

## **3.6 WILDLIFE**

The Keystone Project area crosses seven states and includes a diversity of wildlife, including big game animals, small game animals and furbearers, waterfowl and game birds, and other migratory birds. Wildlife habitats along the Keystone Project ROW include croplands, pasture, grasslands (short-grass prairie, mixed-grass prairie, and tall-grass prairie), savannas, forests, and woodlands. These vegetation communities provide foraging, cover, and breeding habitats for wildlife. This section addresses big game animals, small game animals and furbearers, waterfowl and game birds, and other migratory birds in the Keystone Project area.

### **3.6.1 Wildlife Resources**

Representative big game animals, small game animals and furbearers, waterfowl and game birds, and other migratory birds and the habitats they use are described in Table 3.6.1-1, which also lists estimated harvest levels by state during 2005. Most hunting for big and small game animals, upland game birds, and waterfowl occurs during fall. Turkeys are hunted both spring and fall, with most harvest occurring during the spring hunts.

#### **3.6.1.1 Big Game Animals**

White-tailed deer is the principal big game species that occurs along the entire pipeline route. White-tailed deer are highly adaptable and inhabit a variety of habitats, including cropland, grasslands, shrublands, orchards, and woodlands. White-tailed deer may be found in close association with humans. In the northern portions of their range, they will aggregate or “yard” during winter in stream bottoms, on south-facing slopes, or other areas where snow accumulations are reduced. Mule deer, pronghorn, and elk are generally found west of the Keystone Project area. Isolated populations of pronghorns extend into eastern South Dakota. Elk have been reintroduced into isolated wildlife areas. The northeast corner of North Dakota is the only area along the proposed route where elk may be present. Moose occur along the proposed route in the northeastern portion of North Dakota. Black bear are common only in southeastern Missouri.

#### **3.6.1.2 Small Game Animals and Furbearers**

The small game animals and furbearers most often hunted or trapped in the Keystone Project area include squirrels, cottontails, raccoons, opossums, and coyotes. Squirrels depend on forested habitats, usually deciduous or mixed hardwood forests with abundant supplies of acorns and hickory nuts. Cottontails, raccoons, opossums, and coyotes use a wide variety of habitats, including croplands, hedgerows, and forested habitats. Many furbearers are associated with wetland areas, such as ermine, weasels, mink, raccoon, bobcats, and beavers.

**TABLE 3.6.1-1  
Wildlife Resources That Occur along the Keystone Project Route**

Class and Species	Occurrence and 2005 Harvest Estimate by State							Habitat
	ND	SD	NE	KS	MO	IL	OK	
<b>BIG GAME ANIMALS</b>								
White-tailed deer ( <i>Odocoileus virginianus</i> )	√	√ 60,000	√	√	√ 313,000	√ 114,000	√ 101,000	Found in various habitats—from forest to fields—with adjacent cover. In northern regions, usually require stands of conifers for winter shelter. In the north and in mountain regions, limited ecologically by the depth, duration, and quality of snow cover; summer ranges are traditional, but winter range may vary with snow conditions.
Mule deer ( <i>Odocoileus hemionus</i> )	√	√ 14,000	√	√			√	Found in coniferous forests, desert shrub, chaparral, grasslands with shrubs, and badlands. Often associated with successional vegetation, especially near agricultural lands. Generally found west of Keystone Project area.
Pronghorn ( <i>Antilocapra americana</i> )	√	√	√	√			√	Generally found in grasslands, sagebrush plains, deserts, and foothills. Need for free water varies with succulence of vegetation in the diet. Generally found west of Keystone Project area.
Elk ( <i>Cervus canadensis</i> )	√	√	√	√				Found over a range of habitats. Uses open areas, such as alpine pastures, marshy meadows, river flats, and aspen parkland, as well as coniferous forests, brushy clear cuts or forest edges, and semi-desert areas.
Moose ( <i>Alces alces</i> )	√							Prefers mosaic of second-growth forest, openings, swamps, lakes, and wetlands. Requires water bodies for foraging and hardwood-conifer forests for winter cover. Avoids hot summer conditions by using dense shade or bodies of water.
Black bear ( <i>Ursus americanus</i> )					√			Prefers mixed deciduous-coniferous forests with thick understory but may occur in various situations. In Keystone Project area, restricted to southern and southeast Missouri.

**TABLE 3.6.1-1  
(Continued)**

Class and Species	Occurrence and 2005 Harvest Estimate by State							Habitat
	ND	SD	NE	KS	MO	IL	OK	
<b>SMALL GAME ANIMALS</b>								
Eastern gray squirrel ( <i>Sciurus carolinensis</i> )	√	√	√	√	√	√	√	Prefers mature deciduous and mixed forests with abundant supplies of acorns and hickory nuts. Diversity of nut trees needed to support high densities. Uses city parks and floodplain forests. Seldom far from permanent open water. Nests in tree cavities or in leaf nests, usually 25 feet or more above ground.
Eastern fox squirrel ( <i>Sciurus niger</i> )	√	√	√	√	√	√	√	Found in open mixed hardwood forests or mixed pine-hardwood associations; species also has adapted well to disturbed areas, hedgerows, and city parks. Prefers savannas or open woodlands to dense forests. Western range extensions are associated with riparian corridors of cottonwoods and fencerows of osage-orange. Dens are in tree hollows or leaf nests.
Eastern cottontail ( <i>Sylvilagus floridanus</i> )	√	√ 138,000	√	√	√	√ 331,000	√	Inhabits cropland/hedgerow, grassland/herbaceous, old field, shrubland/chaparral, suburban/orchard, woodland-hardwood, and woodland-mixed forests. Mix of row crops, small grain, and legume fields with shrubby fencerows, old pasture, and forest edge. Burrows in or using soil and fallen log/debris. Early mid-successional habitats over much of continental United States. May be found in brushy areas, open woodlands, swampy areas, stream valleys, grasslands, and suburbs. Very adaptable species. Nests usually are in shallow depressions, in thick vegetation or in underground burrows.
<b>FURBEARERS</b>								
Coyote ( <i>Canis latrans</i> )	√	√	√ 34,000	√ 21,800	√ Common	√	√	Wide ranging and found in virtually all habitats. Often considered pest species, especially by the livestock industry. Control programs have been largely ineffective.

