## 3.8 THREATENED AND ENDANGERED SPECIES

This section addresses species that are federally listed as endangered or threatened, or are considered as candidates for listing by USFWS, and those species that are state listed as threatened, or endangered or as a species of conservation concern. A separate Biological Assessment (BA) that addresses federally endangered and threatened species was prepared by Keystone (ENSR 2007i) for DOS. The BA has been accepted by DOS and submitted to USFWS (Appendix S).

Species listed as threatened or endangered are afforded an additional level of protection. In accordance with Section 7 of the Endangered Species Act (ESA), DOS (as the lead agency), in coordination with USFWS, must ensure that any action authorized, funded, or carried out does not jeopardize the continued existence of a federally listed threatened or endangered species, or result in the adverse modification of the federally designated critical habitat of a federally listed species. The DOS Section 7 Consultation with USFWS (directed by Keystone as DOS's non-federal designee) will be completed prior to issuance of the Presidential Permit.

Candidate species (species for which USFWS has sufficient information on biological vulnerability and threats to justify proposing to add them to the threatened and endangered species list but cannot do so immediately because other species have a higher priority for listing) receive no substantive or procedural protection under the ESA; however, USFWS encourages federal agencies and project proponents to consider candidate species in the project-planning process. Actions taken to avoid effects on candidate species may reduce the need to consider listing the species under the ESA in the future.

Keystone initiated Section 7 consultation with USFWS in January 2006 by sending a project overview and information request letter. The USFWS lead office for DOS consultation was the Denver office with significant assistance from the Grand Island Nebraska Field Office. Keystone also contacted the following state wildlife agencies and provided them with a project overview and information request:

- North Dakota Game and Fish Department (NDGFD);
- South Dakota Game, Fish and Parks (SDGFP);
- Nebraska Game and Parks Commission (NGPC);
- Kansas Department of Wildlife and Parks (KDWP);
- Missouri Department of Conservation (MDC);
- Illinois Department of Natural Resources (IDNR); and
- Oklahoma Department of Wildlife Conservation (OKDWC).

Based on input from these state and federal agencies, state natural heritage programs, agency web sites and other applicable web sites (e.g., NaturServe.org); biological packages summarizing potential habitat for special-status species were sent to applicable federal and state agencies for review and input in June 2006. These applicant-prepared summaries and responding correspondence from federal and state agencies provide the basis for the species listings, life history description, impact assessments, and mitigation measure recommendations in the following EIS sections (ENSR 2006c [Agency correspondence binders], TransCanada 2007d, ENSR 2007i). Meetings between Keystone and federal and state resource agencies were held in February and July 2006 and in February and November 2007. Work plans were developed for surveys of protected species in each state. These plans included the species to be surveyed; survey locations (mileposts and maps); survey periods; and requirements for proposed surveys in 2006, 2007, and pre-construction surveys in 2008. All survey locations and plans were reviewed and approved by the appropriate federal and state resource agencies.

### 3.8.1 Federally Listed Threatened and Endangered Species

Federally protected threatened or endangered species with the potential to occur in the Keystone Project area include three birds, two mammals, four fish, two mollusks, and three plants. Candidate species include one reptile, one insect, and one fish. The distribution, life histories, and habitat requirements for these species are discussed below. Many of these species also are protected by individual states.

#### 3.8.1.1 Federally Protected Birds

Table 3.8.1-1 lists federally and state-protected birds. Federally protected bird species include the bald eagle, piping plover, interior least tern, and whooping crane.

##### Bald Eagle

The bald eagle is no longer federally listed as threatened; a final rule removing the bald eagle from the federal list of threatened species was adopted on June 28, 2007. However, the bald eagle remains state listed as threatened in South Dakota, Nebraska, Kansas, Illinois, and Oklahoma; and is state listed as endangered in Missouri. Historically, populations of bald eagles were drastically reduced by low productivity from the bioaccumulation of pesticides. Since organochlorine pesticides such as DDT have been banned, bald eagle numbers have been increasing—leading to the species being proposed for federal de-listing on July 4, 1999, as "recovered."

Bald eagles also are protected under the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA). The BGEPA not only protects eagles, their young, eggs, and active nests as the MBTA does, it also protects eagles from harm and harassment. "Take" under the BGEPA is defined as to pursue, shoot, shoot at, poison, kill, capture, trap, collect, molest, or disturb. Because bald and golden eagles are afforded more protection than birds protected solely under the MBTA, a discussion of this species and Project-related impacts to the species is retained in this discussion of federally protected birds.

Bald eagles use mature, forested, riparian areas near rivers, streams, lakes, wetlands, and reservoirs. They nest, migrate, and winter in all seven states and within most of the counties along the proposed Mainline Project and Cushing Extension routes. They generally nest from early February through mid-August, and often return to use the same nest and winter roost year after year. The bald eagle's diet consists mostly of fish. Eagles also forage opportunistically on waterfowl, dead fish, jackrabbits, and big game carrion—especially in winter. Southward migration begins as early as October, and the wintering period extends from December to March. Bald eagles roost in a forested area known as a communal roost. A communal roost is generally defined as an area where six or more eagles spend the night within 100 meters of each other.

##### Interior Least Tern and Piping Plover

The interior least tern is federally listed as endangered and is listed as a state-endangered species in South Dakota, Nebraska, Kansas, Missouri, and Oklahoma. The piping plover is federally listed as threatened and is listed as a state-threatened species in South Dakota, Nebraska, and Kansas.

**TABLE 3.8.1-1**
**Protected Birds Potentially Occurring along the Keystone Project Route**

| Species | Federal Status | State Status and Occurrence by County [a] | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | ND | SD | NE | KS | MO | IL | OK | |
| King rail (*Rallus elegans*) | | | | SC – Seward | | E – Buchanan, Carroll, Chariton, Lincoln, St. Charles | | | Suitable nesting habitat in wetlands with abundant grasses, sedges, rushes, and cattails |
| Least bittern (*Ixobrychus exilis*) | | | | | | SC – Buchanan, Chariton, Lincoln , St. Charles | T – Madison, Fayette | | Nesting habitat in freshwater wetlands with dense, tall growths of emergent vegetation with woody vegetation and open water |
| Yellow-crowned night heron (*Nyctanassa violacea*) | | | | | | | E – Fayette | | Nesting habitat includes trees; winter foraging habitats include wetlands, lakes, and rivers |
| Bald eagle (*Haliaeetus leucocephalus*) | D | SC – All | T – All | T – All | T – All | E – Buchanan, Carroll, Chariton, Clinton, Lincoln, Montgomery | T – Bond, Fayette, Madison | T | Potential nesting and roosting habitats along river corridors crossed by the Keystone Project; state-designated critical habitat at the Big Blue and Missouri River crossings in Kansas |
| Northern harrier (*Circus cyaneus*) | | | | | | E – Buchanan, Clinton, Carroll, Chariton, Montgomery, Lincoln, St Charles | E – | | Potential nesting habitats in marshes, meadows, grasslands, and cultivated fields |
| Osprey (*Pandion haliaetus*) | | T – Yankton | | | | | | | Two osprey hack sites for the reintroduction of osprey are located near the ROW at the Missouri River crossing in Yankton County |
| Barn owl (*Tyto alba*) | | | | | | E – Buchanan, Chariton, St Charles | E – Fayette, Marion | | Nesting habitats include tree cavities, caves, cliff crevices, cut bank burrows, and buildings |

