribution of Common Loons in Montana, including nesting and migration areas (MT Field Guide 2012).*

Objective of Recommended Design Standard

- Protect all current and traditional Common Loon nesting sites from development and degradation from human disturbances associated with developed facilities such as buildings, roads, trails, and docks.

Conservation Status

Common Loons are classified as a Tier I species by Montana Fish, Wildlife & Parks (Greatest Conservation Need; MCFWCS 2005); Priority Level I by Montana Partners in Flight (declining population trends and/or Montana is of high importance for the population; Casey 2000); Montana rank S2 by the Montana Natural Heritage Program (at risk because of very limited and/or potentially declining population numbers, range, and/or habitat; MT Field Guide 2012); and a "sensitive species" by both the Bureau of Land Management and the U.S. Forest Service in Montana (MT Field Guide 2012).

Impacts from Development

Because loons exhibit strong year-to-year fidelity to previous nest sites, there is a high probability that they will reuse nests and nurseries if these areas are not developed or degraded. The most significant changes that occur in breeding areas are shoreline development and increased recreational use. Shoreline development impacts habitat for loons by degrading vegetation that provides important cover, increasing predators associated with humans (e.g., dogs, cats, skunks, and raccoons), and increasing overall human activity (Evers 2007). The probability of nest success decreases with increased shoreline development and recreational activity, though some loon pairs show an ability to habituate to human activities (Heimberger et al. 1983). Human and dog disturbance can play an important role in nest failures. As nesting lakes become more developed, shoreline nesting sites can be lost. Loons are highly intolerant of human activity in their nesting territory: One study found that 60 percent of nest departures of incubating loons was due to human disturbance (Kelly 1992); a second study found that cottages within almost 500 feet (150 meters) of a nest drastically lowered hatching success (Heimberger et al. 1983).

Recommended Standard

Maintain a 500-foot vegetated buffer between Common Loon nesting sites and subdivision design features.

Substantial Evidence for Common Loon Recommendation

Common Loons can reuse nests from year to year. Consequently, protection of known nesting and nursery areas is essential. The following scientific studies and professional opinions justify the recommended standard:

- "Erect no structures within 150 m (492 ft) of [Common Loon] nest sites" (Knutson and Naef, 1997, p. 168).

- Avoid construction of a building, road, trail, public access, dock, or any development within 500 feet of existing, historical, and potential nest sites on active nesting lakes or lakes with nesting in the last five years (Hammond 2009).

- "Common loons are very susceptible to nest disturbance. They are intolerant of recurrent disturbance within 150 m (492 ft) of nest sites . . . Erect no structures within 150 m (492 ft) of nesting sites. Avoid building within this distance year-round to maintain a permanent buffer around nests" (Lewis et al. 1999, p. 1–4).

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Great Blue Heron (*Ardea herodias*)

Habitat Requirements

Great Blue Herons live near most types of water, including wetlands, streams, and rivers. They generally forage in slow-moving, calm water and are known to eat fish, amphibians, invertebrates, reptiles, mammals, and birds (MT Field Guide 2012).

Nesting occurs in colonies, primarily in riparian areas, but also in drier uplands. In areas where trees are not available, herons occasionally nest on the ground on islands (MT Field Guide 2012). Nests are usually constructed in the tallest trees available, typically at heights ranging from 29 to 85 feet (9 to 26 meters).

It is important to have nesting sites in close proximity to suitable foraging habitat: Although Great Blue Herons may forage up to 18 miles (29 kilometers) from a colony, most forage within 1 to 3 miles (2 to 5 kilometers) of the colony (Butler 1992; Quinn and Milner 2004).

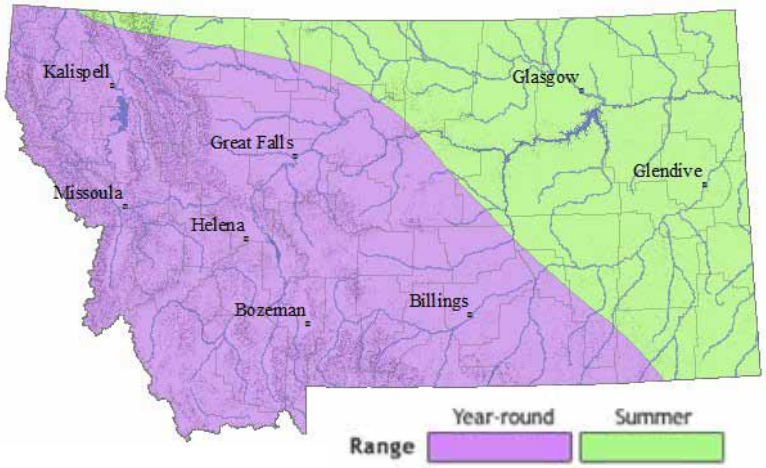

Figure C.6-2. *Map showing the general distribution of Great Blue Herons in Montana (MT Field Guide 2012).*

Typical Locations in Montana

In Montana, Great Blue Herons are found statewide during the breeding season, typically at lower elevations near rivers, streams, and wetlands. They are also known to overwinter in the state (see Figure C.6-2).

Objective of Recommended Design Standards

- Protect colonial Great Blue Heron nesting sites from human disturbances associated with developed facilities such as buildings, roads, trails, and docks.

Conservation Status

Great Blue Herons are a Species of Concern in Montana. They are considered a species potentially at risk because of limited and/or declining numbers, range, and/or habitat (S3) by Montana Fish, Wildlife & Parks and the Montana Natural Heritage Program (MT Field Guide 2012).

Impacts from Development

Great Blue Herons are generally known to be sensitive to human disturbance. They are colonial breeders, most vulnerable to disturbance during the nesting season. Additionally, heron rookeries can become targets for vandalism. Nesting areas have been abandoned in response to housing and industrial development, road construction, vehicle traffic, and repeated human intrusions. It should be noted that some colonies located in close proximity to existing human activities may tolerate some disturbance (Butler 1992; Knutson and Naef 1997; Quinn and Milner 2004).

Recommended Standards

Maintain an 800-foot vegetated buffer between Great Blue Heron colonial nesting areas and subdivision design features. Within the vegetated buffer, install power lines underground.

Substantial Evidence for Great Blue Heron Recommendations

Great Blue Heron colonies usually exist in the same location for many years (Butler 1995). Consequently, protection of known colonial nesting sites is essential. The following scientific studies and professional opinions justify the recommended standards:

- "Establishment of buffer distances will be influenced by factors pertaining to a specific heron colony. Whenever possible, a minimum habitat protection buffer of 250 to 300 m (820–980 ft) from the peripheries of a colony should be established" (Knutson and Naef, 1997, p. 169).

- "We recommend the establishment of permanent, year-round minimum protection areas (buffers) of 250–300 m (820–984 ft) from the peripheries of colonies (Bowman and Siderius 1984; Quebec 1986 in Kelsall 1989; Vos et al. 1985; Buckley and Buckley 1976; Pullin 1988; Short and Cooper 1985; Parker 1980). All human activities likely to cause colony abandonment should be restricted in this buffer year-round." (Quinn and Milner 2004, p. 3-3)

- "To protect colonies from human disturbance, most studies reviewed by Butler (1992) recommended a minimum 300 m (984 ft) buffer zone from the periphery of colonies in which no human activity occurs during the courtship and nesting season (15 February to 31 July)" (Quinn and Milner 2004, p. 3-3).

- "The high casualty rate for great blue herons suggests this species is vulnerable to power line collisions . . . these birds may not see or be able to avoid objects they approach in flight. Great blue herons often fly at dawn or dusk, when visibility is poor, so behavior may influence their vulnerability. We recommend that this species be given special attention in impact analyses of proposed transmission lines near rookeries or other areas they frequent" (Rusz et al. 1986, p. 444).

- "Large, less maneuverable birds are more vulnerable to collisions with power lines, including Great Blue Herons (*Ardea herodias*) . . ." (Manville 2005, p. 1055).

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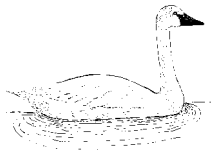

Trumpeter Swan (*Cygnus buccinators*)

Habitat Requirements

Trumpeter Swan breeding habitat consists of unpolluted marshes, ponds, lakes, reservoirs, and slow-moving rivers with little fluctuation in the water level. Ponds and marshes are typically less than 4 feet (1.2 meters) deep, with substantial, diverse aquatic plant communities, aquatic insects, and other invertebrates. Nesting sites generally consist of structures such as muskrat lodges, abandoned beaver lodges, sedge hummocks, islands, or other similar structures (Casey 2000). Swans sometimes show a preference for water bodies with a highly irregular shoreline (Mitchell and Eichholz 2010). The territory defended by breeding adult swans has been documented to be between 3.7 and 250 acres in size, often with only one pair breeding per pond (Mitchell and Eichholz 2010).

Non-breeding habitat for Trumpeter Swans consists of large and small lakes and ponds in southwestern Montana. During the winter these birds use habitat in areas where water does not freeze and food is plentiful and accessible, moving to new locations if conditions become too severe (Montana's Comprehensive Fish and Wildlife Conservation Strategy (MCFWCS) 2005). All water bodies used by Trumpeter Swans need to have approximately 300 feet (100 meters) of open water in order for the birds to take off in flight (Mitchell and Eichholz 2010).