TABLE 3.6.1-1 (Continued)								
Class and Species	Occurrence and 2005 Harvest Estimate by State							Habitat
	ND	SD	NE	KS	MO	IL	OK	
<b>FURBEARERS (CONTINUED)</b>								
Red fox ( <i>Vulpes vulpes</i> )	√	√	√ 3,800	√ 459	√ Common	√	√	Found in various open and semi-open habitats. Usually avoids dense forest, although open woodlands are frequently used. Sometimes occurs in suburban areas or cities. Maternity dens are in burrows dug by fox or abandoned by other mammals, often in open fields or wooded areas; sometimes under rural buildings, in hollow logs, or under stumps.
Gray fox ( <i>Urocyon cinereoargenteus</i> )	√	√	√	√ 89	√ Common	√	√	Found in a variety of habitats, including chaparral, rimrock, riparian, old fields, and early-successional-stage woodlands. Usually prefers diversity of open and wooded areas rather than large tracts of homogeneous habitat.
Swift fox ( <i>Vulpes velox</i> )	√ Rare	√ Rare	√ Rare	√ 206				Prefers short-grass and mixed-grass prairies over most of the Great Plains. Also will use agricultural lands and irrigated meadows, generally west of Keystone Project area. Protected.
Raccoon ( <i>Procyon lotor</i> )	√	√	√ 171,800	√ 66,400	√	√	√	Found in variety of habitats but prefers riparian and edges of wetlands, ponds, streams, and lakes.
Ermine ( <i>Mustela erminea</i> )	√							Found in agricultural lowlands, woodlands, and meadows.
Long-tailed weasel ( <i>Mustela frenata</i> )	√	√	√	√	√	√	√	Most widespread of the weasels and found in all habitats in Keystone Project area but prefers shrublands, open woodlands, and habitats near water.
Least weasel ( <i>Mustela nivalis</i> )	√	√	√					Inhabits cultivated fields, brushy areas, open woods, wetland edges, and meadows.
Mink ( <i>Mustela vison</i> )	√	√	√ 3,990	√ 206	√ Common	√	√	Occurs in wetlands, riparian woodlands, lake and river edges, and near ponds.

TABLE 3.6.1-1 (Continued)								
Class and Species	Occurrence and 2005 Harvest Estimate by State							Habitat
	ND	SD	NE	KS	MO	IL	OK	
<b>FURBEARERS (CONTINUED)</b>								
Striped skunk ( <i>Mephitis mephitis</i> )	√	√	√ 20,520	√ 12,730	√ Common	√	√	Prefers semi-open country with woodland and meadows interspersed with brushy areas, and bottomland woods. Frequently found in suburban areas. Dens often under rocks, logs, or buildings. May excavate burrow or use burrow abandoned by other mammals.
Eastern spotted skunk ( <i>Spilogale putorius</i> )	√	√	√	√	√		√	Found in forested areas or habitats with significant cover. Also uses open and brushy areas, rocky canyons, and outcrops in woodlands and prairies. When inactive or bearing young, occurs in dens—in burrows abandoned by other mammals, under brush piles, in hollow logs or trees, in rock crevices, under buildings, or in similar protected sites.
Opossum ( <i>Didelphis marsupialis</i> )		√	√ 32,400	√ 38,900	√ Abundant	√	√	Uses cropland/hedgerow, grassland/herbaceous, old field, shrubland/chaparral, suburban/orchard, forested wetlands, herbaceous wetland, and riparian habitats in Keystone Project area. Also uses forest and woodland hardwood, and mixed forest. Constructs burrows in or using soil, fallen logs/debris, and standing snags or hollow trees. Very adaptable; may be found in most habitats. Prefers wooded riparian habitats. Also in suburban areas. Generally uses abandoned burrows, buildings, hollow logs, and tree cavities for den sites.
American badger ( <i>Taxidea taxus</i> )	√	√	√ 3,942	√ 1,312	√	√	√	Prefers open grasslands and field, and may also frequent brushlands with little groundcover. When inactive, occupies underground burrow.
Bobcat ( <i>Felis rufus</i> )	√		√ 1,308	√ 7,458			√	Found in woodlands, brushlands, and wooded swampy areas.

TABLE 3.6.1-1 (Continued)								
Class and Species	Occurrence and 2005 Harvest Estimate by State							Habitat
	ND	SD	NE	KS	MO	IL	OK	
<b>FURBEARERS (CONTINUED)</b>								
American beaver ( <i>Castor canadensis</i> )	√	√	√ 16,074	√ 7,200	√ Common	√	√	Inhabits permanent sources of water of almost any type in its range, which extends from arctic North America to Gulf of Mexico and arid Southwest, and from sea level to over 6,800 feet in mountains. Prefers low-gradient streams, which it modifies), ponds, and small mud-bottomed lakes with outlets that can be dammed. Associated with deciduous tree and shrub communities.
<b>WATERFOWL</b>								
<b>Dark Geese</b>								
Canada goose ( <i>Branta canadensis</i> )	√ 133,200	√ 79,800	√ 102,100	√ 100,150	√ 40,430	√ 104,600	√ 31,000	Found in various habitats near water, from temperate regions to tundra. Usually breeds and feeds in areas near lakes, ponds, large streams, and inland and coastal marshes. Forages in pastures, cultivated lands, grasslands, and flooded fields. Canada geese present in Keystone Project area year-round, white-fronted geese occur in Keystone Project area during spring and fall migrations. Widely hunted, with an estimated Mississippi Flyway harvest of 1.0 million and Central Flyway harvest of 735,000 (USFWS 2006).
White-fronted goose ( <i>Anser albifrons</i> )								
<b>Light Geese</b>								
Snow goose ( <i>Chen caerulescens</i> )	√ 20,100	√ 23,300	√ 11,600	√ 8,150	√ 39,300	√ 6,200	√ 11,500	Found in various habitats near water, from temperate regions to tundra. Winters in both freshwater and coastal wetlands, wet prairies, and extensive sandbars; forages in pastures, cultivated lands, and flooded fields. In Keystone Project area during spring and fall migrations. Widely hunted, with an estimated Mississippi Flyway harvest of 250,000 and Central Flyway harvest of 360,000 (USFWS 2006).
Ross's goose ( <i>Chen rossii</i> )								