**TABLE 3.8.1-1**
**(Continued)**

| Species | Federal Status | State Status and Occurrence by County [a] | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | ND | SD | NE | KS | MO | IL | OK | |
| **Piping plover (*Charadrius melodus*)** | T | SC | T – Day, Yankton | T – Butler, Cedar, Colfax, Platte | T – Cowley | | | Kay, Noble, Payne | Suitable habitats in open sandy areas, saline flats, sandbars, and sand and gravel beaches along rivers and gravel pits |
| **Interior least tern (*Sterna antillarum athalassos*)** | E | | E – Yankton | E – Butler, Cedar, Colfax, Platte | E – Cowley | E – St. Charles | E – Madison | E – Kay, Noble, Payne | Nesting habitats in sparsely vegetated sandy, gravelly or silty beaches, and sandbars in wide unobstructed river channels |
| **Whooping crane (*Grus americanan*)** | E | SC – Barnes, Cavalier, Dickey, Griggs, Lamoure | E – Beadle, Clark | E – Seward | E – Cowley | | | E – Noble, Payne | The primary migration route is generally east of the Project area; foraging habitat in croplands, freshwater marshes, and lake margins; roosting habitat on submerged bars in large rivers |
| Loggerhead shrike (*Lanius ludovicianus*) | | | | | | SC – Buchanan | T – Bond, Fayette, Marion | | Potential nesting habitats in open areas with mixed shrub/brush hedgerows and scattered thorny trees |
| Henslow's sparrow (*Ammodramus henslowii*) | | | | | SC – Butler, Dickinson, Nemaha | SC – Randolph, Clinton | E – Marion | | Potential nesting habitat in tall grasslands, meadows, and abandoned fields with wet areas |
| Greater prairie-chicken (*Tympanuchus cupido*) | | SC – Sargent | | | | E – Audrain | | | Potential nesting habitat in mid- and tall-grass prairies bordered by oak forests and croplands |

Notes:

**Boldface text** indicates a federally protected species.

D = De-listed (removed from listing of threatened or endangered species).
E = Endangered.
SC = Species of conservation concern.
T = Threatened.

[a] Species designated as E, T, or SC by states and reported to occur in counties crossed by the Keystone pipeline ROW.

Sources: ENSR 2006a, c; TransCanada 2007c.

Least terns feed on small fish in the river, and piping plovers forage for invertebrates on exposed beach substrates. These species nest on unvegetated or sparsely vegetated sandbars in river channels and wetlands. Least terns also will nest on bare alluvial or dredge spoil island and sand or gravel bars in or adjacent to rivers, lakes, gravel pits, and cooling ponds. Population estimates indicate there are 8,000 interior least terns (USFWS 2007) and 2,953 piping plovers in the Prairie Canada and U.S. Northern Great Plains region (Morrison et al. 2006). Nesting season for the least tern and piping plover is from April 15 through September 15.

### Whooping Crane

Whooping cranes are federally listed as endangered; state listed as endangered by South Dakota, Kansas, Nebraska, and Oklahoma; and listed as species of conservation concern in North Dakota. Whooping cranes use numerous habitats such as cropland and pastures; wet meadows; shallow marshes; shallow portions of rivers, lakes, reservoirs, and stock ponds; and both freshwater and alkaline basins for feeding and loafing during their spring and fall migration. Overnight roosting sites frequently require shallow water in which they stand and rest. Shallow, sparsely vegetated streams and wetlands are required to feed and roost during migration.

The north-south migration corridor through Oklahoma, Kansas, Nebraska, South Dakota, and North Dakota would be crossed by the Mainline Project and Cushing Extension. Migrating whooping cranes could be roosting or feeding in the Keystone Project area. The migration periods are approximately from March 23 through May 10 and from September 16 through November 16. Migration periods throughout the states involved may vary, depending on the northern or southern location during the migration period. Young adult whooping cranes are known to summer in North Dakota.

### 3.8.1.2 Federally Protected Mammals

Table 3.8.1-2 lists federally and state-protected mammals. Federally-protected mammals include the gray bat, Indiana bat, and gray wolf.

### Gray Bat

The gray bat is federally endangered and is state listed as endangered in Missouri, Illinois, Kansas, and Oklahoma. This species has been recorded in Madison County, Illinois, and Lincoln County, Missouri and could occur along the Keystone Project ROW in these counties. Gray bats are not known to occur along the Mainline Project in Kansas or along the Cushing Extension in Kansas and Oklahoma.

The gray bat inhabits caves throughout the year and forages over rivers and reservoirs adjacent to forests. In some areas, the same caves are used in winter and summer; in other areas (e.g., Missouri and Arkansas), many caves used in summer are vacant in winter. This species requires undisturbed caves with a corridor of mature trees, such as oak-hickory floodplain forests, between caves and foraging sites over lakes, reservoirs, streams, and riparian forests. Gray bats feed on aquatic insects and are generally opportunistic feeders. Virtually all prey are associated with water, swamp, or riparian vegetation.

**TABLE 3.8.1-2**
**Protected Mammals Potentially Occurring along the Keystone Project Route**

| Species | Federal Status | State Status and Occurrence by County [a] | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | ND | SD | NE | KS | MO | IL | OK | |
| **Gray bat (*Myotis grisescens*)** | E | | | | | E – Lincoln | E – Madison | | Forages along streams and lakes and uses caves for winter, summer, and maternity roosts |
| **Indiana bat (*Myotis sodalis*)** | E | | | | | E – all counties | E – all counties | | Maternity roost beneath loose bark in oak and hickory trees; winter hibernation in caves in Shannon, Washington, and Iron Counties, MO |
| River otter (*Lontra canadensis*) | | | | T – Stanton, Colfax | | | | | Suitable habitats include rivers, streams, lakes, ponds, and marshes |
| **Gray wolf (*Canis lupus*)** | E, D | SC – Cavalier, Dickey, Grand Forks, Nelson, Pembina, Sargent, Walsh | | | | | | | Suitable habitats in the project area include hardwood forest, mixed forest, and grasslands; has been extirpated from most of the Keystone Project route, although individuals could occur in the project area |

Notes:

**Boldface text** indicates a federally protected species.

D = De-listed (removed from listing of threatened or endangered species).
E = Endangered.
SC = Species of conservation concern.
T = Threatened.

[a] Species designated as T, E, or SC by states and reported to occur in counties crossed by the Keystone pipeline ROW.

Sources: ENSR 2006a, c; TransCanada 2007c.

Summer colonies occupy traditional home ranges that often contain several roosting caves scattered along as much as 43 miles of river or reservoir borders. Individuals forage along rivers or shoreline up to 12 miles from their roost caves. Roost sites are restricted nearly exclusively to caves throughout the year, although only a few percent of available caves are suitable. Large summer colonies use caves that trap warm air and provide restricted rooms or domed ceilings; maternity caves often have a stream flowing through them. Forested areas along the banks of streams and lakes provide important protection for adults and young. Rivers or reservoirs where the forest has been cleared are unsuitable as foraging habitat.

### Indiana Bat

The Indiana bat is federally listed as endangered and state listed as endangered in Missouri and Illinois. This species is found east of the Missouri River in all counties in Missouri and Illinois along the proposed Keystone Project route. Potential habitat for this species occurs statewide in Illinois; therefore, Indiana bats are considered as potentially occurring in any area with forested habitat, including Marion County.