Typical Locations in Montana

Trumpeter Swans are found in Montana throughout the year (see Figure C.6-3). This species historically bred throughout much of western Montana, but now is found breeding in the Greater Yellowstone Ecosystem (including Red Rock Lakes/Centennial Valley) and on the Rocky Mountain Front (MT Field Guide 2012). The non-breeding range of these swans is limited to several areas in the southwestern part of the state (Beaverhead, Gallatin, and Madison Counties). In winter, distribution of these birds is concentrated around Ennis Lake, the Madison River complex, Hebgen Lake, and the surrounding area (MCFWCS 2005). Work to reestablish a population has been initiated on the Flathead Reservation south of Kalispell and in the Upper Blackfoot drainage (Casey 2000; MT Field Guide 2012).

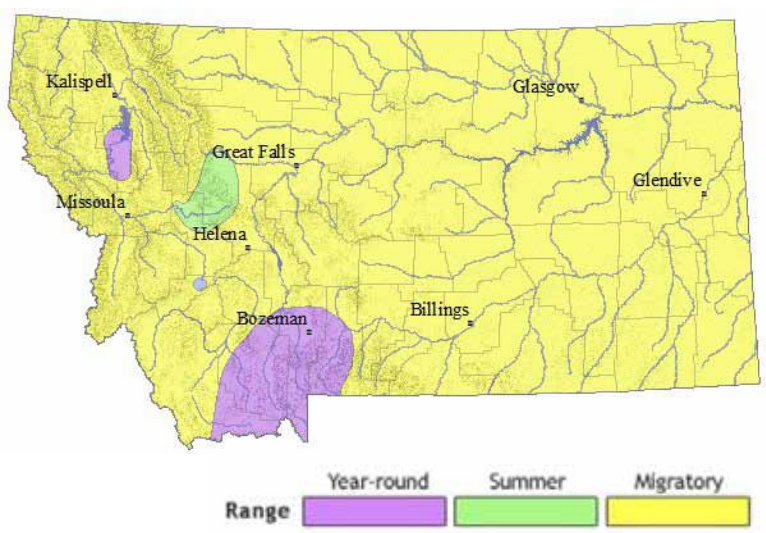

Figure C.6-3. *Map showing the general distribution of Trumpeter Swans in Montana, including breeding and overwintering areas (MT Field Guide 2012).*

Objective of Recommended Design Standards

- Protect all current and traditional Trumpeter Swan nesting and overwintering sites from development and degradation from human disturbances associated with developed facilities such as buildings, roads, trails, and docks.

Conservation Status

Trumpeter Swans are a Species of Concern in Montana. They are classified as a Tier I species by Montana Fish, Wildlife & Parks (Greatest Conservation Need; MCFWCS 2005); Priority Level I by Montana Partners in Flight (declining population trends and/or Montana is of high importance for the population; Casey 2000); Montana rank S3 by the Montana Natural Heritage Program (potentially at risk because of limited and/or declining numbers, range, and/or habitat; MT Field Guide 2012); and a "sensitive species" by both the Bureau of Land Management and the U.S. Forest Service in Montana (MT Field Guide 2012).

Impacts from Development

Managing biologists have identified the following threats to Trumpeter Swans: rapid increases in human populations and development in the Greater Yellowstone area; habitat destruction and fragmentation; and lack of protection for core nesting, migration, and winter habitats (Pacific Flyway Council and U.S. Fish & Wildlife Service 2003).

Trumpeter Swans are sensitive to human disturbance, and they exhibit strong year-to-year fidelity to both previous nest sites and wintering habitat (Mitchell and Eichholz 2010; Slater 2006). Because there is a high probability that these birds will reuse specific lakes and ponds, it is important to protect these areas from development and degradation. Swans are sensitive to bird watching, photography, boating, float-plane use, and other activities in or near nesting areas. These activities may cause nest failures or cygnet loss (Mitchell and Eichholz 2010). Additionally, activities that disrupt winter foraging or cause excessive energy loss may cause fatality or loss of reproductive potential because of poor condition (Mitchell and Eichholz 2010).

Trumpeter Swans are vulnerable to collisions with power lines, wind turbines, communications towers, and other structures (Pacific Flyway Council and U.S. Fish & Wildlife Service 2003). It is recommended that power lines be relocated underground in areas adjacent to nesting and brood-rearing locations (MCFWCS 2005).

Recommended Standards

Maintain a 1,000-foot vegetated buffer between Trumpeter Swan nesting and overwintering sites and subdivision design features. Within the vegetated buffer, install power lines underground.

Substantial Evidence for Trumpeter Swan Recommendations

Trumpeter Swans use the same locations for nesting and wintering for many years (Mitchell and Eichholz 2010; Slater 2006). Consequently, protection of known nesting and overwintering sites is essential. The following scientific studies and professional opinions justify the recommended standard:

- "Where wildlife viewing areas are desired, such sites should be located > 300 m [984 feet] from a trumpeter swan nest, and be hidden in vegetation or designed to minimize noise and visibility of users" (Henson and Grant 1991, p. 255).

- "No long term development (roads, wells, pipelines, etc.) within 500 m [1,640 feet] of the high water mark on identified lakes or water bodies [used by Trumpeter Swans]" (Alberta Fish and Wildlife Division 2001, p. 2).

- Trumpeter Swans are vulnerable to power line collisions. Montana's Comprehensive Fish and Wildlife Conservation Strategy specifically recommends to "relocate power lines underground in areas adjacent to [Trumpeter Swan] nesting and brood rearing locations" (MCFWCS 2005, p. 293).

- "Large, less maneuverable birds are more vulnerable to collisions with power lines, including Great Blue Herons (*Ardea herodias*), cranes (*Grus* spp.), swans (*Cygnus* spp.) . . . Line collisions resulted in . . . 44 percent mortality of fledged Trumpeter Swans (*C. buccinator*) in Wyoming (Lockman 1988) . . ." (Manville 2005, p. 1055)

- "Electrocution resulting from collisions with power lines is thought to be a significant source of mortality for Trumpeter Swans. Several studies report high mortality from power lines and wire fences (Lockman et al. 1987; Gillette 1990; Lockman 1990). In the Grande Prairie area, 6–10 swan electrocutions are reported annually, but the actual number of deaths from electrocution is likely much higher (D. Hervieux, pers. comm.)." (James 2000, p. 12)

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Long-billed Curlew (*Numenius americanus*)

Habitat Requirements

In Montana, Long-billed Curlews are usually found in native prairies and grasslands. Their habitat depends on the presence of short grasses, predominantly where vegetation is 4 to 12 inches (10 to 30 centimeters) tall. During the breeding season they are found in "the simplest, most open habitat available" as they are "avoiding trees, tall weedy vegetation, and tall dense shrubs . . ." (Fellows and Jones 2009). While wet habitats are not known to be necessary for nesting, water does seem to be important, especially for fledgling birds who must feed themselves; many nests have been located in arid habitats relatively close to a water source (Casey 2000; Fellows and Jones 2009).

Typical Locations in Montana

Long-billed Curlews breed in suitable habitat throughout Montana, although they are more common east of the Rocky Mountains. These birds do not overwinter in the state (see Figure C.6-4) (MT Field Guide 2012; MCFWCS 2005).

Objective of Recommended Design Standard

- Maintain large blocks of breeding habitat for Long-billed Curlews by minimizing human disturbances associated with developed facilities such as buildings, roads, towers, and other infrastructure.

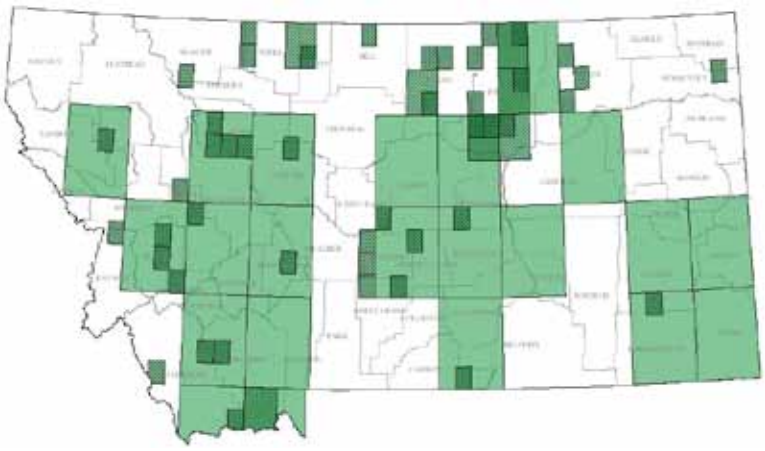

Figure C.6-4. *Map showing the known locations of Long-billed Curlew breeding areas identified in Montana. Darker colors represent more nesting sites (MT Field Guide 2012).*

Conservation Status

Long-billed Curlews are a Species of Concern in Montana; it is estimated that 19 percent of the world's population of Long-billed Curlew nest in Montana (Montana Natural Heritage Program and Montana Department of Fish, Wildlife & Parks 2010). They are classified as a Tier I species by Montana Fish, Wildlife & Parks (Greatest Conservation Need; MCFWCS 2005); Priority Level II by Montana Partners in Flight (Species in Need, lesser threat or stable/increasing population; Casey 2000); Montana rank S3B by the Montana Natural Heritage Program (the breeding population of the species in Montana is potentially at risk because of limited and/or declining numbers, range, and/or habitat; MT Field Guide 2012); and a "sensitive species" by the Bureau of Land Management (MT Field Guide 2012).

Impacts from Development

This species is considered at risk because of loss and/or fragmentation of habitat, population declines in some areas, and human disturbance during nesting (e.g., Fellows and Jones 2009; Dechant et al. 2003; Saalfeld and Conway 2008). Several resource management plans developed by western states indicate that conservation of curlew habitat requires minimizing the conversion of native prairie to urban development, including subdivisions (e.g., MCFWCS 2005; Fellows and Jones 2009; Wyoming Game and Fish Department 2005).