**TABLE 3.6.1-1  
(Continued)**

Class and Species	Occurrence and 2005 Harvest Estimate by State							Habitat
	ND	SD	NE	KS	MO	IL	OK	
<b>WATERFOWL (CONTINUED)</b>								
<b>Light Geese (continued)</b>								
Tundra swan ( <i>Cygnus columbianus</i> )	√	√ 120	√	√	√	√	√	Generally found in lakes, sloughs, rivers, and sometimes fields during migration. Open marshy lakes and ponds, and sluggish streams in summer. Present in Keystone Project area during spring and fall migration; hunted in North Dakota and South Dakota, with estimated harvest of several hundred birds.
<b>Dabbling Ducks</b>								
Mallard ( <i>Anas platyrhynchos</i> )	√ 450,200	√ 165,100	√ 156,100	√ 150,000	√ 438,000	√ 339,400	√ 262,650	Primarily found in shallow waters, such as ponds, lakes, marshes, and flooded fields; in migration and in winter, mostly found in fresh water and cultivated fields, less commonly in brackish situations. Both migratory and resident populations may occur in Keystone Project area. Widely hunted, with estimated Mississippi Flyway harvest of 4.7 million and Central Flyway harvest of 2.5 million during 2005 (USFWS 2006).
Gadwall ( <i>Anas strepera</i> )								
Green-winged teal ( <i>Anas crecca</i> )								
Blue-winged teal ( <i>Anas discors</i> )								
Cinnamon teal ( <i>Anas cyanoptera</i> )								
American wigeon ( <i>Anas americana</i> )								
Northern shoveler ( <i>Anas clypeata</i> )								
Northern pintail ( <i>Anas acuta</i> )								

**TABLE 3.6.1-1  
(Continued)**

Class and Species	Occurrence and 2005 Harvest Estimate by State							Habitat
	ND	SD	NE	KS	MO	IL	OK	
<b>WATERFOWL (CONTINUED)</b>								
<b>Diving Ducks</b>								
Ring-necked duck ( <i>Aythya collaris</i> )	√ 69,170	√ 13,900	√ 8,600	√ 7,950	√ 27,200	√ 41,000	√ 22,460	Commonly found on marshes, ponds, lakes, rivers, and bays. Widely hunted, with estimated Mississippi Flyway harvest of 580,000 and Central Flyway harvest of 260,000 during 2005 (USFWS 2006).
Lesser scaup ( <i>Aythya affinis</i> )								
Redhead ( <i>Aythya americana</i> )								
Bufflehead ( <i>Bucephala albeola</i> )								
Canvasback ( <i>Aythya valisineria</i> )								
Greater scaup ( <i>Aythya marila</i> )								
Hooded merganser ( <i>Lophodytes cucullatus</i> )								
American coot ( <i>Fulica americana</i> )	√ 800	√ 5,300	√ 1,500	√ 400	√ 400	√ 4,300	√ 200	Commonly found on marshes, ponds, lakes, rivers, and bays. Widely hunted, with estimated Mississippi Flyway harvest of 110,000 and Central Flyway harvest of 15,000 during 2005 (USFWS 2006).
<b>GAME BIRDS</b>								
Sandhill crane ( <i>Grus canadensis</i> )	√ 3,792	√ 190	√	√ 475			√ 513	During migration, roosts at night along river channels, on alluvial islands of braided rivers, or natural basin wetlands. Communal roost site consisting of an open expanse of shallow water is key feature of wintering habitat. Occurs throughout Keystone Project area during spring and fall migrations. Hunted during fall in North Dakota and South Dakota, and during fall and winter in Oklahoma. Estimated Central Flyway harvest of 18,575 during 2005 (Sharp et al. 2006).



**TABLE 3.6.1-1  
(Continued)**

Class and Species	Occurrence and 2005 Harvest Estimate by State							Habitat
	ND	SD	NE	KS	MO	IL	OK	
<b>GAME BIRDS (CONTINUED)</b>								
Ring-necked pheasant ( <i>Phasianus colchincus</i> )	√	√ 1,653,265	√	√	√ 31,204	√ 155,000	√	Non-native game bird; inhabits open country (especially cultivated areas, scrubby wastes, open woodland, and edges of woods), grassy steppe, desert oases, riverside thickets, swamps, and open mountain forest. Winter shelter includes bushes and trees along streams, shelterbelts, and fencerows. Usually nests in fields, brushy edges, or pastures; also along road rights-of-way. Nest is shallow depression scratched out by female.
Gray partridge (hun) ( <i>Perdix perdix</i> )	√	√ 9,280	√					Non-native game bird; inhabits cultivated lands, hedgerows, brushy pastures, and meadows.
Mourning dove ( <i>Zenaida macrora</i> )	√ 55,500	√ 127,700	√ 371,100	√ 680,400	√ 641,800	√ 798,800	√ 828,500	Inhabits open woodlands, forest edge, cultivated lands with scattered trees and bushes, and arid and desert country. Widely hunted—9.0 million estimated harvest during 2005 (USFWS 2006).

√ = Indicates that the species occurs in the state. Numbers that may follow are the 2005 harvest estimate.

Sources: Adapted from ENSR 2006a; occurrence information (NatureServe 2006); harvest information (state wildlife management agency web sites, USFWS 2006, Sharp et al. 2006).

### **3.6.1.3 Waterfowl and Game Birds**

All ducks, geese, swans, coots, and sandhill cranes occurring within the Keystone Project area are considered migratory. All migratory birds are protected by the Migratory Bird Treaty Act (MBTA) (16 USC 703–712; 40 Stat. 755 as amended) which prohibits the take of any migratory bird without authorization from USFWS. The MBTA states that “unless and except as permitted by regulations. . . it shall be unlawful at any time, by any means or in any manner, to . . . take, capture, kill, possess. . . any migratory bird, any part, nest, or eggs of any such bird. . .”. Non-migratory birds such as upland game birds and non-native birds such as European starling, pigeon (rock dove), and English house sparrow are not protected by the MBTA. Hunting seasons are set and regulated by USFWS and state fish and game departments. Waterfowl are harvested primarily in fall; however, spring light goose seasons (snow and Ross’s geese) are open in some areas in response to expanding populations of these birds that nest in arctic Canada. Many waterfowl breed in habitats that would be crossed by the pipeline, and additional migrants pass through the Keystone Project area to northern breeding grounds during both spring and fall. The Keystone Project area crosses both the Central and Mississippi Flyways. Waterfowl that occur only as migrants in the Keystone Project area include snow geese, Ross’s geese, white-fronted geese, and sandhill cranes. Sandhill cranes are hunted in North Dakota, eastern portions of South Dakota, Kansas, and Oklahoma. Nebraska is closed to hunting for sandhill cranes (Sharp et al. 2006).