Indiana bats have recently been identified at the Swan Lake National Wildlife Refuge in Chariton County, Missouri; approximately 6 miles north of the Keystone Project alignment. Two confirmed winter hibernacula are more than 5 miles south of the Mainline Project in Boone County, Missouri. USFWS also indicated a hibernaculum in St. Louis County, Missouri; approximately 15 miles south of the Mainline Project. Indiana bats are assumed present during summer in all Illinois counties. Known occurrences include non-reproductive Indiana bats in Madison County and capture of lactating females and juveniles in Bond County, Illinois, indicating the presence of a maternity colony. Adult female Indiana bats also have been collected in mid-August in Clinton County on both the east and west side of Carlyle Lake. The distribution of these collections suggests the possible presence of one or more maternity colonies in the vicinity of Carlyle Lake, including the WMA. Indiana bats are not known to occur in North Dakota, South Dakota, Nebraska, or Kansas.

Indiana bats migrate seasonally between winter hibernacula and summer roosting habitats. Winter hibernacula include caves and abandoned mines. These bats hibernate in large, tight clusters that may contain thousands of individuals. Very few caves exist that provide the conditions necessary for hibernation. Stable, low temperatures are required to allow the bats to reduce their metabolic rate and conserve fat reserves.

Females emerge from hibernation in late March or early April to migrate to summer roosts. Females form nursery colonies (1 to 100 individuals) under the loose bark of trees (dead or alive) or cavities, where each female gives birth to a single young in June or early July. A single colony may use a number of roost trees during the summer—typically a primary roost tree and several alternates. The species or size of trees does not appear to influence whether Indiana bats use a tree for roosting, provided the appropriate bark structure is present.

Indiana bats feed entirely on nocturnal flying insects, and a colony of bats can consume thousands of insects each night. During summer, Indiana bats frequent the corridors of small streams with well-developed riparian woods, as well as mature upland and bottomland forests. They forage for insects along stream corridors, within the canopy of floodplain and upland forests, over clearings with early succession vegetation (old fields), along the borders of crop lands, along wooded fence rows, and over farm ponds and in pastures. The foraging range for the bats varies by season, age, and sex, and ranges up to 81 acres.

Indiana bats are subject to natural hazards during hibernation, such as cave flooding; however, humans have been the major cause of declining bat populations. Clusters of hibernating bats are very susceptible

to disturbance and vandalism. Clearing of forests has caused a decline in the summer habitat of the Indiana bat.

### Gray Wolf

The gray wolf is federally listed as endangered and state listed as a species of conservation concern by North Dakota. The gray wolf is an occasional visitor to the Keystone Project area in North Dakota. The gray wolves in North Dakota and South Dakota are part of the Great Lakes Region Population and the Western Great Lakes Distinct Population Segment. On February 8, 2007, USFWS announced a final rule to change the status of the gray wolf (FR [72] 26i 6052-6103). As of March 12, 2007, the gray wolf was de-listed in the portion of the Keystone Project area where they were most likely to occur—in the portion of North Dakota north and east of the centerline of Highway 83 from Lake Sakakawea to the Canadian border. The gray wolf remains endangered in western North Dakota and the remainder of the Keystone Project area.

## 3.8.1.3 Federally Protected Reptiles and Insects

Table 3.8.1-3 lists federal candidate and state-protected reptiles and insects. Federal candidates include the eastern massasauga, a pygmy rattlesnake; and the Dakota skipper, a butterfly.

### Massasauga

The eastern massasauga rattlesnake (one of three subspecies of massasauga) is a federal candidate species and is state listed as endangered by Missouri and Illinois. The three subspecies of massasauga are the eastern massasauga (*Sistrurus catenatus catenatus*), western massasauga (*Sistrurus catenatus tergeminus*), and desert massasauga (*Sistrurus catenatus edwardsii*). Two of these three subspecies, the eastern and western massasauga, may occur within the Keystone Project area. Taxonomic review of the species has indicated that the three designated subspecies appeared to be arbitrary (Crother et al. 2000). To further complicate the conservation status of this species, Nebraska lists the massasauga at a species level, using the common name for the western subspecies. The federal candidate listing includes only the eastern subspecies within Illinois and Missouri; however, both the eastern and western subspecies may occur in Missouri. Massasauga (c.f. eastern or western) accounts have been recorded in the Keystone Project area within Jefferson and Gage Counties in Nebraska; Chariton, Randolph, and St. Charles Counties in Missouri; and Bond, Fayette, and Madison Counties in Illinois.

Massasaugas live in wet areas, including wet prairies, marshes, and low areas along rivers and lakes. In many areas, massasaugas also use adjacent uplands—including forest—during part of the year. They often hibernate in crayfish burrows, but they also may be found under logs and tree roots or in small mammal burrows. Unlike other rattlesnakes, massasaugas hibernate alone. Small mammal and crayfish burrows are used for winter hibernation.

Females sexually mature in 3 years and breed every few years, giving birth in late July through early September. Movement within the home range occurs between suitable winter and summer habitats, sometimes spanning almost 2 miles; however, most movement occurs within 650 feet from their burrows. Peak activity occurs from about April or May through October.

**TABLE 3.8.1-3**
**Protected Amphibians, Reptiles, and Insects Potentially Occurring along the Keystone Project Route**

| Species | Federal Status | State Status and Occurrence by County [a] | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | ND | SD | NE | KS | MO | IL | OK | |
| **AMPHIBIANS** | | | | | | | | | |
| Illinois chorus frog (*Pseudacris strecheri illino*) | | | | | | | T | | Sand prairies |
| **REPTILES** | | | | | | | | | |
| Kirtland's snake (*Clonophis kirtlandi*) | | | | | | | T | | Prairie wetlands, herbaceous wetlands, and riparian wetlands; usually associated with crayfish burrows |
| Western fox snake (*Elaphe vulpine vulpina*) | | | | | | E | | | Riparian habitat, woodlands, prairie wetlands, and croplands |
| **Eastern massasauga (*Sistrurus catenatus catenatus*)** | C | | | | | E – Chariton, Randolph, St. Charles | E – Bond, Fayette, Madison | | Wet prairies, marshes, and swamps dominated by emergent vegetation and lowland areas along rivers and lakes |
| Massasauga (c.f. Western) (*Sistrurus catenatus*) | | | | T - Gage, Jefferson | | | | | Wet prairies, marshes, and swamps dominated by emergent vegetation and lowland areas along rivers and lakes |
| False map turtle (*Graptemys pseudogeo-graphica*) | | | T | | | | | | Rivers, streams, sloughs, oxbow lakes, ponds impoundments, and backwaters |
| **INSECTS** | | | | | | | | | |
| **Dakota skipper (*Hesperia dacotae*)** | C | SC – Ransom, Sargent | SC | | | | | | Lowland and upland prairies |

Notes:

**Boldface text** indicates a federally protected species.

E = Endangered.
SC = Species of conservation concern.
T = Threatened.

[a] Species designated as E, T, or SC by states and reported to occur in counties crossed by the Keystone pipeline ROW.

Sources: ENSR 2006a, c; TransCanada 2007c.

### Dakota Skipper

The Dakota skipper (butterfly) is federally listed as a candidate species and is state listed as a species of concern by North Dakota and South Dakota. The Dakota skipper is found in North Dakota and South Dakota native prairies containing a high diversity of wildflowers and grasses. In the vicinity of the Keystone Project, the Dakota skipper occurs in Ransom and Sargent Counties in North Dakota; and in Brookings, Brown, Codington, Day, Duel, Edmunds, Grant, Hamlin, Marshall, McPherson, and Roberts Counties in South Dakota.