Recommended Standard

Maintain a 1,000-foot vegetated buffer between Long-billed Curlew nesting areas and subdivision design features.

Substantial Evidence for Long-billed Curlew Recommendation

Protection of areas used by Long-billed Curlews is critical for their conservation. Many individuals return to the same breeding sites year after year. This trend has specifically been documented on the Rocky Mountain Front (Fellows and Jones 2009). Consequently, protection of known nesting areas is essential. The loss of native grasslands in nesting areas is the primary threat to curlew populations. The following scientific studies and professional opinions justify the recommended standard:

- "Habitat areas need to be more than three times as large as a long-billed curlew's territory, which averages about 14 hectares (34.6 acres), in order for curlews to use them" (MCFWCS 2005, p. 327). Three times the average curlew territory of 34.6 acres is approximately 104 acres, or 4,521,528 square feet; the radius of a 104-acre circular buffer protecting a curlew nesting site is 1,200 feet (see Figure C.6-5).

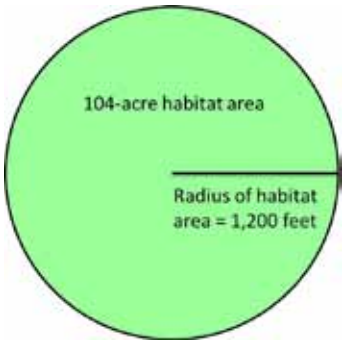

Figure C.6-5. *Illustration showing the radius of a circular 104-acre Long-billed Curlew habitat area (radius = 1,200 feet)*

- "Long-billed Curlews seem to require large blocks of grasslands. Bicak et al. (1982) found that territories averaged 14 ha [hectare] in size and were set in a[n additional] buffer zone of from 300 to 500 m [984–1,640 feet] of grassland" (Casey 2000, p. 51).

- The setback distance by land use category for human structures (e.g., well site, power line, pipeline, building, road) is recommended to be 200 meters (656 feet) from a Long-billed Curlew nest site. "Setback distances are based on what experts believe are the thresholds at which human disturbance is likely to cause degradation and possible abandonment of key wildlife areas/sites" (Alberta Fish and Wildlife Division 2001, p. 3).

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Burrowing Owl (*Athene cunicularia*)

Habitat Requirements

In Montana, Burrowing Owls are found in open grasslands where abandoned burrows dug by mammals such as ground squirrels (*Spermophilus* spp.), prairie dogs (*Cynomies* spp.), and badgers (*Taxidea taxus*) are available. Black-tailed prairie dog (*Cynomys ludoviscianus*) and Richardson's ground squirrel (*Spermophilus richardsonii*) colonies provide the primary and secondary habitat for Burrowing Owls in Montana (Klute et al. 2003; Restani et al. 2001). The burrows may be enlarged or modified, making them more suitable. Burrowing Owls spend much time on the ground or on low perches such as fence posts or dirt mounds.

Typical Locations in Montana

Burrowing Owls have been observed throughout the state, but are more common east of the Continental Divide where there is more grassland habitat available for nesting and prey species (see Figure C.6-6). In Montana, Burrowing Owls are closely tied to prairie dog habitat (e.g., Klute 2003; Restani et al. 2001; Restani et al. 2008).

Objective of Recommended Design Standard

- Protect and conserve Burrowing Owl nests from human disturbances associated with developed facilities such as buildings and roads.

Conservation Status

Burrowing Owls are a Species of Concern in Montana. They are classified as a Tier I species by Montana Fish, Wildlife & Parks (Greatest Conservation Need; MCFWCS 2005); Priority Level I by Montana Partners in Flight (highest priority species, Montana has a clear obligation to implement conservation; Casey 2000); Montana rank S3B by the Montana Natural Heritage Program (the breeding population of the species in Montana is potentially at risk because of limited and/or declining numbers, range, and/or habitat; MT Field Guide 2012); and a "sensitive species" by the U.S. Forest Service and Bureau of Land Management (MT Field Guide 2012).

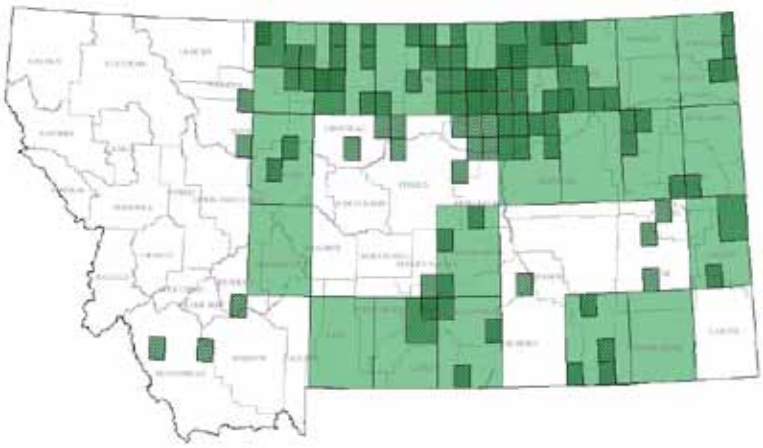


Figure C.6-6. *Map showing the general distribution of known Burrowing Owl nesting areas identified in Montana. Darker colors represent more nesting sites (MT Field Guide 2012).*

Impacts from Development

Urban development is one of the important factors limiting Burrowing Owl populations through the destruction of nesting habitat (Casey 2000; Nicholoff 2003). Urbanization increases the risk of mortality from vehicles, humans, and domestic and feral animals (Klute et al. 2003). One study estimated that 20 percent of damaged Burrowing Owl burrows within the study site were caused by dogs and 65 percent by humans (Haug et al. 1993). Additionally, reproductive success at sites where home construction occurs is significantly less than at sites next to construction or where construction is not taking place (Haug et al. 1993). Although research suggests that Burrowing Owls can benefit from high prey densities around homes, increases in human-caused nest failures and declines in the number of young fledged at successful nests in heavily developed areas offset the advantages of abundant prey (Millsap and Bear 2000).

Recommended Standard

Maintain a 1,000-foot vegetated buffer between Burrowing Owl nesting areas and subdivision design features.

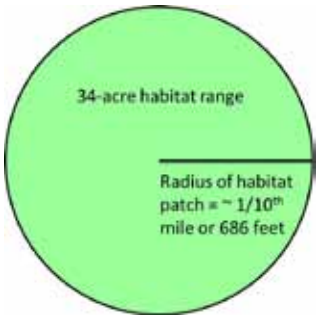
Substantial Evidence for Burrowing Owl Recommendation

Burrowing Owls can reuse nests from year to year (Nicholoff 2003). Consequently, protection of known nesting areas is essential. The following scientific studies and professional opinions justify the recommended standard:

- The setback distance by land use category for human structures (e.g., well site, power line, pipeline, building, road) is 500 meters (1,640 feet equals approximately one-third mile) for a Burrowing Owl nest site. "Setback distances are based on what experts believe are the thresholds at which human disturbance is likely to cause degradation and possible abandonment of key wildlife areas/sites" (Alberta Fish and Wildlife Division 2001, p. 3).

- "Maintain habitat conditions within ¼ to ½ mile (0.4 to 0.8 km [or 1,320 to 2,640 feet]) of known Burrowing Owl nest sites in an undisturbed manner . . . Protect all known nest burrows, as the same burrow will often be reused in subsequent years . . . Maintain a buffer zone of ¼ to ½ mile (0.4 to 0.8 km) around Burrowing Owl nest burrows. Limit insecticide use, rodent control, and human disturbances in these buffer zones" (Nicholoff 2003).

- "Home ranges for Burrowing Owls in Saskatchewan were found to be 0.14 to 4.81 square kilometers; with 95% of all movements within 600 meters [1,970 feet equals approximately one-third mile] of the nest burrow (Haug and Oliphant 1990)." (MT Field Guide 2010) Burrowing owl home ranges of 0.14 to 4.81 square kilometers are 34 to 1,188 acres in size, or 1,481,040 to 51,749,280 square feet; the radius of a 34- to 1,188-acre circular buffer protecting a Burrowing Owl nesting site is 686 to 4,058 feet (approximately one-tenth to three-quarters of a mile) (see Figure C.6-7 below).



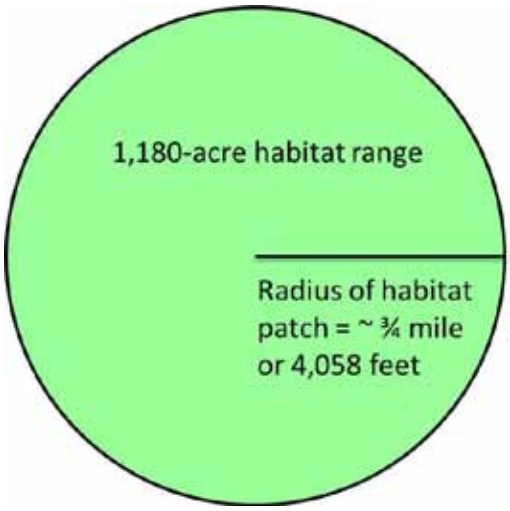


Figure C.6-7. *Illustrations showing the radii of circular Burrowing Owl habitat ranges found in Saskatchewan: (above left) a 34-acre range (radius = 686 feet) and (above right) a 1,180-acre range (radius = 4,058 feet)*

- "Radii of 600 m [1,969 feet] . . . had biological significance because burrowing owls spent approximately 95% of their time foraging within 600 m of nests (Haug and Oliphant 1990) . .." (Restani et al. 2008, p. 980)

- Before fall migration, young Burrowing Owls were found between 20 to 300 meters (66 tp 984 feet) from their nest burrow, with an average distance of 350 feet (107.5 meters) plus or minus 68 feet (20.6 meters) (Davies and Restani 2006).