Turkeys, prairie chickens, grouse, and bobwhites are resident game birds and as such are not protected by the MBTA. Seasons and bag limits for these species and introduced game birds such as pheasants and huns are set by state fish and game departments. Turkeys are hunted primarily during spring (bearded birds—males only), when most harvest occurs; but they also may be taken during fall hunts, which are usually open for any turkey. Most other resident game birds are hunted during fall. Woodcock, snipe, and mourning doves are migratory game birds that are protected by the MBTA. Hunting seasons and limits are set and regulated by USFWS and state fish and game departments.

### **3.6.1.4 Other Migratory Birds**

Numerous other migratory birds protected by the MBTA occupy habitats that would be crossed by the pipeline ROWs. Eagles and their nests are further protected by the Bald and Golden Eagle Protection Act (16 USC 688–688d [a and b]). Eagles are discussed in Section 3.8, as are other migratory birds of conservation concern. Destruction or disturbance of a migratory bird nest that results in the loss of eggs or young is a violation of the MBTA.

Aerial surveys were conducted along the entire Mainline Project and Cushing Extension ROWs from January 30 to February 4, 2007, to identify raptor nest sites in deciduous trees within or next to the Keystone Project ROW (ENSR 2007a). A total of 103 nests were documented within 300 feet of the Keystone Project ROW; 86 along the Mainline Project and 17 along the Cushing Extension. Of those nests identified by species, there were 35 red-tailed hawk nests, 14 crow nests, 3 great horned owl nests, 4 Swainson’s hawk nests, 2 Cooper’s hawk nests, 1 sharp-shinned hawk nest, and 2 osprey nests at artificial nest stands. Of those nests that could not be definitively identified by species, 35 were Cooper’s hawk or sharp-shinned hawk nests (3 of these could have been great-horned owl nests), and 2 were unknown. Woodlots (40 percent) were the most common habitats recorded for raptor nests, followed by riparian habitats (35 percent) and shelterbelts (19 percent).

### 3.6.2 Potential Impacts

The Mainline Project and Cushing Extension pipeline primarily would affect wildlife resources by:

- Habitat loss, alteration, and fragmentation;
- Loss of breeding success from exposure to construction and operations noise, and from increased human activity;
- Direct mortality from Keystone Project construction and operation;
- Direct mortality due to collision with or electrocution by power lines;
- Indirect mortality because of stress or avoidance of feeding due to exposure to construction and operations noise, and from increased human activity; and
- Loss of individuals and habitats due to exposure to toxic materials or crude oil releases (addressed in Section 3.13, Safety and Reliability).

The pipeline ROW would cross habitats used by wildlife, as described in Table 3.6.1-1. Estimated wildlife habitat impacts are described in Tables 3.6.2-1, 3.6.2-2, and 3.6.2-3. Estimated impacts to habitats specifically set aside for wildlife conservation are described in Table 3.6.2-4. Pipeline construction would result in short-term disturbance and long-term habitat modification to 11 acres in the Pigeon Hill Conservation Area in Buchanan County, Missouri, and 33 acres in the Carlyle Lake Wildlife Management Area (WMA) in Fayette County, Illinois. The Keystone Project would cross eight Conservation Opportunity Areas (COAs) in Missouri, which are listed in Table 3.6.2-4. The Mississippi/Missouri River Confluence COA is located on the floodplain of Missouri and Mississippi Rivers in St. Charles and Lincoln Counties in Missouri. This COA is important to a large array of wildlife and is a major migratory pathway for birds. During peak migration, ducks, geese, shorebirds, large wading birds, raptors, warblers, and other songbirds use habitats along the Confluence and the river corridor to rest, refuel, and nest. Noted fish and wildlife natural areas in the COA area include Ellis, Dresser, and Maple Islands on the Mississippi River; Pelican and Cora Islands on the Missouri River; MDC's Marais Temps Clair Conservation Area; COE's environmental demonstration area; the Missouri Department of Natural Resource's Confluence Park; and numerous wetland and open water areas associated with duck clubs and county parks. Long-term conversion of wooded habitats to herbaceous communities would result in increased habitat fragmentation in these state WMAs and COAs.

Wildlife habitat fragmentation issues relevant for pipeline construction and ROWs include:

- Barriers to movement,
- Creation of edge effects,
- Habitat disturbance,
- Reduction in patch size of remaining available habitats,
- Facilitation of predator movements,
- Intrusion of invasive species, and
- Intrusion of humans (Hinkle et al. 2002).

<b>TABLE 3.6.2-1 Estimated Wildlife Habitat Impacts for the Keystone Mainline Project</b>			
<b>Habitat Classification <sup>a</sup></b>	<b>Habitat Area within 110-foot ROW (acres)</b>	<b>Habitat Area within 5 miles of ROW (acres)</b>	<b>Proportion of Affected to Available Habitat (%)</b>
<b>North Dakota</b>			
Cropland and pasture	1,475	681,563	0.2
Cropland/grassland mosaic	1,001	499,834	0.2
Cropland/woodland mosaic	436	200,645	0.2
Grassland	0	1,025	0.0
Deciduous broadleaf forest		119	0.0
Evergreen needleleaf forest			
Mixed forest			
Savanna			
Water bodies		170	0.0
<i>North Dakota subtotal</i>	<i>2,912</i>	<i>1,383,357</i>	<i>0.2</i>
<b>South Dakota</b>			
Cropland and pasture	1,681	824,792	0.2
Cropland/grassland mosaic	1,152	525,305	0.2
Cropland/woodland mosaic	10	3,762	0.3
Grassland	72	43,803	0.2
Deciduous broadleaf forest			
Evergreen needleleaf forest		1,415	0.0
Mixed forest			
Savanna			
Water bodies			
<i>South Dakota subtotal</i>	<i>2,914</i>	<i>1,399,077</i>	<i>0.2</i>
<b>Nebraska</b>			
Cropland and pasture	2,872	1,347,267	0.2
Cropland/grassland mosaic	5	10,812	0.1
Cropland/woodland mosaic			
Grassland	26	11,727	0.2
Deciduous broadleaf forest			
Evergreen needleleaf forest			
Mixed forest			
Savanna		912	0.0
Water bodies		835	0.0
<i>Nebraska subtotal</i>	<i>2,903</i>	<i>1,371,553</i>	<i>0.2</i>
<b>Kansas</b>			
Cropland and pasture	1,060	504,837	0.2
Cropland/grassland mosaic	49	44,813	0.1
Cropland/woodland mosaic			
Grassland	124	46,109	0.3
Deciduous broadleaf forest			
Evergreen needleleaf forest		81	0.0
Mixed forest			
Savanna	43	14,080	0.3
Water bodies			
<i>Kansas subtotal</i>	<i>1,276</i>	<i>609,921</i>	<i>0.2</i>