One of the best indicators for Dakota skipper habitat is the presence of food plants for larva and nectar plants for adults. Habitats include low (wet) prairie dominated by bluestem grasses, wood lily, harebell, and smooth camas; and upland (dry) prairie on ridges and hillsides dominated by bluestem grasses, needlegrass, pale purple and upright coneflowers, and blanketflower. Nectar provides the nutrients and carbohydrates for Dakota skippers to meet the energetic demands of flight. Grassland sites with a diverse mix of native forbs, one or two of the known larvae or pollen plants, and proximity to other native grassland areas are considered suitable habitats.

## 3.8.1.4 Federally Protected Fish and Mollusks

Table 3.8.1-4 lists federally and state-protected fish and mollusks. Federally protected fish include the pallid sturgeon, Arkansas River shiner, Topeka shiner, and Neosho madtom. Federally protected mollusks include the Higgins' eye pearlymussel, and the scaleshell mussel. Federal candidate species include the Arkansas darter (fish).

### Pallid Sturgeon

The pallid sturgeon is a federally listed endangered species and is state listed as endangered in South Dakota, Nebraska, Kansas, Missouri, and Illinois. Within the Keystone Project area, the pallid sturgeon has been identified in the Missouri River in South Dakota, the Missouri and lower Platte Rivers in Nebraska, the Missouri River in Kansas and Missouri, and the Mississippi River in Illinois.

This species inhabits diverse aquatic habitats. It requires large, turbid, free-flowing riverine habitats; however, it also has been found in reservoirs and deep water with low current velocities. Floodplains, backwaters, chutes, sloughs, islands, sandbars, and main channel waters formed the large river ecosystems that provide macrohabitat requirements. Adults are opportunistic feeders with prey including aquatic insects, crustaceans, mollusks, annelids, eggs of other fish, and other fish.

Pallid sturgeons are extremely long-lived fish; their lifespan in the wild is estimated to average 60 years. They usually take a decade to mature and become able to reproduce. The fish spawns between June and August, and can produce thousands of eggs. The eggs produced in the wild are heavily subject to predation and other forces of nature.

### Arkansas Darter

The Arkansas darter is federally listed as a candidate species and state listed as threatened in Kansas. Along the Keystone Project route, the Arkansas darter has been identified in one tributary of the Arkansas River in Kansas. Arkansas darters live in shallow, clear, usually spring-fed streams with sandy bottoms. They prefer slow currents of cool water, partially overgrown with rooted aquatic vegetation, such as watercress. The vegetation provides a cover that offers the Arkansas darter hiding places from predators. Arkansas darters feed on a variety of aquatic insects and some plant material, including small seeds.

**TABLE 3.8.1-4**
**Protected Fish and Mollusks Potentially Occurring along the Keystone Project Route**

| Species | Federal Status | State Status and Occurrence by County [a] | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | ND | SD | NE | KS | MO | IL | OK | |
| **FISH** | | | | | | | | | |
| Chestnut lamprey (*Ichtyomyzon castaneus*) | | | | | T | | | | Rivers and creeks; Missouri River |
| **Pallid sturgeon (*Scaphirhynchus albus*)** | E | | E – Yankton | E – Cedar | E – Doniphan | E – Buchanon, Carrol, Montgom-ery, St. Charles | E – Madison | | Large turbid rivers and sand substrate; Missouri, Platte, and Mississippi Rivers |
| Lake sturgeon (*Acipenser fulvescens*) | | | | | | E | E | | Large rivers and lakes, and gravel substrate; Missouri and Mississippi Rivers |
| **Arkansas darter (*Etheostoma cragini*)** | C | | | | T – Cowley | E – | | | Tributaries to the Arkansas River; shallow, clear, spring-fed tributaries with sand and sand-gravel substrates |
| Flathead chub (*Platygobio gracillis*) | | | | | T – Clay, Cowley | | | | Turbid rivers and streams, and sand substrate; Nemaha and Missouri Rivers |
| Silver chub (*Macrhybopsis storeriana*) | | | | | E – Clay, Cowley | SC | | | Large sandy rivers; Missouri, Republican, and Arkansas Rivers |
| Sturgeon chub (*Macrhybopsis gelida*) | | | T | E | T | SC | | | Large, turbid rivers and sand-gravel substrates; Missouri and Platte Rivers |
| Sicklefin chub (*Machrybopsis meeki*) | | | T | T | E | SC | | | Large, turbid rivers and sand-gravel substrates; Rock Creek; Missouri and Platte Rivers |
| Arkansas River speckled chub (*Machrybopsis tetranema*) | | | | | E – Cowley | | | | Shallow channels of perennial streams with clean fine sand; Arkansas River |
| Western silvery minnow (*Hybognathus argyritis*) | | | | SC | T | SC | | | Backwaters of large, turbid rivers and prairie streams; South Fork Nemaha and Missouri Rivers |
| **Arkansas River shiner (*Notropis girardi*)** | T | | | | E – Cowley | | | T | Depends on flood flows in June-August for spawning; Arkansas River and main tributaries |

**TABLE 3.8.1-4**
**(Continued)**

| Species | Federal Status | State Status and Occurrence by County [a] | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | ND | SD | NE | KS | MO | IL | OK | |
| **FISH (CONTINUED)** | | | | | | | | | |
| Silverband shiner (*Notropis shumardi*) | | | | T | | | | | Large, turbid rivers |
| **Topeka shiner (*Notropis topeka*)** | E | | SC – all but Day, Marshall | | T – Butler, Dickinson, Marion, Marshall | E | | | Small, cool (often intermittent) prairie streams; Wolf, North Elm, Castile, Shoal, Log, Crush, and Crabapple Creeks; James, Missouri, West Fork Big Blue, and Little Platte Rivers; |
| **Neosho madtom (*Noturus placidus*)** | T | | | | T – Marion | E | | T | riffles and sloping gravel bars in relatively clear, moderately large rivers; Cottonwood River |
| **Mollusks** | | | | | | | | | |
| **Higgins' eye pearlymussel (*Lampsilis higginsi*)** | E | | SC – Yankton | E – Cedar | | E | E | | Fast-flowing creeks and rivers, and silt substrate; Missouri drainage |
| **Scaleshell mussel (*Leptodea leptodon*)** | E | | SC – Yankton | E – Cedar | | | | | Creeks and rivers; Missouri drainage |

Notes:

**Boldface text** indicates a federally protected species.

E = Endangered.
SC = Species of conservation concern.
T = Threatened.

[a] Species designated as E, T, or SC by states and reported occurring within counties crossed by the Keystone pipeline ROW.

Sources: ENSR 2006a, c; TransCanada 2007c.

Spawning occurs from mid-February to mid-July. Although this darter will live 3 years, most of the spawning population is in its first year. Spawning takes place in open areas of shallow water over a bottom of coarse gravel.

Historically, the biggest threat to the Arkansas darter has been loss of habitat as more water is taken from streams and underlying aquifers for agricultural uses. Livestock grazing near streambanks often destroys the vegetation that darters use as protection and increases the organic matter that enters the streams. Removal of sand and gravel from stream bottoms destroys the Arkansas darter's breeding habitat. Impoundments and reduced stream flows decrease the Arkansas darter's ability to move to new locations.

### Arkansas River Shiner

The Arkansas River shiner is federally listed as threatened and state listed as endangered in Kansas and threatened in Oklahoma. In the Keystone Project area, this species has been identified in the Republican and Arkansas Rivers in Kansas, and in the Cimarron River in Oklahoma. Its preferred habitat usually consists of turbid waters of broad, shallow, unshaded channels of creeks and small to large rivers, over mostly silt and shifting sand bottoms. They tend to congregate on the downstream side of large transverse sand ridges. Their diet consists mainly of plankton and organisms that are exposed by moving sand or by drifting downstream. Spawning occurs from June to July in the main stream channel.