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Bald Eagle (*Haliaeetus leucocephalus*) and Golden Eagle (*Aquila chrysaetos*)

Habitat Descriptions and Locations

Bald and Golden Eagle habitat requirements and distribution information are described below.

Bald Eagle

Bald Eagle Habitat Requirements

Throughout their range, Bald Eagles select territories with tall snags or live trees with horizontal limbs capable of supporting large, heavy nests and providing perches and roosts. They have also been known to nest in short trees and on human-made structures (e.g., osprey platforms, cellular towers), cliffs, and other substrates. In Montana, Jensen (1988) documented Bald Eagles nesting in the following tree species: ponderosa pine, black cottonwood, plains cottonwood, narrowleaf cottonwood, western larch, Douglas fir, and lodgepole pine. Nest trees averaged 99.7 feet in height and 37.8 inches in diameter at breast height (DBH). The average distance from the nest to water was 738 feet (Jensen 1998).

Bald Eagle Locations in Montana

Bald eagles occur year-round throughout Montana (see Figure C.6-8). Breeding distribution is generally associated with the availability of nesting habitat near lakes and large rivers (MT

Figure C.6-8. *Map showing the year-round, statewide distribution of Bald Eagles in Montana. (MT Field Guide 2012).*

Field Guide 2012). As of 2008, there were approximately 490 Bald Eagle nesting territories in Montana (FWP unpublished data).

Golden Eagle

Golden Eagle Habitat Requirements

Throughout their range, Golden Eagles are most commonly associated with arid, open habitat with a dominant vegetation of shrubs and grasses where they hunt for food. In Montana these eagles eat primarily jackrabbits, ground squirrels, and carrion (dead animals). They nest on cliffs and in large trees, where nests are sometimes over six feet in diameter. Occasionally they nest on power poles. Golden Eagles nest in the same territory year after year, and the same pair often uses the same nest year after year. These eagles also may use different nests within the territory in different years (MT Field Guide 2012; Kochert et al. 2002).

Figure C.6-9. Map showing the year-round, statewide distribution of Golden Eagles in Montana (MT Field Guide 2012).

Golden Eagle Locations in Montana

Golden Eagles occur year-round throughout Montana (see Figure C.6-9). Breeding distribution is generally associated with the availability of suitable nest sites near open country, such as grasslands, mountain meadows, and sagebrush shrub/steppe, which is used for foraging. They are found from low (sea level) to high (11,900 feet) elevations (MT Field Guide 2012; Kochert et al. 2002).

Objectives of Recommended Design Standards

- Protect and conserve Bald and Golden Eagle nests from human disturbances associated with developed facilities such as buildings, roads, and trails.
- Reduce the potential risk for violations associated with the Bald and Golden Eagle Protection Act. A description of this act follows.

Bald and Golden Eagle Protection Act

This legislation prohibits destruction or disturbance of Bald and Golden Eagles or their nests. Penalties can be imposed for failure to comply with this act. A copy of the Bald and Golden Eagle Protection Act is available at **http://www.fws.gov/le/pdffiles/BEPA.pdf**. The U.S. Fish and Wildlife Service (USFWS) describes the Act as follows:

> "The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c) . . . prohibits anyone, without a permit issued by the Secretary of the Interior, from 'taking' bald [or golden] eagles, including their parts, nests, or eggs . . . The Act defines 'take' as 'pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb . . .' '[D]isturb' 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 interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death, or nest abandonment.
>
> "A violation of the Act can result in a fine of $100,000 ($200,000 for organizations), imprisonment for one year, or both, for a first offense. Penalties increase substantially for additional offenses, and a second violation of this Act is a felony" (USFWS 2010).

Recommendations for reducing the potential of violating the Bald and Golden Eagle Protection Act when conducting activities in Bald Eagle habitat can be found in the *Montana Bald Eagle Management Guidelines* (Montana Bald Eagle Working Group 2010). A limited number of permits allowing take or disturbance of a Bald or Golden Eagle or their nest may be issued by the USFWS. Potential applicants are strongly encouraged to contact FWP prior to applying for a federal take permit. A state permit may also be required.

Conservation Status

Both Bald and Golden Eagles are Species of Concern in Montana:

- **Bald Eagles** are classified as a Tier I species by Montana Fish, Wildlife & Parks (Greatest Conservation Need; MCFWCS 2005); Priority Level II by Montana Partners in Flight (Species in Need; Casey 2000); Montana rank S3 by the Montana Natural Heritage Program (potentially at risk because of limited and/or declining numbers, range, and/or habitat; MT Field Guide 2012); and a "sensitive species" by the Bureau of Land Management. Bald Eagles are no longer listed as a threatened species under the Endangered Species Act. Instead, they are listed as "recovered and being monitored" (MT Field Guide 2012).

- **Golden Eagles** are classified as a Tier II species by Montana Fish, Wildlife & Parks (Moderate Conservation Need; MCFWCS 2005); Montana rank S3 by the Montana Natural Heritage Program (potentially at risk because of limited and/or declining numbers, range, and/or habitat; MT Field Guide 2012); and a "sensitive species" by the Bureau of Land Management (MT Field Guide 2012).

Impacts from Development

More than 80 percent of the Bald Eagle territories in Montana occur in counties with increasing human populations. Human population growth often translates into increased development. As development in Montana increases, the potential for disturbance-related impacts to eagles also increases. The response of Bald Eagles to disturbance is variable and closely associated with the type of activity, proximity to the eagle, and the visibility of the disturbance activity, but not all activity disturbs eagles (Anthony et al. 1994; Anthony and Isaacs 1989; Arnett et al. 2001; Becker 2002; Call 1979; Chandler et al. 1995; Fraser et al. 1985; Grier et al. 1983; Grubb et al. 2002; Grubb and King 1991; Richardson and Miller 1997; Stalmaster and Kaiser 1999; Steidl and Anthony 1996). Some seemingly benign human activities, such as hiking, may have greater potential to disturb Bald Eagles than watercraft, vehicles, or loud activities (Grubb and King 1991). However, disturbance may result when human activity is unusually loud (e.g., fireworks or construction activities) or the activity breaks from the normal pattern of human use in the vicinity of the nest.

Less is known about the impacts of human disturbance on Golden Eagles. In a study of Golden Eagles, 85 percent of all known nest losses were attributed to human disturbance (Boeker and Ray 1971). In addition, Golden Eagles have been known to abandon their nests because of human activity. Abandoned nesting territories in a California research project had more dwellings within one mile and higher human populations within three miles, than territories that continued to be occupied (Kochert et al. 2002).

Impacts on eagles and other raptors from human disturbance have been well documented:

> "Human disturbances near nest sites have resulted in the abandonment of the nest; high nestling mortality due to overheating, chilling, or desiccation when young are left unattended; premature fledging; and ejection of eggs or young from the nest (Bent 1938; Woffinden 1942; Boeker and Ray 1971; Snow 1974; Fyfe and Olendorff 1976; Call 1979; Swenson 1979; Craighead and Mindell 1981; Suter and Joness 1981; Postovit and Postovit 1987; Palmer 1988; Tella et al. 1996; Anderson and Squires 1997). Raptors which successfully nest during a disturbance may abandon the nesting territory the year following the disturbance (Fyfe and Olendorff 1976; Platt 1977; Ratcliffe 1980; White and Thurow 1985) . . ." (Romin and Muck 1999, p. 7)

Recommended Standards

Maintain a one-half mile vegetated buffer between any Bald or Golden Eagle nests and subdivision design features. Within the vegetated buffer, install power lines according to the raptor standards established by the Avian Power Line Interaction Committee (APLIC 2006).

Substantial Evidence for Bald and Golden Eagle Recommendations

Bald and Golden Eagles usually nest in the same territory annually. Bald Eagles often nest in the same nest for many years (e.g., MT Field Guide 2012; Watson and Rodrick 2000). Golden Eagles can also use the same nest year after year (MT Field Guide 2012). However, both of these birds can have multiple nests in a territory and may use different nests from year to year. Consequently, protection of both occupied and unoccupied nests is essential. The following scientific studies and professional opinions justify the recommended standards:

Bald Eagles

- The following buffer distance is recommended for Bald Eagles in the absence of a visual buffer:

  "½ mile for the following activities:

  - o Any activity that will result in more than one house or permanent construction to include commercial use, buildings 3 or more stories high, activity that would increase human use, or project with a footprint greater than ½ acre.
  - o Construction of new marinas with routine use by 6 or more boats.
  - o Any use of explosives or activities that produce extremely loud noise, such as blasting, use of jackhammers or gravel crushing equipment, or fireworks.
  - o Forest management activities that include harvesting and heavy truck traffic in areas that don't normally have that type of activity.
  - o Construction of new above ground power and utility lines" (Montana Bald Eagle Working Group 2010, p. 7).

- For Bald Eagles ". . . we recommend that human activities within 800 m (one-half mile) of nests be restricted from 1 January to 31 August of each year" (Anthony and Isaacs 1989, p. 158).

- "We suggest a minimum, generic, primary zone of approximately 600 m [three-eighths mile] around breeding bald eagles. Beyond this distance response frequency was generally below 30%. A 1,200-m [three-quarters mile] secondary buffer zone would accommodate most of the distant responses from vehicle, noise, and aircraft disturbance. Typically, no human activity is permitted at any time within a primary protection zone. Within a secondary buffer zone, limited, nonpermanent activity may be allowed during the nonbreeding season (Mathisen et al. 1977; U.S. Fish and Wildlife Service 1981)." (Grubb and King 1991, p. 509)

- "Median distances recommended for buffer zones for nesting raptors . . . bald eagle = 500 m [S‡mile] (range = 250–800 m [approximately 820–2,625 feet (½ mile)], n = 5) . . ." Note that "n = 5" refers to the *number* of studies used to determine the recommended median buffer zone distance (Richardson and Miller 1997, p. 635).