<b>TABLE 3.6.2-1 (Continued)</b>			
<b>Habitat Classification a</b>	<b>Habitat Area within 110-foot ROW (acres)</b>	<b>Habitat Area within 5 miles of ROW (acres)</b>	<b>Proportion of Affected to Available Habitat (%)</b>
<b>Missouri</b>			
Cropland and pasture	1,263	548,602	0.2
Cropland/grassland mosaic	1,047	509,873	0.2
Cropland/woodland mosaic	520	291,312	0.2
Grassland	55	11,158	0.5
Deciduous broadleaf forest	237	94,110	0.3
Evergreen needleleaf forest		1,862	0.0
Mixed forest	20	12,380	0.2
Savanna	477	185,243	0.3
Water bodies	37	21,742	0.2
<i>Missouri subtotal</i>	<b>3,656</b>	<b>1,676,281</b>	<b>0.2</b>
<b>Illinois</b>			
Cropland and pasture	9	6,393	0.1
Cropland/grassland mosaic	41	19,332	0.2
Cropland/woodland mosaic	631	348,186	0.2
Grassland	10	2,306	0.4
Deciduous broadleaf forest	33	25,118	0.1
Evergreen needleleaf forest			
Mixed forest		2,282	0.0
Savanna	29	9,622	0.3
Water bodies	8	13,881	0.1
<i>Illinois subtotal</i>	<b>761</b>	<b>427,119</b>	<b>0.2</b>
<b>MAINLINE PROJECT</b>			
Cropland and pasture	8,358	3,913,454	0.2
Cropland/grassland mosaic	3,295	1,609,969	0.2
Cropland/woodland mosaic	1,596	843,905	0.2
Grassland	288	116,128	0.2
Deciduous broadleaf forest	271	119,346	0.2
Evergreen needleleaf forest	0	3,358	0.0
Mixed forest	20	14,662	0.1
Savanna	549	209,858	0.3
Water bodies	46	36,628	0.1
<b>Mainline Project total</b>	<b>14,422</b>	<b>6,867,309</b>	<b>0.2</b>

Sources: TransCanada 2007d (pipeline shapefiles), USGS 1998.

<b>TABLE 3.6.2-2 Estimated Wildlife Habitat Impacts for the Keystone Cushing Extension</b>			
	<b>Habitat Area within 110-foot ROW (acres)</b>	<b>Habitat Area within 5 miles of ROW (acres)</b>	<b>Proportion of Affected to Available Habitat (%)</b>
<b>Nebraska</b>			
Cropland and pasture	14	35,619	0.0
Cropland/grassland mosaic	12	5,057	0.2
Cropland/woodland mosaic			
Grassland	13	2,574	0.5
Deciduous broadleaf forest			
Evergreen needleleaf forest			
Mixed forest			
Savanna		159	0.0
Water bodies			
<i>Nebraska subtotal</i>	<i>38</i>	<i>43,409</i>	<i>0.1</i>
<b>Kansas</b>			
Cropland and pasture	404	164,797	0.2
Cropland/grassland mosaic	117	68,705	0.2
Cropland/woodland mosaic			
Grassland	969	527,336	0.2
Deciduous broadleaf forest	17	2,576	0.6
Evergreen needleleaf forest		727	0.0
Mixed forest		128	0.0
Savanna	1,295	554,749	0.2
Water bodies		12,542	0.0
<i>Kansas subtotal</i>	<i>2,802</i>	<i>1,098,058</i>	<i>0.3</i>
<b>Oklahoma</b>			
Cropland and pasture	354	180,617	0.2
Cropland/grassland mosaic	41	14,689	0.3
Cropland/woodland mosaic			
Grassland	249	87,547	0.3
Deciduous broadleaf forest		435	0.0
Evergreen needleleaf forest	37	5,233	0.7
Mixed forest		685	0.0
Savanna	410	232,565	0.2
Water bodies		7,909	0.0
<i>Oklahoma subtotal</i>	<i>1,092</i>	<i>529,679</i>	<i>0.2</i>
<b>CUSHING EXTENSION</b>			
Cropland and pasture	772	381,033	0.2
Cropland/grassland mosaic	171	88,451	0.2
Cropland/woodland mosaic	0		
Grassland	1,231	617,456	0.2
Deciduous broadleaf forest	17	3,011	0.6
Evergreen needleleaf forest	37	5,960	0.6
Mixed forest		813	0.0
Savanna	1,705	787,473	0.2
Water bodies		20,450	0.0
<b>Cushing Extension total</b>	<b>3,932</b>	<b>1,904,648</b>	<b>0.2</b>

Sources: TransCanada 2007d (pipeline shapefiles), USGS 1998.