Current threats to this species include habitat destruction, water quality degradation, and reduced stream flow, caused by diversion of surface water, groundwater pumping, and construction of impoundments. The decline in populations also may be attributed to competition, accidental capture, drought, and other natural causes.

### Topeka Shiner

The Topeka shiner is federally listed as endangered. It is state listed as a species of concern in South Dakota, threatened in Kansas, and endangered in Missouri. The Topeka shiner is a small minnow that historically was distributed throughout much of the Midwestern states. The fish inhabits spring-fed, sandy-bottomed streams with good water quality. This species lives in pools and slack water areas between riffle sequences along a stream course.

Within the Keystone Project area, the Topeka shiner occurs in several drainage basins in South Dakota, Kansas, Missouri, and Nebraska. Topeka shiners are known to occupy numerous small streams in eastern South Dakota, and most are concentrated in the Big Sioux, Vermillion, and James Rivers watersheds. Survey efforts continue to reveal additional inhabited streams. In Missouri, the proposed Keystone pipeline ROW would pass through Caldwell and Clinton Counties. The Topeka shiner's historical range occurred in these two counties; however, it is believed that the fish no longer occurs in this part of its former range.

Topeka shiners are opportunistic omnivore predators; their prey includes insects, algae, fish larvae, and worms. The maximum life span of the Topeka shiner is three summers. Most reach maturity in the spring or summer of their second year. They spawn from late-May to mid-July and deposit their eggs in the nests of green and orange-spotted sunfish.

The Topeka shiner is susceptible to water quality changes in its habitat and has disappeared from several sites because of increased sedimentation resulting from accelerated soil runoff. Stream modifications, sediment deposition, pollution, overgrazing, and predation by introduced fish are thought to have led to the decline of the Topeka shiner across its Midwestern range.

### Neosho Madtom

The Neosho madtom is federally listed as a threatened species and state listed as endangered in Missouri, and state listed as threatened in Kansas, and Oklahoma. The preferred habitat of the adult Neosho madtom is shallow riffles with loose, uncompacted gravel bottoms. In the Keystone Project area, the species has been found in the Cottonwood River in Kansas.

Larval, aquatic insects are the major food source of Neosho madtoms. These fish have a short life cycle, with a maximum life expectancy of 3 years. The reproductive cycle begins in March with egg development, and continues through at least the end of July.

The Neosho madtom has declined because of habitat destruction. Construction of dams, dredging of gravel, and an increase in water demands have contributed to habitat loss. Pollution from cattle feedlot runoff also has adversely affected the fish.

### Higgins' Eye Pearlymussel

The Higgins' eye pearlymussel is federally listed as endangered and is state listed as a species of conservation concern in South Dakota. This species is native to the Mississippi River and some of its northern tributaries, although it is not known to occur in the Mississippi River within the Keystone Project area. Along the proposed Keystone Project route, the Higgins' eye pearlymussel is expected to occur in the Missouri River in South Dakota. Shells of the endangered Higgins' eye pearlymussel recently have been found below the Gavins Point Dam; however, populations of these mussels are not known to occur in this reach of the Missouri River.

The Higgins' eye pearlymussel prefers areas with deep water and moderate currents; stable but not firmly packed substrates that vary from silt to boulders; low current velocities; and mussel beds that are dense with other associated species.

The exact breeding season for this species is unknown; however, closely related species are gravid from September to June. Sexual maturity is reached in 6–12 years, with a total life expectancy of up to 50 years. This species has been found to use a large variety of fish hosts for their larvae, including the sauger, walleye, yellow perch, largemouth and smallmouth bass, and freshwater drum.

### Scaleshell Mussel

The scaleshell mussel is federally listed as endangered; it is state listed as endangered in Kansas and as a species of conservation concern in South Dakota. In the Keystone Project area, the scaleshell mussel is currently found in South Dakota and in a portion of the Missouri River in Nebraska. Shells of the endangered scaleshell mussel recently have been found below the Gavins Point Dam; however, populations of these mussels are not known to occur in this reach of the Missouri River. No scaleshell mussels were found during sampling of the James River crossing for the Keystone pipeline ROW (ENSR 2006h).

Scaleshells live in medium and large rivers with stable channels and good water quality. They are usually found in riffle habitats of the rivers with substrates including gravel, rock, and boulder, and occasionally sand and mud. They bury themselves into the substrate with only the edge of their partially-opened shells exposed. As river currents flow over them, they siphon particles for food out of the water, such as plant debris, plankton, and other microorganisms.

Little is known about the specific reproductive requirements for this species. It is believed to be a long-term brooder that spawns in fall months, with females brooding the larvae in their gills until the following spring or summer. The scaleshell mussel uses the freshwater drum as a fish host for its larvae.

### 3.8.1.5 Federally Protected Plants

Table 3.8.1-5 lists the federally and state-protected plants potentially occurring in the Keystone Project area. Under common law, plants generally are treated differently than animals; they typically are considered the private property of the landowner. Federal regulations prohibit any commercial activity involving federally listed plant species or the destruction, malicious damage, or removal of these species on federal property. Federally-protected plants include the decurrent false aster, eastern prairie fringed orchid, western prairie fringed orchid, and running buffalo clover.

#### Decurrent False Aster

The decurrent false aster is federally listed as threatened and is state listed as threatened by Illinois and endangered by Missouri. It occurs in seasonally flooded emergent wetlands. In the Keystone Project area, the plant is known to occur in Madison County in Illinois, in the floodplain of the Mississippi River. A number of populations occur in the Mississippi River and Missouri River floodplains in St. Charles County, Missouri.

Decurrent false asters maintain self-sustaining populations in habitats with moist, sandy soil; regular disturbance (preferably from periodic flooding); and open areas with high light levels. The plant blooms from August through October, and historically has occurred along the Illinois and Mississippi River floodplains. Habitat destruction and modification have contributed to the species decline. The asters are dependent on periodic disturbance from major floods, which are currently controlled by dams and levees, and much of their former habitat has been converted to agricultural use (NatureServe 2006).

#### Western Prairie Fringed Orchid

The western prairie fringed orchid is federally listed as threatened; it is state listed as endangered in Missouri, threatened in Nebraska, and a species of conservation concern in North Dakota and South Dakota. Along the proposed Keystone pipeline route in Nebraska, populations of western prairie fringed orchid are known to occur in Seward and Stanton Counties, and may occur at other sites in Nebraska. The western prairie fringed orchid has not been documented recently in South Dakota. However, the life cycle of the plant can impede its detection, and populations currently exist in the neighboring states of Nebraska, Minnesota, and North Dakota. Potential habitat still may be found in South Dakota; therefore, the potential exists for the orchid to be found there. In North Dakota, the orchid is found in Ransom County and on the Sheyenne National Grasslands, where the largest population in the United States is known to occur.

The western prairie fringed orchid is similar in appearance to the closely related eastern prairie fringed orchid; but grows west of the Mississippi River and has generally fewer, but larger flowers than the eastern prairie fringed orchid. The western prairie fringed orchid inhabits tall-grass calcareous silt loam or sub-irrigated sand prairies, where it flowers from May to August.

Declines in western prairie fringed orchid populations have been caused by drainage and conversion of its habitats to agricultural production, channelization, siltation, road and bridge construction, grazing, haying, and herbicide application.