- For Bald Eagle nest sites there should be "[n]o surface occupancy (beyond that which historically occurred in the area) within ¼ mile radius of active nests. . . . Seasonal restriction to human encroachment within ½ mile radius of active nests from October 15 through July 31." Surface occupancy is defined as "[a]ny physical object that is intended to remain on the landscape permanently or for a significant amount of time. Examples include houses, oil and gas wells, tanks, wind turbines, roads, tracks, etc." Human encroachment is defined as "[a]ny activity that brings humans in the area. Examples include driving, facilities maintenance, boating, trail access (e.g., hiking, biking), etc." (Colorado Division of Wildlife 2008, pp. 2 and 5).

- For Bald Eagles "… [b]uffers between 100–1,200 m (330–4,000 ft) have been recommended throughout the United States to protect the integrity of nest trees and stands (Mathison et al. 1977; U.S. Fish and Wildlife Service 1982, 1986; Fraser et al. 1985; Anthony and Isaacs 1989; Grubb and King 1991; Grubb et al. 1992). Nests and nest trees must be protected year-round, since bald eagles typically use and maintain the same nests year after year. In addition, nests that appear to be abandoned also need protection, since bald eagles often construct alternate nests that are used periodically" (Watson and Rodrick 2000, p. 9-9).

Golden Eagles

- "Accelerated commercial and urban development was attributed to golden eagle nesting declines along the Colorado Front Range (Boeker 1974)." (Romin and Muck 1999, p. 7)

- "Median distances recommended for buffer zones for nesting raptors . . . golden eagle = 800 m [½ mile] (range = 200–1,600 m [approximately 660–5,250 feet (1 mile)], n = 3) . . ." Note that "n = 3" refers to the *number* of scientific studies used to determine the recommended median buffer zone distance (Richardson and Miller 1997, p. 635).

- [I]t is recommended that shrub stands be preserved within 3 km (1.9 mi) of golden eagle nests (Kochert et al. 1999). This distance accounted for 95% of eagle movements measured during the breeding season in western Idaho (Marzluff et al. 1997) . . . Avoid new development and human activities near nest sites (especially between 15 February and 15 July)." (Watson and Whalen 2003, pp. 8-3 and 8-7)

- For Golden Eagles there should be "[n]o surface occupancy (beyond that which historically occurred in the area) within ¼ mile radius of active nests. . . . Seasonal restriction to human encroachment within ½ mile radius of active nests from December 15 through July 15." Surface occupancy is defined as "[a]ny physical object that is intended to remain on the landscape permanently or for a significant amount of time. Examples include houses, oil and gas wells, tanks, wind turbines, roads, tracks, etc." Human encroachment is defined as "[a]ny activity that brings humans in the area. Examples include driving, facilities maintenance, boating, trail access (e.g., hiking, biking), etc." (Colorado Division of Wildlife 2008, pp. 2 and 5).

Both Bald and Golden Eagles

- Spatial buffers of one (1) mile for Bald Eagles nests and one-half (½) mile for Golden Eagles nests are recommended (Romin and Muck 1999).

- The federal Bald and Golden Eagle Protection Act (see section above) is designed to protect the nests of these birds from human activity by prohibiting anyone without a permit to "take" ("pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb") Bald and Golden Eagles. Under the Act, the term "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." 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 interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death or nest abandonment" (USFWS 2010).

- "In a summary of eagle mortalities from the early 1960s to the mid-1990s, electrocution accounted for 25% of golden eagle and 12% of bald eagle deaths (Franson et al. 1995). Electrocution accounted for 0.5% of deaths in a study of raptor mortality (n = 409) in California from 1983 to 1994 (Morishita et al. 1998). Of bald eagles banded in the Yellowstone area (n = 49), 20% died from electrocution or collision with power lines (Harmata et al. 1999). In Florida, 17% of bald eagle mortalities (n = 309) from 1963 to 1994 were due to electrocution (Forrester and Spalding 2003). Electrocution also accounted for 6% of eagle mortalities (n = 274) from a rehabilitation database in Florida from 1988 to 1994 (Forrester and Spalding 2003). Electrocution was the cause of death for 11.5% of bald and golden eagles evaluated (n = 546) from 1986 to 1998 in western Canada (Wayland et al. 2003). Of 61 eagles killed in the Diablo Range of the Altamont Pass Wind Resource Area, California, from 1994 to 1997, 16% were electrocuted (Hunt et al. 1999). The frequency of electrocutions and associated outages has been dramatically reduced in areas where concerted efforts have been made to retrofit or replace hazardous poles… using recommendations from previous editions of *Suggested Practices*." Note that "n =" refers to the total *number* of birds (total number of dead eagles, total number of eagles banded, etc.) in a specific scientific study (e.g., the above reference to "n = 49" refers to the following: Of the 49 Bald Eagles banded in the Yellowstone area, 20 percent (or 10 Bald Eagles) died from electrocution or collision with power lines (APLIC 2006, p. 11).

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Ferruginous Hawk (*Buteo regalis*)

Habitat Requirements

In Montana, Ferruginous Hawks commonly nest in sagebrush and grasslands. Nests can be on the ground, in trees, or on rocky outcrops. Although they do not nest in agricultural fields, these hawks will nest in close proximity to capitalize on more abundant prey associated with edge habitats (MT Field Guide 2012).

Typical Locations in Montana

Ferruginous Hawks in Montana are generally associated with native prairie grasslands (prairie grasslands, including mixed-grass prairie) and native shrub habitats (e.g., shrub-grasslands, grass-sagebrush complex, and sagebrush shrub-steppe habitats) (Ensign 1983; Restani 1989; Restani 1991; Wittenhagen 1992; Black 1992; Atkinson 1992; Atkinson 1993) (see Figure C.6-10).

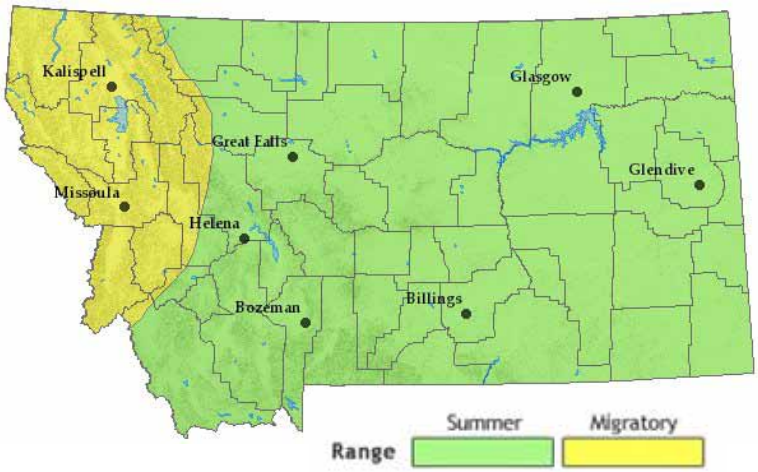

Figure C.6-10. *Map showing the general distribution of Ferruginous Hawks in Montana, including nesting and migration areas (MT Field Guide 2012).*

Objective of Recommended Design Standards

- Protect and conserve Ferruginous Hawk nests from human disturbances associated with developed facilities such as buildings, roads, and trails.

Conservation Status

Ferruginous Hawks are a Species of Concern in Montana. They are classified as a Tier II species by Montana Fish, Wildlife & Parks (Moderate Conservation Need; MCFWCS 2005); Priority Level II by Montana Partners in Flight (Species in Need; Casey 2000); Montana rank S3 by the Montana Natural Heritage Program (potentially at risk because of limited and/or declining numbers, range, and/or habitat; MT Field Guide 2012); and a "sensitive species" by the Bureau of Land Management (MT Field Guide 2012).

Impacts from Development

Ferruginous Hawks are sensitive to disturbance, including low-level disturbance. For example, White and Thurow (1985) found 33 percent of Ferruginous Hawk nests were abandoned after low-level human disturbances. "Low-level disturbance" for their studies meant nesting birds were

disturbed once per day, and the humans left the area as soon as the birds flushed. Ferruginous Hawks are known to abandon nests even when mildly disturbed during nest building or incubation (March 1 through May 31). Additionally, studies show that disturbed nests fledge fewer young, and they often are not reoccupied the year following disturbances (Richardson et al. 1999). Ferruginous Hawks are especially sensitive to human disturbance during incubation, even more so than other raptors. Out of 107 Ferruginous Hawk nests in southern Idaho, no nests were located next to houses (White and Thurow 1985). In addition, researchers found that Ferruginous Hawk tolerance to disturbance did not increase over time, as is the case with many birds, but actually decreased as they were continually exposed to disturbance, resulting in increased flushing distances (White and Thurow 1985). In addition, only 52 percent of the territories that contained disturbed nests were occupied the following year, compared to 93 percent of territories containing undisturbed, control nests (White and Thurow 1985).

Recommended Standards

Maintain a one-half mile vegetated buffer between Ferruginous Hawk nests and any subdivision design features. Within the vegetated buffer, install power lines according to the raptor standards established by the Avian Power Line Interaction Committee (APLIC 2006).