**TABLE 3.6.2-3  
Summary of Estimated Wildlife Habitat Impacts for the Keystone Project**

	<b>Habitat Area within 110-foot ROW (acres)</b>	<b>Habitat Area within 5 miles of ROW (acres)</b>	<b>Proportion of Affected to Available Habitat (%)</b>
<b>Mainline Project</b>			
Cropland and pasture	8,358	3,913,454	0.2
Cropland/grassland mosaic	3,295	1,609,969	0.2
Cropland/woodland mosaic	1,596	843,905	0.2
Grassland	288	116,128	0.2
Deciduous broadleaf forest	271	119,346	0.2
Evergreen needleleaf forest	0	3,358	0.0
Mixed forest	20	14,662	0.1
Savanna	549	209,858	0.3
Water bodies	46	36,628	0.1
<i>Mainline Project subtotal</i>	<i>14,422</i>	<i>6,867,309</i>	<i>0.2</i>
<b>Cushing Extension</b>			
Cropland and pasture	772	381,033	0.2
Cropland/grassland mosaic	171	88,451	0.2
Cropland/woodland mosaic		0	
Grassland	1,231	617,456	0.2
Deciduous broadleaf forest	17	3,011	0.6
Evergreen needleleaf forest	37	5,960	0.6
Mixed forest		813	0.0
Savanna	1,705	787,473	0.2
Water bodies		20,450	0.0
<i>Cushing Extension subtotal</i>	<i>3,932</i>	<i>1,904,648</i>	<i>0.2</i>
<b>KEYSTONE PROJECT</b>			
Cropland and pasture	9,130	4,294,488	0.2
Cropland/grassland mosaic	3,465	1,698,420	0.2
Cropland/woodland mosaic	1,596	843,905	0.2
Grassland	1,519	733,584	0.2
Deciduous broadleaf forest	287	122,357	0.2
Evergreen needleleaf forest	37	9,318	0.4
Mixed forest	20	15,475	0.1
Savanna	2,254	997,331	0.2
Water bodies	46	57,079	0.1
<b>Keystone Project total</b>	<b>18,355</b>	<b>8,771,956</b>	<b>0.2</b>

Sources: TransCanada 2007d (pipeline shapefiles), USGS 1998.

**TABLE 3.6.2-4  
Important Wildlife Habitats along the Keystone Project  
Route (Mainline Project and Cushing Extension)**

<b>Milepost</b>	<b>Name</b>	<b>Ownership and Description</b>	<b>Miles</b>
<b>North Dakota</b>			
ML Various	U.S. Fish and Wildlife Service (USFWS) wetland easements	Private	24.0
ML 6.8–7.7	Tetrault Woods State Forest	North Dakota State Forest	0.8
<b>South Dakota</b>			
ML 358.0–358.1	Game production area	South Dakota Game Fish and Parks Department	0.1
ML Various	USFWS wetland easements	Private	11.8
ML 435.8–437.5	Missouri National Recreational River	Private designated as Wild and Scenic by National Park Service	2.3
<b>Kansas</b>			
CE 50.0–54.3	Milford State Wildlife Management Area	U.S. Army Corps of Engineers (COE)	3.4
<b>Missouri</b>			
ML 750.9–755.2	Western Missouri River Alluvial Plain/Missouri River Loess Woodland Conservation Opportunity Area (COA)	Private and Missouri Department of Conservation	4.1
ML 751.0–751.1	Jentell Brees Access	Missouri Department of Conservation	0.1
ML 760.9–761.3	Pigeon Hill Conservation Area	Missouri Department of Conservation	0.4
ML 770.0–771.4	Little Prairie River Woodland/Forest Scarped Hills COA	Private	1.4
ML 773.5–775	Little Platte River Woodland/Forest Scarped Hills COA	Private	1.0
ML 781.9–784.0	Cameron Upland Prairie Plain COA	Private	2.1
ML 825.8–829.2	Shoal Creek Prairie/Woodland Scarped Plain COA	Private	1.3
ML 841.6–844.4	Lower Grand River Lowland Plains/Missouri Grand River Alluvial Plain COA	Private	2.8
ML 870.6–871.8	Chariton River Alluvial Plain COA	Private	1.3
ML 874.3–875.2	Chariton River Alluvial Plain COA	Private	0.8
ML 931.8	West Fork Cuivre River	State of Missouri	0.1
ML 958.3–959.7	Veronica Baier – The Nature Conservancy	The Nature Conservancy	1.4
ML 964.3–966.2	Cuivre River Woodland/ Forest Hills COA	Private	1.9
ML 973.8–976.0	Cuivre River Woodland/ Forest Hills COA	Private	2.2
ML 987.7–1024.9	St. Charles County Prairie / Woodland Low Hills, Mississippi/Missouri River Confluence Area, other COAs	Private	37.2

<b>TABLE 3.6.2-4 (Continued)</b>			
<b>Milepost</b>	<b>Name</b>	<b>Ownership and Description</b>	<b>Miles</b>
<b>Missouri (continued)</b>			
ML 1023.5–1024.7	Edward "Ted" and Pat Jones – Confluence Point State Park	Missouri Department of Natural Resources	1.2
<b>Illinois</b>			
ML 1069.6–1072.7	Carlyle Lake	Illinois Department of Natural Resources and COE	3.1

Note: No important wildlife habitats were reported for Nebraska, Kansas, or Oklahoma.

Source: TransCanada 2007d.

Habitat fragmentation effects are generally reduced for pipeline corridors compared to road corridors because their widths are usually narrower and there is usually less associated human disturbance; during construction, however, pipelines can be significant barriers to wildlife movements (Hinkle et al. 2002). After construction, pipeline corridors may be used as travel corridors by deer, coyotes, raccoons, and many other animals. Most habitats crossed by the Mainline Project and Cushing Extension have been previously fragmented by road and transmission line networks, and exist as mosaics of croplands with patches of grasslands and woodlands. Only very short segments of new permanent roadways would be constructed for the pipeline (see Section 2). Temporary access roads would be removed and habitats restored after construction, which would generally prevent any increased human access to the ROW following construction. Review of land cover mapping (USGS 1998) indicates that the pipeline could potentially contribute to increased fragmentation of several apparently contiguous areas of grasslands and forestlands that would be crossed by the pipeline ROW. Areas where these apparently contiguous habitats coincide with areas set aside as wildlife habitats include:

- USFWS wetland easements in North Dakota and South Dakota – cropland/grassland mosaic,
- Shoal Creek Prairie/Woodland Scarped Plain COA in Missouri – deciduous broadleaf forest,
- Cuivre River Woodland/Forest Hills COA in Missouri – deciduous broadleaf forest,
- COE Carlyle Lake in Illinois – deciduous broadleaf forest, and
- COE Milford Wildlife Area in Kansas – grasslands and savanna.