**TABLE 3.8.1-5**
**Protected Plants Potentially Occurring along the Keystone Project Route**

| Species | Federal Status | State Status and Occurrence by County [a] | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | ND | SD | NE | KS | MO | IL | OK | |
| **Decurrent false aster (*Boltonia decurrens*)** | T | | | | | E – St. Charles | T – Madison | | Riparian floodplains and bottomlands subject to periodic flooding |
| Small white lady's slipper (*Cypripedium candidum*) | | | | T | | | | | Herbaceous wetlands, prairie wetlands, and fens |
| **Western prairie fringed orchid (*Platanthera praeclara*)** | T | SC – Ransom | SC – Day, Yankton | T – Seward, Stanton | | | | | Mesic-wet tall-grass prairie, herbaceous wetlands, and dune complexes |
| **Running buffalo clover (*Trifolium stoloniferum*)** | E | | | | | E – Buchanan, Chariton, Lincoln, St. Charles | | | Riparian areas, woodland/prairie edge, and disturbed areas |
| Royal catchfly (*Silene regia*) | | | | | | | E | | Prairies, upland forest clearings, savannas, and disturbed areas |
| Prairie spiderwort (*Tradescantia bracteata*) | | | | | | | T | | Dry, sandy prairies and grazed prairies |
| Spring ladies' tresses (*Spiranthes vernalis*) | | | | | | | E | | Dry to mesic forests, prairies, and croplands |

Notes:

**Boldface text** indicates a federally protected species.

E = Endangered.
SC = Species of conservation concern.
T = Threatened.

[a] Species designated as E, T, or SC by states and reported to occur in counties crossed by the Keystone pipeline ROW.

Sources: ENSR 2006a, c; TransCanada 2007c.

### Running Buffalo Clover

Running buffalo clover is federally listed as endangered and is state listed as endangered by Missouri. In the Keystone Project area, the plant occurs on the floodplain of the Cuivre River in Cuivre River State Park in Lincoln County, Missouri.

Running buffalo clover occurs most commonly in mesic woodlands in partial to filtered sunlight, where there is moderate periodic disturbance, such as mowing, trampling, or grazing. Running buffalo clover has been reported in disturbed woodland habitats, including floodplains, streambanks, grazed woodlots, mowed paths, old roads and trails; mowed wildlife openings within mature forests; and steep, weedy ravines. The clover may prefer soils underlain with limestone or other calcareous bedrock. It blooms from mid-May through early June.

Declines of running buffalo clover have been attributed to: (1) habitat destruction, (2) poor dispersal following the elimination of bison and other large herbivores, (3) loss of the natural grazers, (4) increased grazing from cattle and rabbits, and (5) competition from exotic plants (NatureServe 2006).

## 3.8.1.6 Potential Impacts and Mitigation for Federally Protected Species

Preliminary data identified 55 federally or state-listed threatened, endangered, or candidate species potentially occurring within or near the Keystone Project ROW that could be affected by construction. USFWS Region 6 determined that 14 federally listed species and two candidate species are known to occur along the Keystone Project route and may be affected by its location or construction activities. An additional five federally listed species and two candidate species were identified as occurring along the Keystone Project ROW during consultations with KDWP and SDGFP. Designated critical habitats for federally listed species also were identified along the Keystone Project ROW.

### Federally Protected Birds

Types of impacts on protected birds would be generally similar to those described for wildlife in Section 3.6.5. Table 3.8.1-1 lists federally and state-protected birds. The Mainline Project and Cushing Extension pipeline could affect these species 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 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).

Keystone has committed to implementing the following measures in its CMR Plan (Appendix B):

- Keystone would contract a qualified biologist to conduct a survey of breeding bird habitat within 330 feet from proposed surface disturbance activities that would occur during the breeding

season. The biologist would document active nests, birds, and other evidence of nesting (e.g., mated pairs, territorial defense, and birds carrying nesting material or transporting food). If an active nest of a federally or state-protected bird species (Table 3.8.1-1) is documented during the survey, Keystone would work with the relevant regulatory authorities to determine whether any additional protection measures would be required.

- Immediately prior to construction activities during the raptor breeding season (February 1–July 31), breeding raptor surveys would be conducted by a qualified biologist 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 the relevant regulatory authorities to develop mitigation measures. These measures would be implemented on a site-specific and species-specific basis, in coordination with federal and state agency wildlife biologists.

Wildlife habitat loss or alteration from construction of the Keystone Project pipeline is described in Section 3.5.5. Most affected habitat would include croplands (13,594 acres) and grasslands (4,112 acres), followed by wetlands and open water (845 acres) and upland and riparian forests (1,078 acres) (Table 3.6.5-1). Loss of shrublands and wooded habitats would be long term (5–20 years) in reclaimed areas of the construction ROW. Additional hedgerow or windrow habitats along fields that were too small to be quantified (habitats less than 50 feet wide were not mapped) across the 1,370-mile ROW also would be lost. The incidence of electrocution and collision mortality would be increased by construction and operation of approximately 161 miles of new electrical power lines from generation sources to the pump stations. Because of the linear nature of the ROW, these long-term habitat losses represent a small area of the total available habitat and therefore are expected to have little effect on wildlife species (Table 3.6.5-1).

In addition to these general impacts, specific impacts and mitigation measures have been identified for the species described below.

### *Bald Eagle*

Potential impacts to bald eagles include long-term loss or alteration of potential breeding, foraging, or winter habitats due to the removal of large trees and snags in the vicinity of large reservoirs, lakes, rivers, or streams—especially in the vicinity of the Missouri and Mississippi Rivers. Habitat fragmentation from ROW crossings through forested floodplains of large rivers and habitat degradation from invasion of noxious species are also potential impacts from construction. Habitat degradation and forage species declines may occur because of water withdrawal for hydrostatic testing. Direct mortality of adults and juveniles may occur due to collisions with construction vehicles or power lines, and mortality of eggs or young may occur due to nest disturbances.

Because bald eagles are particularly sensitive to human disturbance at nests and communal roosts, protective buffers should be implemented around these areas. Disturbances near an active nest or within line-of-sight of the nest could cause adult eagles to discontinue nest building or abandon eggs. Recent survey work and agency consultations have identified 11 bald eagle nests within 1 mile of the Project ROW (Table 3.8.1-6). Generally, bald eagle nest buffer recommendations include restricting activities within 1 mile of bald eagle nests in open country. In more heavily forested or mountainous areas, where the line-of-sight distance from the nest is shorter, this buffer distance potentially could be reduced. During the nesting season, bald eagle nest buffers should receive maximum protection. Seven of nine bald eagle nest sites along the Mainline Project were within 1 mile of the pipeline ROW, and both of the two nest sites along the Cushing Extension were within 1 mile of the pipeline ROW (Table 3.8.1-6).

**TABLE 3.8.1-6**
**Bald Eagle Nest Sites and Territories along the Keystone Project Route**

| Milepost | State | County | Distance from Right-of-Way (Observation Date) | Comments |
|---|---|---|---|---|
| **Mainline Project** | | | | |
| 7.4 | North Dakota | Cavalier | 2,859 feet (February 2007) | Historical nest on south bank of Pembina River |
| 435.6 | South Dakota | Yankton | 220 feet to the east (April–May 2006) | Actively incubating, two adults present, on north bank of Missouri River; immature bald eagle present 0.5 mile west of nest site |
| 658.5 | Kansas | Marshall | 2,026 feet (January 2007) | Two adults flushed from tree near nest |
| 985.7 | Missouri | St. Charles | 958 feet (January 2007) | Adult on nest, Cuivre River |
| 985.7 | Missouri | St. Charles | 1,557 feet (January 2007) | Partially collapsed nest, Cuivre River |
| 989.2 | Missouri | St. Charles | 7,708 feet (January 2007) | Nest – west side of drainage, Cuivre and Missouri River floodplains |
| 989.4 | Missouri | St. Charles | Unknown distance (October 2006) | Active nest |
| 1021.0 | Missouri | St. Charles | 2,900 feet (January 2007) | Historical nest on west bank in Confluence State Park |
| 1021.0 | Missouri | St. Charles | 6,744 feet (January 2007) | Alternate nest on island on west side, south of Confluence State Park |
| **Cushing Extension** | | | | |
| 76.2 | Kansas | Dickinson | 2,081 feet (February 2007) | Nest – within 0.5 mile of ROW |
| 285.3 | Oklahoma | Payne | 4,056 feet (February 2007) | Collapsed nest within 1 mile of ROW |

Sources: ENSR 2006c, d; 2007a.