Substantial Evidence for Ferruginous Hawk Recommendations

Ferruginous Hawks are documented to reuse the same nest from year to year. These hawks can have multiple nests in a territory. Sometimes two or more nests are built or refurbished without being used in a particular year (White and Thurow 1985; Bechard and Schmutz 1995). The following studies and professional opinions justify the recommended standards:

- In south-central Idaho, 33 percent of the Ferruginous Hawk nests that were subject to low-level disturbance were abandoned. Those disturbed nests that successfully fledged young produced significantly fewer young than undisturbed nests (White and Thurow 1985).

- "Brief human access and intermittent ground-based activities should be avoided within a distance of 250 m (820 ft) of [Ferruginous Hawk] nests during the hawks' most sensitive period (1 March to 31 May) (White and Thurow 1985). Prolonged activities (0.5 hr to several days) should be avoided, and noisy, prolonged activities should not occur within 1 km (0.6 mi) of nests during the breeding season (1 March to 15 August) (Suter and Joness 1981)." (Richardson et al. 1999, p. 7-3)

- "Avoid construction within 1.6 km (1 mi) of [Ferruginous Hawk] nest sites" (Richardson et al. 1999, p. 7-6).

- "Median distances recommended for buffer zones for nesting raptors . . . ferruginous hawk = 500 m [S‡mile] (range = 200–800 m [approximately 660–2,625 feet (½ mile)], n = 3) . . ." Note that "n = 3" refers to the *number* of scientific studies used to determine the recommended median buffer zone distance (Richardson and Miller 1997, p. 635).

- Spatial buffers of one-half mile are recommended for Ferruginous Hawk nests (Romin and Muck 1999).

- For Ferruginous Hawk nests: "[n]o surface occupancy (beyond that which historically occurred in the area) within ½ mile radius of active nests. Seasonal restriction to human encroachment within ½ mile radius of active nests from February 1 through July 15. This species is especially prone to nest abandonment during incubation if disturbed." Surface occupancy is defined as "[a]ny physical object that is intended to remain on the landscape permanently or for a significant amount of time. Examples include houses, oil and gas wells, tanks, wind turbines, roads, tracks, etc." Human encroachment is defined as "[a]ny activity that brings humans in the area. Examples include driving, facilities maintenance, boating, trail access (e.g., hiking, biking), etc." (Colorado Division of Wildlife 2008, pp. 2 and 5).

- "Buteos accounted for 21.4% of electrocuted raptors found in Utah and Wyoming (n = 547), and included red-tailed hawks (7.5%), Swainson's hawks (5.9%) (*Buteo swainsoni*), ferruginous hawks (1.6%) (*B. regalis*), rough-legged hawks (0.2%) (*B. lagopus*), and unidentified buteos (6.2%) (Liguori and Burruss 2003)…In a 2004 survey of poles in the Butte Valley of California, buteos accounted for 50% of suspected electrocutions (n = 18)…" (APLIC 2006, p. 12). Note that Ferruginous Hawks are a Buteo, which refers to the genus name of closely related medium-sized raptors with a robust body and broad wings.

- "The frequency of electrocutions and associated outages has been dramatically reduced in areas where concerted efforts have been made to retrofit or replace hazardous poles… using recommendations from previous editions of *Suggested Practices*." (APLIC 2006, p. 11)

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Peregrine Falcon (*Falco peregrinus*)

Habitat Requirements

Peregrine Falcon nests are typically situated on ledges of vertical cliffs, often with a sheltering overhang. Ideal locations include undisturbed areas with a wide view, near water, and close to plentiful prey. Substitute man-made sites can include tall buildings, bridges, rock quarries, and raised platforms (MT Field Guide 2012).

Typical Locations in Montana

Peregrine Falcons are distributed throughout the state, but are most commonly associated with habitat that provides cliffs for nest sites and abundant prey (see Figure C.6-11).

Objective of Recommended Design Standard

- Protect and conserve Peregrine Falcon nests from human disturbances associated with developed facilities such as buildings, roads, and trails.

Conservation Status

Peregrine Falcons are a Species of Concern in Montana. They are classified as a Tier II species by Montana Fish, Wildlife & Parks (Moderate conservation need; MCFWCS 2005); Priority Level II by Montana Partners in Flight (Species in Need; Casey 2000); Montana rank S3 by the Montana Natural Heritage Program (Potentially at risk because of limited and/or declining numbers, range and/or habitat; MT Field Guide 2012); and a "sensitive species" by the Bureau of Land Management and U.S. Forest Service. Peregrine Falcons were listed as an endangered species from 1970 to 1999. They are currently classified as "recovered and being monitored" (MT Field Guide 2012).

Figure C.6-11. *Map showing the year-round, statewide distribution of Peregrine Falcons in Montana (MT Field Guide 2012).*

Impacts from Development

Peregrine Falcons are directly impacted by development through the loss of their nesting habitat in close proximity to water as well as through the loss of foraging habitat. Additionally, increased disturbance near nesting cliffs can cause increased time away from the nest leading to cooled or overheated eggs, chick deaths from starvation, and/or abandonment of a territory. Nesting

Peregrine Falcons vary greatly in their responsiveness to human activities, but are almost always more sensitive to disturbance from above their nest than from below. Birds in remote locations are the most reactive; those in urban areas can become habituated to human activity. Researchers have documented where historically used eyries (nests) were abandoned because of human encroachments or increased levels of nearby activity (White et al. 2002).

Recommended Standard

Maintain a one-half mile vegetated buffer between Peregrine Falcon nests and subdivision design features.

Substantial Evidence for Peregrine Falcon Recommendation

Peregrine Falcons can reuse nests from year to year. If they move nest locations, they usually locate close by, often within the same cliff face (White et al. 2002). Consequently, protection of known nesting areas is essential. The following scientific studies and professional opinions justify the recommended standard:

- "Median distances recommended for buffer zones for nesting raptors . . . peregrine falcon = 800 m [½ mile] (range = 800–1,600 m [approximately 2,625–5,250 feet (1 mile)], n = 5) . . ." Note that "n" is the *number* of studies used to determine the recommended median buffer zone distance (Richardson and Miller 1997, p. 635).

- For Peregrine Falcons "[n]o surface occupancy (beyond that which historically occurred in the area) within ½-mile radius of active nests. . . . Seasonal restriction to human encroachment within ½ mile of the nest cliff(s) from March 15 to July 31. Due to propensity to relocate nest sites, sometimes up to ½ mile along cliff faces, it is more appropriate to designate 'Nesting Areas' that encompass the cliff system and a ½ mile buffer around the cliff complex." Surface occupancy is defined as "[a]ny physical object that is intended to remain on the landscape permanently or for a significant amount of time. Examples include houses, oil and gas wells, tanks, wind turbines, roads, tracks, etc." Human encroachment is defined as "[a]ny activity that brings humans in the area. Examples include driving, facilities maintenance, boating, trail access (e.g., hiking, biking), etc." (Colorado Division of Wildlife 2008, pp. 3 and 5).

- "[H]uman access along the cliff rim [where Peregrine Falcons are nesting] should be restricted within 0.8 km (0.5 mi) of the nest from March through the end of June . . . Human activities on the face of, or immediately below, nest cliffs should be restricted from 0.4–0.8 km (0.25–0.5 mi) of the nest during this time . . . [new] facilities should not be established within 0.4–0.8 km (0.25–0.5 mi) of the eyries…" (Hays and Milner 1999, p. 11-2). (The nest of a Peregrine Falcon is sometimes called an eyrie.)

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Greater Sage-Grouse (*Centrocercus urophasianus*)
Sharp-tailed Grouse (*Tympanuchus phasianellus*)

Habitat Descriptions and Locations

Greater Sage-Grouse and Sharp-tailed Grouse are sometimes referred to as prairie grouse. Their habitat requirements and distribution information is described below.

Greater Sage-Grouse

Greater Sage-Grouse Habitat Requirements

Sage-grouse depend on sagebrush (*Artemisia* spp.), primarily big sagebrush, for food and cover throughout the year. In eastern Montana, where close interspersion of wintering, nesting, and brood-rearing habitat rarely require large seasonal movements, sage-grouse are essentially nonmigratory. Some sage-grouse in southwestern Montana are migratory, moving between separate summer and winter areas.

The following seasonal habitats are important for sage-grouse:

- Breeding Habitat. Males employ elaborate courtship displays in the spring to attract females to central communal display grounds called "leks." Leks are key activity areas and most often consist of clearings surrounded by sagebrush cover. Research in central Montana reported a 20 to 50 percent (average of 32 percent) sagebrush canopy cover at feeding and loafing sites in the vicinity of leks. Because of the importance and sometimes obvious location of leks, other habitats used by prairie grouse (nesting habitat, wintering habitat, etc.) are measured in terms of their proximity to the leks (MT Sage-grouse Working Group (MT SGWG) 2005).

- Nesting Habitat. Sage-grouse depend upon sagebrush for nesting cover, and in turn, the quality of nesting cover directly influences nest success. Successful nesting requires that nests are concealed, which is generally provided by a combination of shrub and residual grass cover. Sage-grouse most frequently select nesting cover with a sagebrush canopy of 15 to 31 percent. Research findings in a nonmigratory population in central Montana suggest that about two-thirds of nests occur within two miles of a lek (MT SGWG 2005).

- Brood-Rearing Habitat. Brood-rearing habitat is concentrated in areas providing abundant, diverse, succulent forbs, which are an important summer food source for young sage-grouse. Research in central Montana indicates that sage-grouse broods prefer relatively open stands of sagebrush during summer, generally with a canopy ranging from 1 to 25 percent. Later in the summer, as the palatability of forbs declines, sage-grouse move to moist areas that still support succulent vegetation, including alfalfa fields, roadside ditches, and other moist sites. In southwest Montana, these grouse often move to intermountain valleys during late summer where forbs remain succulent through summer and early fall, and where the sagebrush canopy varies from 8.5 to 14 percent (MT SGWG 2005).