Three proposed blasting locations would potentially affect important wildlife habitats along the Keystone Project. These locations are within the Chariton River Alluvial Plains COA (MP 870–871), and the Cuivre River Woodland/ Forest Hills COA (MP 964–966). Blasting can cause both short-term disturbance, in the form of increased noise, dust, and vibration, and permanent habitat modification. Blasting operations and mitigation measures to decrease the effects of blasting are discussed in Section 3.1.1.2.

Loss of shrublands and wooded habitats would be long term (from 5 to 20 years) within reclaimed areas of the construction ROW. Additional shelterbelt habitats along fields that were too small to be quantified (habitats less than 50 feet wide were not mapped) across the 1,300-mile ROW would be lost. Due to the linear nature of the ROW, these long-term habitat losses represent a small total area of available habitat and therefore are expected to have little impact on wildlife species (see Tables 3.6.2-1, 3.6.2-2, and 3.6.2-3).

Total habitat loss due to pipeline construction would be small in the context of available habitat within a 5-mile area surrounding the pipeline (Table 3.6.2-3), both because of the linear nature of the Keystone

Project and because restoration would follow pipeline construction. During restoration, however, Keystone would be obligated to reseed areas as directed by the landowner, such that areas of native vegetation could be converted to non-native species. Such conversion would likely reduce the value of the habitat for wildlife. If disturbance involved important remnant habitats, such as prairie chicken leks, habitat loss would be locally significant. Normal operation of the pipelines would 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. Keystone would consult with appropriate state wildlife agencies prior to initiation of maintenance activities beyond standard inspection procedures.

### **3.6.2.1 Big Game Animals**

Keystone Project construction would affect large game animals, primarily white-tailed deer, by loss of potential foraging and cover habitats; and would result in increased habitat fragmentation, especially in areas with continuous forest cover. Noise and increased human activity during construction would lead to short-term displacement and may act as a barrier to movements for some animals. Winter construction at woodlands or in riparian corridors with denning black bears in Missouri could lead to destruction of bears and dens during hibernation. Disturbance of female bears with newborn cubs likely would lead to the death of the newborn cub(s). After construction, maintained ROWs may be used as movement corridors by some big game animals and humans. Human access may be facilitated by vegetation clearing and the perception that the ROW is no longer private property. Increased human use could lead to increased disturbances and hunting pressure (Hinkle et al. 2002).

### **3.6.2.2 Small Game Animals and Furbearers**

Potential impacts on small game animals and furbearers include nest or burrow destruction, or abandonment and loss of young, foraging, and cover habitat. Displacement or attraction of small game animals and furbearers from disturbance areas would be short term, as animals would be expected to return following completion of construction and reclamation activities. Small mammals can fall into and become trapped in the open trench during pipeline construction. Burrowing animals would be expected to return and re-colonize the ROW after construction, although compacted areas such as temporary workspaces may become less suitable habitat. 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 these habitats may not be equivalent at least for several years after construction (Lauzon et al. 2002). Some badger, prairie dog, and rodent burrows would likely be destroyed during construction if they occur within the construction ROW. Badgers, prairie dogs, and burrowing rodents may be attracted by the warmth generated by the pipeline, especially during winter months. The heat generated by the pipeline will warm the soils within the proximity of the pipeline out to as much as 11 feet from the pipeline center at the maximum flow rate. Changes from surrounding soil temperature would be most noticeable during spring. The pipeline would generally not affect soil temperatures more than a few degrees at a depth of 6 inches, with soil temperatures at the surface generally unaffected.

For species that use tree and shrub habitats for cover, forage, 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 1,191 acres of forested habitats (see Table 3.5.5-3) would be affected by construction of the Mainline Project and Cushing Extension, of which an estimated 407 acres would be maintained as herbaceous vegetation. Permanent habitat loss also would occur along shelterbelts, windbreaks, and living snow fences that are intersected by the Keystone Project. Most of these habitats would be identified as cropland due to the resolution of habitat mapping used to generate estimates of habitat

impacts. Those areas crossed as part of the construction ROW would be cleared of trees and brush to provide access for construction equipment. Trees and shrubs would not be allowed to reestablish on the permanent ROW. Losses of these habitat types would be most likely to affect small game and furbearer species, as these habitats would be used as refuge next to cropland foraging habitats (Table 3.6.1-1). Differences in vegetation cover between the ROW and the surrounding landscape can act as a barrier for some species, such as squirrels, while acting as a movement corridor for others, such as raccoons and coyotes.

### **3.6.2.3 Waterfowl and Game Birds**

Most waterfowl and game birds nest on the ground, although a few notable species such as wood ducks and mourning doves nest in trees. Habitat loss and fragmentation would occur until vegetation is reestablished; then the habitat may be degraded due to the spread of noxious and invasive species. 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 to reestablish and the permanent ROW would be maintained free of trees and large shrubs. Migratory waterfowl may be attracted to the pipeline corridor during early spring if it becomes snow free earlier than surrounding habitats. This would be most likely to occur in North Dakota and South Dakota. Early greenup near roadways and the buried portion of the Trans Alaska Pipeline in Northern Alaska attracts waterfowl, shorebirds, and ptarmigan (Trans Alaska Pipeline System Owners 2001).

The greater prairie chicken and sharp-tailed grouse inhabit native prairies and nest in grasslands. These species have disappeared from large portions of their historical ranges, due primarily 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 where males display, and nesting may be concentrated within several miles of active leks. Prairie chickens and sharp-tailed grouse are also vulnerable to displacement by the creation of roads and power lines and reductions in habitat suitability due to fragmentation.

### **3.6.2.4 Other Migratory Birds**

Removal of trees from the construction ROW and extra workspaces in woodlots, riparian areas, and shelterbelts—habitats supporting 94 percent of raptor nests—would lead to the destruction of some of the approximately 100 raptor nest structures identified within 300 feet of the pipeline alignment. If nests were occupied when trees were cut, nests, eggs, or young would be lost. Because most raptors reuse nest structures, loss of nest structures would require pairs to find new nest trees. If suitable new nest trees are not available within their established territory, new territories would need to be established. These processes would lead to increased energy demands during nesting and could lead to reduced or lost reproduction in subsequent years. Losses of tree and shrub habitats used by migratory birds for cover, forage, and nesting would be long term because it would require from 5 to 20 years to reestablish trees and shrubs, and 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 habitats would have the greatest effect on raptors and migrant songbirds (Hinkle et al. 2002). Forest-nesting songbird abundance, diversity, and reproduction rates all become depressed as a result of fragmentation associated with linear developments (Jalkotzy et al. 1997). Linear corridors increase songbird nest predation and parasitism by fragmenting forest habitats.