For some activities (construction, seismic exploration, blasting, and timber harvest) a limited-disturbance home-range buffer may be required to extend outward into potential foraging habitat for 2.5 miles from the nest. No identified bald eagle nest sites appeared to occur within 2.5 miles of the proposed blasting locations (Table 3.8.1-6).

Human disturbances to communal winter roosts and loss of eagle wintering habitat can cause undue stress, leading to cessation of feeding and failure to meet winter thermoregulatory requirements. These effects can reduce the carrying capacity of preferred wintering habitat and subsequent reproductive success for the species. Twenty-four major river crossings were selected in consultation with USFWS (John Cochnar, USFWS, February 5, 2007) for surveys of potential bald eagle winter roost areas on the Mainline Project ROW (Table 3.8.1-7). Of these, 14 were found to be frozen solid or supported no suitably sized perch trees near the ROW (ENSR 2007a). Seven major river crossings were selected for surveys of potential bald eagle winter roost areas on the Cushing Extension ROW (Table 3.8.1-7); of these, all were found to contain suitable habitat (ENSR 2007a).

**TABLE 3.8.1-7**
**Bald Eagle Winter Roost Habitat Evaluation along the Keystone Project Route**

| Milepost | Status | State, County | Roost/Nest near ROW | Water Body Name – Comments |
|---|---|---|---|---|
| **Mainline Project** | | | | |
| 7.4 | Frozen (no roost survey) | North Dakota, Cavalier | Nest | Pembina River – 2 golden eagles perched near river |
| 168.4 | Frozen (no roost survey) | North Dakota, Ransom | None | Sheyenne River – no eagles observed |
| 436 | Open | South Dakota Yankton | None | Missouri River – 10 bald eagles about 5 miles upstream |
| 502.8 | Frozen (no roost survey) | Nebraska, Stanton | None | Elkhorn River – no eagles observed |
| 542.0 | Limited open water | Nebraska, Colfax/Butler | None | Platte River – roosting more than 1 mile upstream form ROW |
| 591.0 | Frozen (no roost survey) | Nebraska, Saline | None | West Fork Big Blue River – no eagles observed |
| 658.5 | Open | Kansas, Marshall | Roost/nest | Big Blue River – 2 bald eagles within 1 mile of ROW |
| 689.6 | Frozen (no roost survey) | Kansas, Nemaha | None | South Fork Big Nemaha River – no eagles observed |
| 748.5 | Open | Kansas/ Missouri | Roosts | Missouri River – ~12 eagles in or near ROW |
| 762.2 | Frozen (no roost survey) | Missouri, Buchanan | None | Platte River – no eagles observed |
| 772.9 | Frozen (no roost survey) | Missouri, Clinton | None | Castile Creek – no eagles observed |
| 780.9 | Frozen (no roost survey) | Missouri, Clinton | None | Little Platte River – no eagles observed |
| 840.6 | Open | Missouri, Carroll | None | Grand River – no eagles observed |
| 845.9 | Frozen (no roost survey) | Missouri, Chariton | None | Salt Creek – no eagles observed |
| 857.8 | Frozen (no roost survey) | Missouri, Chariton | None | Mussel Fork Creek – no eagles observed |
| 862.4 | No trees (no roost survey) | Missouri, Chariton | None | Chariton River – no eagles observed |
| 868.0 | Frozen (no roost survey) | Missouri, Chariton | None | Middle Fork Little Chariton Creek – no eagles observed |
| 871.6 | Frozen (no roost survey) | Missouri, Chariton | None | East Fork Little Chariton Creek – no eagles observed |
| 904.0 | Frozen (no roost survey) | Missouri, Audrain | None | Goodwater Creek – no eagles observed |
| 955.0 | Open | Missouri, Audrain | Roost | West Fork Cuivre River – ~10 eagles within 1 mile of ROW |
| 971.1 | Open | Missouri, Lincoln | Roost | Cuivre River - >5 eagles within 1 mile of ROW |
| 996.7 | Open | Missouri, Lincoln | Roost/nest | Cuivre River - >5 eagles within 1 mile of ROW |
| 1021.1 | Open | Illinois, Madison | Roost/nest | Mississippi River - >300 eagles within 1 mile of ROW |
| 1072.1 | Limited open | Illinois, Bond | None | Kaskaskia River – no eagles observed |

| TABLE 3.8.1-7 (Continued) | | | | |
|---|---|---|---|---|
| **Milepost** | **Status** | **State, County** | **Roost/Nest near ROW** | **Water Body Name – Comments** |
| **Cushing Extension** | | | | |
| 4.1 | Open | Kansas, Washington | Roost | Little Blue River – 3 eagles within 1 mile of ROW |
| 9.7 | Open | Kansas, Charleston | Roost? | Mill Creek – 2 eagles within 1 mile of ROW |
| 51.2 | Open | Kansas, Clay | Roost? | Republican River – several eagles within 1 mile of ROW |
| 76.5 | Open | Kansas, Dickson | Roost/nest | Smokey Hill River – nest within 0.5 mile of ROW, eagle within 1 mile of ROW |
| 205.8 | Open | Kansas, Cowley | Roosts | Arkansas River – 5 eagles within 1 mile of ROW |
| 241.2 | Open | Kansas, Kay | Roosts | Salt Fork Arkansas River – 4 eagles within a mile of ROW |
| 282.0 | Open | Oklahoma, Payne | Nest | Cimarron River – no eagles, nest 1 mile from ROW |

Source: ENSR 2007a.

Surveys for winter bald eagles identified 19 transitory or communal roosts and winter concentration areas along the Mainline Project, and 14 winter roosts and concentration areas along the Cushing Extension (Table 3.8.1-8). A "transitory roost" is defined as three or more eagles within 100 meters of each other for at least two nights in an area with no previous knowledge of winter communal roosting. A "communal roost" is defined as six or more eagles in a small area for extended periods or that is used for multiple years (John Cochnar, USFWS, January 24, 2007). Of the 19 roost sites along the Mainline Project, seven were within 0.5 mile of the ROW and ten were within 1 mile of the pipeline ROW (Table 3.8.1-8). Of the fourteen roost sites along the Cushing Extension, six were within 0.5 mile and ten were within 1 mile of the pipeline ROW (Table 3.8.1-8).

Proposed blasting sites near bald eagle winter roost sites along the Mainline Project occur at:

- MP 747 to 748 – occupied roosts between MP 747.5 and 748.5,
- MP 953 to 957 – occupied roosts at MP 955 and 958, and
- MP 967 to 970 – occupied roost at MP 971 (Tables 3.8.1-7 and 3.8.1-8).