- Winter Habitat. Sage-grouse generally select relatively tall and large expanses of dense sagebrush during winter. Wintering areas in central Montana include sagebrush stands on relatively flat sites with a 20 percent canopy and an average height of 10 inches. The importance of shrub height increases with snow depth. Thus, snow depth can limit the availability of wintering sites to sage-grouse (MT SGWG 2005).

Greater Sage-Grouse Locations in Montana

Sage-grouse depend on sagebrush steppe. In fact, their distribution closely follows that of sagebrush, primarily big sagebrush (*Artemisia tridentata*). In Montana these birds are found in the eastern half and southwest corner of the state (see Figure C.6-12). In eastern Montana, where wintering, nesting, and brood-rearing habitat is relatively close in proximity, sage-grouse are essentially nonmigratory. In southwestern Montana, some sage-grouse are migratory, moving between separate summer and winter areas. Historically, sage-grouse occupied the Bitterroot Valley in western Montana. (MCFWCS 2005).

Figure C.6-12. *Map showing the year-round distribution of Greater Sage-Grouse in Montana (MT Field Guide 2012).*

Sharp-tailed Grouse

Sharp-tailed Grouse Habitat Requirements

Sharp-tailed Grouse habitat is primarily native grasslands interspersed with native shrub- and brush-filled coulees. These grouse prefer stands of intermixed tree and shrub grasslands for food, rest, escape, cover, and winter survival. They inhabit breeding grounds from mid-March to mid-April, nest from mid-May to mid-June, rear broods from June to September, and inhabit wintering areas from mid-October to mid-December (MT Field Guide 2012).

The following seasonal habitats are important for Sharp-tailed Grouse in Montana:

- Breeding Habitat. Males employ elaborate courtship displays in the spring to attract females to central communal display grounds called "leks." Sharp-tailed Grouse leks are located in native grasslands with low, sparse vegetation allowing good visibility and unrestricted movement, especially areas near dense herbaceous vegetation. Because of the importance and sometimes obvious location of leks, other habitats used by prairie grouse (nesting habitat, wintering habitat, etc.) are measured in terms of their proximity to the leks (NatureServe 2011).

- Nesting Habitat. Nests have been detected approximately 160 feet to 1 mile (50 to 1,600 meters) from leks, with 75 percent within 0.6 mile (1 kilometer) of a lek site. High-quality

nesting habitat is structurally diverse, containing stands of grasses, shrubs, and forbs. Nests are generally surrounded by vegetation that is at least 6 to 12 inches (15 to 30 centimeters) tall (NatureServe 2011).

- Winter Habitat. During the winter, Sharp-tailed Grouse favor patches of deciduous trees and shrubs in upland and riparian areas, which provide food and protective cover. Although these grouse will feed on cultivated grain crops during the winter, deciduous shrubs and trees (e.g., water birch) appear to be critical when snow conditions are such that access to wheat is restricted (Schroeder and Tirhi 2003).

Sharp-tailed Grouse Locations in Montana

Sharp-tailed grouse are found predominantly east of the Continental Divide. Until recently, these grouse were found west of the Continental Divide in larger mountain valleys with extensive native bunchgrass-shrub stands. However, they have been extirpated, or nearly extirpated, from this historic range (see Figure C.6-13). Overwintering areas still include northwest Montana (MT Field Guide 2012).

Figure C.6-13. *Map showing the current year-round distribution of Sharp-tailed Grouse in Montana (MT Field Guide 2012).*

Objectives of Recommended Design Standards

- ▶ Protect Greater Sage-Grouse and Sharp-tailed Grouse lek sites from elimination or disturbances associated with subdivision development.
- ▶ Maintain Greater Sage-Grouse and Sharp-tailed Grouse nesting habitat found in the vicinity of lek sites.

Conservation Status

Both Greater Sage-Grouse and Sharp-tailed Grouse are Species of Concern in Montana:

- **Greater Sage-Grouse** are classified as a Tier I species by Montana Fish, Wildlife & Parks (Greatest Conservation Need; MCFWCS 2005); Priority Level I by Montana Partners in Flight (declining population trends and/or Montana is of high importance for the population; Casey 2000); Montana rank S2 by the Montana Natural Heritage Program (at risk because of very limited and/or potentially declining population numbers, range, and/or habitat; MT Field Guide 2012); and a "sensitive species" by both the Bureau of Land Management and the U.S. Forest Service in Montana (MT Field Guide 2012). In March 2010, the U.S. Fish and Wildlife Service placed the Greater Sage-Grouse on the list of "candidate" species and will propose it for protection under the Endangered Species Act as funding and priorities dictate (USFWS 2010b).

- **Sharp-tailed Grouse** are classified as a Tier III species by Montana Fish, Wildlife & Parks (Lower Conservation Need; MCFWCS 2005). However, west of the Continental Divide, these grouse have an S1 Montana rank by the Montana Natural Heritage Program (species at high risk because of extremely limited and/or rapidly declining population numbers, range, and/or habitat; MT Field Guide 2012) and a Priority Level II by Montana Partners in Flight (viability of the species or a portion of the species habitat in the state is threatened by one or more activities; MT Field Guide 2012). East of the Continental Divide, Sharp-tailed Grouse have a S4 rank (species is apparently secure, although it may be quite rare in parts of its range and/or suspected to be declining; MT Field Guide 2012).

Impacts from Development

As development in Montana increases, the potential for disturbance-related impacts to prairie grouse also increases. Specific ways that Greater Sage-Grouse and Sharp-tailed Grouse are impacted by development appear below.

Greater Sage-Grouse

- "In recent years the greater sage-grouse has lost 44 percent of its habitat due to agriculture; urban development; energy extraction, generation, and transmission; invasive weeds, pinion-juniper tree encroachment, and wildfire. The human footprint across the area where greater sage-grouse live is large and becoming larger as the country strives for energy independence, agriculture, development, and other, often competing uses" (USFWS 2010a, p. 2).

- "Urban and exurban development also have direct and indirect negative effects on sage-grouse, including direct and indirect habitat losses, disturbance, and introduction of new predators and invasive plant species. Given current trends in the Rocky Mountain west, urban and exurban development is expected to continue. Infrastructure such as power lines, roads, communication towers, and fences continue to fragment sage-grouse habitat. These sources of fragmentation likely will increase into the future. Fragmentation of sagebrush habitats through a variety of mechanisms including those listed above has been cited as a primary cause of the decline of sage-grouse populations. The negative effects of habitat fragmentation on sage-grouse are diverse and include reductions in the following: lek persistence, lek attendance, winter habitat, recruitment, yearling annual survival, and female nest site choice. Habitat fragmentation is believed to be a primary cause of sage-grouse decline and in some areas has already led to population extirpation. Fragmentation is expected to continue into the foreseeable future and will continue to threaten the persistence of greater sage-grouse populations" (NatureServe 2011).

- Conservation concerns include conversion of native sagebrush grassland to cropland, non-native pasture, or residential development; fragmentation of sagebrush grasslands (e.g., structural developments, roads, urban sprawl); and vulnerability to West Nile virus (MCFWCS 2005).

- "... Greater Sage-grouse have low tolerance to human disturbance such as roads (Lyon and Anderson 2003; Holloran and Anderson 2005; Aldridge and Boyce 2007), oil and gas development (Braun et al. 2002; Lyon and Anderson 2003; Holloran and Anderson 2005; Aldridge and Boyce 2007; Walker et al. 2007; Doherty et al. 2008), and exurban development (Aldridge et al. 2008) especially during the breeding season. The human footprint is most intense at low elevation near valley floors (Leu et al. 2008) and may have a disproportionate effect on sage-grouse populations that depend on low to mid-elevation habitat" (Leu and Hanser 2011, p. 271).

Sharp-tailed Grouse

- For Sharp-tailed Grouse "... housing developments and agriculture have eliminated large portions of habitat required for shelter, protection from predators, night roosting, and spring nesting" (MT Field Guide 2012).

- "At leks, males are tolerant of a variety of disturbances but are displaced by human presence. Females are more susceptible to various types of disturbance than males. Disturbance of leks appears to limit reproductive opportunities and may result in regional population declines (Baydack and Hein 1987)." (NatureServe 2011)

- "Although rural developments may continue to provide some habitats for CSTG [Columbian Sharp-tailed Grouse, a subspecies found in western Montana] in contrast to total urban conversion, dwellings, roads, fences, utility lines, pets, and increased human activities that are part of any development generally render the habitat of marginal value to CSTG. Studies of other prairie grouse suggest they exhibit a behavioral aversion to structures (Pitman et al. 2005). The potential consequence of such behavior is that a single home placed in CSTG habitat may effectively reduce habitat availability to a much greater distance than might superficially appear" (Hoffman and Thomas 2007, p. 80).

- "Disturbances to [Sharp-tailed Grouse] leks appear to limit reproductive opportunities and may result in regional population declines (Baydack and Hein 1987)." (Connelly et al. 1998)

Prairie Grouse in General

- "All species of grouse have strongholds in natural ecosystems (Johnsgard 1973; Storch 2000). Maintaining healthy grouse populations requires large, relatively undisturbed, natural landscapes. Whereas some grouse species can tolerate a moderate degree of habitat disturbance and can even use and benefit from artificially created habitats, the healthiest grouse populations are associated with extensive natural landscapes exposed to natural disturbance regimes (Johnsgard 1973; Storch 2000)." (Hoffman and Thomas 2007, p. 67)

- Roads and overhead power lines associated with human development present threats of various sorts. The following excerpt addresses energy development impacts on Greater Sage-Grouse, but the infrastructure impacts described are similar to those found in

residential development, and they point out sensitivities to human disturbance that are exhibited by both species of grouse.