### 3.6.3 Mitigation

To minimize potential construction- and operations-related effects, Keystone would implement procedures outlined in its CMR Plan (Appendix B). Keystone has identified mitigation procedures in the CMR Plan to minimize adverse effects to shelterbelts, windbreaks, and living snow fences; these additional mitigation measures can be found in Section 3.9.3.2. Pipeline construction would be conducted in accordance with required permits.

Keystone has committed to implementing the following measures in its CMR Plan to protect wildlife:

- Bevel shavings produced during pipe bevel operation would be removed immediately to ensure that livestock and wildlife do not ingest this material.
- Litter and garbage that could attract wildlife would be collected and removed from the construction site at the end of the day's activities.
- Feeding or harassment of livestock or wildlife is prohibited.
- Construction personnel would not be permitted to have firearms or pets on the construction ROW.
- All food and wastes would be stored and secured in vehicles and/or appropriate facilities.
- Areas of disturbance in native range would be seeded with a native seed mix after topsoil replacement.

Keystone has committed to implementing the following measures in its CMR Plan to protect sensitive wildlife species:

- Contracting a qualified biologist to conduct a survey of sensitive species associated with native tall-grass prairie. Locations of sensitive species found would be documented; if sensitive species are identified in the ROW, Keystone would work with the relevant regulatory authorities to determine whether any additional protection measures would be required.
- Reclaiming disturbance to native prairie species in native prairie using native seed mixes specified by applicable state and federal agencies, to ensure no net loss of native prairie habitat.
- Implementing appropriate surveys where avoidance of native tall-grass prairie by the pipeline ROW is infeasible, to ensure that populations of sensitive wildlife species are not affected.
- Contracting a qualified biologist to conduct a survey of breeding bird habitat within 330 feet of proposed surface disturbance activities that would occur during the breeding season. The biologist would document active nests, bird species, and other evidence of nesting (e.g., mated pairs, territorial defense, and birds carrying nesting material or transporting food). If the biologist documents an active nest for a species that is designated as a migratory bird during the survey, Keystone would work with USFWS to identify measures to comply with the MBTA.
- Conducting breeding raptor surveys by a qualified biologist prior to construction activities and during the raptor breeding season (February 1–July 31), through areas of suitable nesting habitat to identify any potentially active nest sites in the Keystone Project area. If raptors are identified within 0.5 mile of the construction ROW, Keystone would work with USFWS and state agency wildlife biologists to determine whether additional mitigation is needed to protect raptors. These measures would be implemented on a site-specific and species-specific basis, in coordination with USFWS and state agency wildlife biologists.

- Identifying pesticides proposed for use and any best management practices that would be implemented to minimize the impacts of pesticides used to maintain the pipeline ROW.
- Providing data from pre-biological surveys to appropriate USFWS Environmental Services field offices.
- Providing construction maps that identify seasonal restrictions and special construction restrictions to contractors, so that contractors would be informed and take the necessary precautions to protect natural resources during construction.
- Encouraging landowners to allow Keystone to use native species for restoration of the construction ROW across their lands.

In addition to the measures listed above, the following additional measures would further reduce impacts to wildlife from construction of the Keystone Project:

- USFWS recommends that all unavoidable impacts to fish and wildlife habitats be mitigated in accordance with guidelines provided by the USFWS Environmental Services field offices and state fish and wildlife agencies (Willie R. Taylor, USFWS, October 11, 2007).
- USFWS recommends restoration or replacement of native prairie and forest, and that replacement occurs in areas adjacent to existing large tracts of native habitat in order to consolidate habitats and reduce habitat fragmentation (Willie R. Taylor, USFWS, October 11, 2007).
- Construction within the Mississippi/Missouri Confluence COA should not occur during fall and spring migration (Willie R. Taylor, USFWS, October 10, 2007).

### **3.6.4 Connected Actions**

#### **3.6.4.1 Power Lines and Substations**

Approximately 193 miles of new electric transmission lines would be necessary to power pump stations along the pipeline ROW for the Mainline Project and the Cushing Extension (see Sections 2.1.4.1). Wildlife habitats affected by construction and operation of transmission lines include 119 miles of cropland and pasture, 51 miles of cropland/grassland mosaic, 12 miles of cropland/woodland mosaic, 5 miles of grassland, and 5 miles of savanna (see Table 3.5.5-5). Approximately 64 percent of these lines (124 miles) would be located in proximity to prairie potholes in North Dakota and South Dakota, which are notable waterfowl production areas. Other routes would cross rivers and riparian areas that are likely to attract raptors and migratory birds. Newly constructed power lines would cross croplands and pastures, cropland/grassland mosaics, and grassland habitats that would be used by ground-nesting birds. Transmission line poles would be used as vantage perches by raptors, facilitating predation on ground-nesting birds. Location of poles across grassland habitats also reduces habitat suitability for ground-nesting birds.

New electric power 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 line-related factors influencing collision risk include the configuration and location of the line and line placement with respect to other structures or topography (APLIC and USFWS 2005).

Birds are electrocuted by power lines 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 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 transmission lines would be reduced by provider implementation of the following mitigation measures:

- Standard, safe designs, as outlined in Suggested Practice for Avian Protection on Power Lines (APLIC 2006), into the design of electrical distribution lines in areas of identified avian concern.
- Marking techniques to increase transmission line visibility using balls or flappers.
- A minimum 60-inch separation between conductors and/or grounded hardware and recommended use of insulation materials and other applicable measures, depending on line configuration.
- Standard raptor-proof designs, as outlined in Avian Protection Plan Guidelines (APLIC and USFWS 2005), into the design of the electrical distribution lines to prevent collision by foraging and migrating raptors in the Keystone Project area.

Electrical service providers and, where applicable, the RUS would coordinate with the appropriate state and federal resource agencies to identify specific locations for flight deterrents or other avoidance or minimization measures.

#### **3.6.4.2 Wood River Refinery Expansion**

No impacts related to wildlife are associated with the Wood River Refinery Expansion other than those evaluated as part of that project.

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