"Energy development and its infrastructure may negatively affect sage-grouse populations via several different mechanisms. Mechanisms responsible for cumulative impacts that lead to population declines depend in part on the magnitude and extent of human disturbance. We quantified changes in landscape features detrimental to sage-grouse that result from energy development. Males and females may abandon leks if repeatedly disturbed by raptors perching on power lines near leks (Ellis 1984), by vehicle traffic on nearby roads (Lyon and Anderson 2003), or by noise and human activity associated with energy development (Braun et al. 2002; Holloran 2005; Kaiser 2006). Collisions with power lines and vehicles, and increased predation by raptors may increase mortality of birds at leks (Connelly et al. 2000a; Lammers and Collopy 2007). Roads and power lines may also indirectly affect lek persistence by altering productivity of local populations or survival at other times of the year. Sage-grouse mortality associated with power lines and roads occurs year-round (Aldridge and Boyce 2007), and artificial ponds created by development (Zou et al. 2006b) that support breeding mosquitoes known to vector West Nile virus (Walker et al. 2007b) elevate risk of mortality from disease in late summer (Walker and Naugle, this volume, chapter 9). Sage-grouse may also avoid otherwise suitable habitat as development increases (Lyon and Anderson 2003; Holloran 2005; Kaiser 2006; Doherty et al. 2008)." (Naugle 2011, pp. 491–92)

Recommended Standards

- Greater Sage-Grouse and Sharp-tailed Grouse need a sizeable buffer from human disturbance in order to maintain their populations. If a subdivision is proposed in an area with known leks of either species, the subdivider is encouraged to consult the local FWP biologist, or other professionally trained biologist, for a recommended vegetated buffer. If consulted, the FWP biologist should consider each situation on a case-by-case basis. Scientific studies recommend vegetated buffers from lek sites be from 1.2 miles to 5 miles. Recommended Greater Sage-Grouse buffers are generally larger (3 to 5 miles) than recommended Sharp-tailed Grouse buffers.
- Within the vegetated buffer, install power lines underground.

Substantial Evidence in Support of Greater Sage-Grouse and Sharp-tailed Grouse Recommendations

Established Greater Sage-Grouse and Sharp-tailed Grouse leks may be used for many years, although their exact location may shift over time and smaller satellite leks can form in the vicinity of historic leks (NatureServe 2009). The following scientific studies and professional opinions justify the recommended standards:

Greater Sage-Grouse

- "Distances between nest sites and nearest leks average 1.1 to 6.2 kilometers [0.7–3.8 miles], but females may move more than 20 kilometers [12.4 miles] from a lek to nest.

In Colorado, generally stayed within 6 kilometers [3.7 miles] of the lek (Schoenberg 1982)." (NatureServe 2011)

- The vegetation within 2 miles (3.2 kilometers) of occupied leks of nonmigratory populations should be protected. For migratory populations, leks generally are associated with nesting habitats, but the migratory birds may move more than 11 miles (18 kilometers) from leks to nest sites. Thus, protection of habitat within 2 miles of leks may not protect most of the important nesting areas (Connelly et al. 2000).

- "Over 8,400,000 people live within 3 miles of sagebrush. As infrastructure expands to support population growth, sagebrush is fragmented into small, isolated patches, ultimately making the landscape unsuitable for sage-grouse . . . Ninety-five percent of the sagebrush within the sage-grouse range is within 1.5 miles of a road. Roads can influence predator movements, introduce invasive species, increase wildfire potential from human activities, and exacerbate other factors that may adversely affect sage-grouse" (USGS 2009, p. 3).

- In recent years, extensive research has been conducted on the impacts of energy development on Greater Sage-Grouse. These energy development guidelines help inform the less-studied consideration of guidelines for residential or commercial development in sagebrush habitats. For example, the Oregon Department of Fish and Wildlife recommends a three-mile habitat protection area of no-development around occupied leks:

  "The concept of establishing "no disturbance" habitat protection areas (or buffers) around lek sites or other important habitats [for prairie grouse] dates back more than 40 years, and has evolved over time as the body of scientific knowledge has grown. The first set of published guidelines for sage-grouse management recommended a 2-mile buffer (Braun et al. 1977), [because] at the time it was thought most nesting occurred within that distance. Connelly et al. (2000) provided an updated set of guidelines, which included a considerable amount of data from radio-telemetry studies to make a recommendation of 2–3 mile buffer, but recognized that nesting habitats could be as far as 11 miles from leks.

  More recently Colorado (Colorado Steering Committee 2008) and Wyoming (Governor's Executive Order 2008) adopted a 4-mile buffer to protect sage-grouse breeding habitat. These buffers were based on regional radio-telemetry data that indicated 80% of nesting occurred within 4 miles of leks. Thus, 20% of the nesting population in these regions may be compromised.

  In Oregon, a 3-mile habitat protection radius around lek sites protects 80% of the nesting habitat used by female sage-grouse (data from 493 nest sites in Oregon)…" (Oregon Department of Fish and Wildlife 2009, p. 8).

- "Generally sagebrush habitat and mesic (e.g., wet meadows, seeps, springs) sites within 3 miles of a lek is suitable for breeding and brood-rearing (Connelly et al. 2000). While both lek habitat and nesting habitat can be reclaimed, the biological dynamic that occurs between female nest site selection and their movement patterns that drive males to

establish a lek in these areas of female use (Bradbury et al. 1989), has yet to be restored by human actions. Given the uncertainty and risk involved in trying to mitigate for the loss (i.e., reclaim/restore) of these habitat and biological dynamics, protection of these areas is paramount." (Oregon Department of Fish and Wildlife 2009, p. 3)

- "Utility wires can also create hazards for sage-grouse (Borell 1939). Wind turbines should not be located in habitat known to be occupied by sage-grouse because this species avoids vertical structures and is sensitive to habitat fragmentation (U.S. Fish and Wildlife Service 2003). In grouse habitat, avoid placing turbines within 8 km (5 mi) of known leks (U.S. Fish and Wildlife Service 2003). The expansion of roads near shrub-steppe habitat used by grouse leads to habitat loss and fragmentation, direct mortality (Braun 1998), and the spread of invasive weeds. Consequently, limitations should be placed on the expansion of roads within grouse habitat." (Schroeder et al. 2003, p. 17-7)

- "Avoid building power lines, wind turbines, and other tall structures within 3 kilometers (1.9 miles) of grouse habitat or within 8 km (5 miles) of leks" (Schroeder et al. 2003, p. 17-13).

- "Power lines provide additional hunting perches for raptors in otherwise treeless areas. Power lines most likely impact grouse near leks, in brood-rearing habitat, and in wintering areas that also support large numbers of wintering raptors. Construction of new power lines contributes to habitat degradation when accompanied by new roads or other infrastructure, e.g., pipelines, fences, etc. Utilities commonly make power poles safe for raptors to use as perches, which poses a dilemma in sage-grouse habitat" (MT SGWG 2005, p. vi).

- For transmission lines in sage-grouse habitat: ". . . Use existing utility corridors and rights-of-ways to consolidate activities to reduce habitat loss, degradation, and fragmentation by new construction. Where topographically possible, install new power lines within existing power line corridors or highway rights-of-way . . . In some cases power lines should be buried to minimize the disturbance" (Hagen 2011, p. 114).

Sharp-tailed Grouse

- "The area within 2.5 kilometers (1.5 miles) of an active breeding lek is believed to be critical to management of nesting and brood-rearing habitats (Saab and Marks 1992; Giesen and Connelly 1993)." (NatureServe 2011)

- "Vegetation removal should be discouraged within 2 km (1.2 mi) of active or potential lek sites, especially during the breeding season (Giesen and Connelly 1993; Washington Department of Fish and Wildlife 1995) . . . Vegetation manipulation should be avoided . . . within 2 km (1.2 mi) of active or potential lek sites, within 100 m (328 ft) of streams, or within winter habitat." (Schroeder and Tirhi 2003, p. 16-3)

- "[A]void vegetation manipulation within the breeding complex (defined as the lek and all land within a 2-km [1.2 miles] radius)" (Hoffman and Thomas 2007, p. 97).

- "The breeding complex (lek and nesting areas) includes all lands within a 2-km radius [1.25 miles] of lek sites. Vegetation manipulation should be avoided within these complexes because of their importance for nesting and brood-rearing. Disturbance of vegetation that has long-term (i.e., > 5 yr) effects on mountain shrub habitats used during winter should be avoided if shrubs constitute < 10% of cover within occupied areas" (Connelly et al. 1998).

Prairie Grouse in General

- "Raptor-proofing techniques [to minimize perching by raptors] might include placing power lines underground . . ." (Schroeder et al. 2003, p. 17-7; and Schroeder and Tirhi 2003, p. 16-5).

- In the context of wind energy development planning, the U.S. Fish and Wildlife Service (Service or FWS) recommends a 5-mile buffer from occupied prairie grouse leks. "The intent of the Service's recommendation for a 5-mile zone of protection is to buffer against increased mortality (both human-caused and natural), against habitat degradation and fragmentation, and against disturbance. In considering our recommendation, FWS recognizes major declines in populations and habitats of prairie grouse. All species of prairie grouse are in varying stages of decline—some populations declining precipitously—requiring a major focus on direct human impacts, disturbance from structures, and fragmentation of habitats. While wind plants are new additions to prairie grouse habitats in the Midwest and West, cumulative impacts from human development and exploitation must be assessed with great care and considerable detail" (Manville 2004, p. 12).

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