For bald eagle communal winter roosts, USFWS recommends that disturbance be restricted within 1 mile of known communal winter roosts from November 1 to April 1. USFWS recommends that habitat-altering activities be prohibited within 0.5 mile of active roost sites year-round. The buffers and timing stipulation, as described above, are normally implemented unless site-specific information indicates otherwise. Modification of buffer sizes may be permitted where supported by the biological findings and in coordination with USFWS.

**TABLE 3.8.1-8**
**Bald Eagle Winter Roosts and Concentration Areas along the Keystone Project Route**

| Milepost | State | County | Distance from Right-of-Way (Observation Date) | Comments |
|---|---|---|---|---|
| **Mainline Project** | | | | |
| 658.5 | Kansas | Marshall | 2,026 feet (January 2007) | Transitory roost? - Two adults flushed from tree near nest, Big Blue River |
| 747.5 | Missouri | Buchanan | 6,507 feet (January 2007) | Transitory and communal roost – immature and adults on east bank of Missouri River |
| 747.9 | Missouri | Buchanan | 5,555 feet (January 2007) | Transitory and communal roost – east bank of Missouri River |
| 748.1 | Kansas | Doniphan | 4,366 feet (January 2007) | Transitory and communal roost – west bank of Missouri River |
| 748.5 | Kansas/ Missouri | Doniphan/ Buchanan | 1,454 feet (January 2007) | Transitory and communal roost – within 100 feet of ROW, Missouri River |
| 748.5 | Kansas/ Missouri | Doniphan/ Buchanan | 706 feet (January 2007) | Transitory and communal roost – within 100 feet of ROW, Missouri River |
| 748.5 | Kansas/ Missouri | Doniphan/ Buchanan | 3,390 feet (January 2007) | Transitory and communal roost – Missouri River |
| 958.0 | Missouri | Lincoln | 1,793 feet (January 2007) | Communal roost – West Fork Cuivre River |
| 982.1 | Missouri | St. Charles | 1,998 feet (January 2007) | Communal roost – Cuivre River |
| 983.4 | Missouri | St. Charles | 244 feet (January 2007) | Communal roost – Cuivre River |
| 987.1 | Missouri | St. Charles | 1,736 feet (January 2007) | Communal roost – Cuivre River |
| 989.1 | Missouri | St. Charles | 7,742 feet (January 2007) | Communal roost – immature and adult – Cuivre River |
| 996.7 | Missouri | St. Charles | 2,737 feet (January 2007) | Communal roost – immature and adult – Cuivre River |
| 1018.0 | Missouri | St. Louis | 6,179 feet (January 2007) | Communal roost – immature and adult – Missouri River |
| 1019.0 | Missouri | St Charles | 6,742 feet (January 2007) | Communal roost – west bank of Mississippi River |
| 1019.7 | Missouri | St Charles | 7,273 feet (January 2007) | Communal roost – west bank of Mississippi River |
| 1020.0 | Missouri | St Charles | 9,528 feet (January 2007) | Communal roost – west bank of Mississippi River |
| 1020.5 | Missouri | St Charles | 6,161 feet (January 2007) | Communal roost, winter concentration – 300 Bald Eagles – west bank of Mississippi River |
| 1021.0 | Missouri | St. Louis | 8,607 feet (January 2007) | Communal roost – west bank of Mississippi River |
| **Cushing Extension** | | | | |
| 4.1 | Kansas | Washington | 0 feet (February 2007) | Transitory roost? – 2 adults, 1 immature within 1 mile of ROW, Little Blue River |
| 9.7 | Kansas | Washington | 1,461 feet (February 2007) | Transitory roost? – 1 adult – Mill Creek |

**TABLE 3.8.1-8 (Continued)**

| Milepost | State | County | Distance from Right-of-Way (Observation Date) | Comments |
|---|---|---|---|---|
| **Cushing Extension (Continued)** | | | | |
| 13.2 | Kansas | Washington | 685 feet (February 2007) | Transitory roost? – 1 adult – Mill Creek |
| 51.2 | Kansas | Clay | 1,667 feet (February 2007) | Transitory roost? – 2 adults – Republican River |
| 51.2 | Kansas | Clay | 4,289 feet (February 2007) | Transitory roost? – 1 adult – Republican River |
| 75.8 | Kansas | Dickinson | 5,711 feet (February 2007) | Transitory roost? – 1 adult – Smoky Hill River |
| 205.8 | Kansas | Cowley | 450 feet (February 2007) | Communal roost? – 5 eagles – Arkansas River |
| 206.4 | Kansas | Cowley | 4,892 feet (February 2007) | Communal roost? – Arkansas River |
| 206.4 | Kansas | Cowley | 6,835 feet (February 2007) | Communal roost? – Arkansas River |
| 206.4 | Kansas | Cowley | 2,447 feet (February 2007) | Communal roost? – Arkansas River |
| 238.7 | Oklahoma | Kay | 4,120 feet (February 2007) | Transitory roost? – 3 eagles – Salt Fork and Bois d'Arc River |
| 241.2 | Oklahoma | Noble | 2,850 feet (February 2007) | Transitory roost? – 1 eagle – Salt Fork Arkansas River |
| 281.5 | Oklahoma | Payne/ Pawnee | >10,580 feet (February 2007) | Roost – 2 eagles – Cimarron River |
| 282.2 | Oklahoma | Pawnee | >10,560 (February 2007) | Roost – 2 eagles – Cimarron River |

Source: ENSR 2007a.

To protect nesting or winter roosting bald eagles, Keystone:

- Has completed winter roost and spring nest surveys along the pipeline ROW in order to prevent adverse direct and indirect impacts to bald eagles, active eagle nests, and young.
- Would use aerial and/or ground-based surveys, prior to construction, to locate any newly constructed nests and to determine the activity status of nests during the appropriate season (February 1–August 15).
- Would not construct within 1 mile of active bald eagle nests unless otherwise permitted by USFWS between February 1 and August 15 (January 1 and July 15 for Missouri).
- Would avoid construction activities from 3:00 p.m. to 10:00 a.m. within 1 mile of identified communal winter roosting sites between November 1 and April 1.

To further protect the bald eagle the USFWS suggests that Keystone should use the northern alternative at Milepost 1020.6 in the Mississippi/Missouri confluence area to avoid impacts to the active bald eagle nest near this location (Willie R. Taylor, USFWS, October 11, 2007).

Construction of the Mainline Project and Cushing Extension may affect nesting and winter roosting bald eagles and their habitats. Coordination with USFWS and state resource agencies should continue, with the goal of impact avoidance, minimization, or mitigation.

### Connected Actions

Approximately 181 miles of new transmission lines and 22 miles of upgraded transmission lines would be required to power pumpstations along the Mainline, with about 12 miles of new lines for the Cushing Extension (see Section 2.1.4.1). New electrical power line segments would increase the collision potential for nesting and roosting bald eagles. Factors influencing collision risk are related to the avian species, the environment, and the configuration and location of lines (see Section 3.6.4). 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).

Surveys for bald eagles have not been completed for the proposed transmission line routes. Evaluation of the habitats crossed and data from nearby Keystone ROW raptor surveys indicate that suitable habitats or the occurrence of bald eagle nests within several miles of the proposed transmission lines occurs at the following pump stations:

- MP 171 Mainline PS-18: Sheyenne River – eagle nest within about 3 miles of transmission line crossing.
- MP 742 Mainline PS-30: Missouri River – five eagle nests within 8 to10 miles of transmission line.
- MP 1027 Mainline PS-37: Mississippi River – eagle nest about 2 miles from transmission line.
- MP 243 Cushing Extension PS-33: Salt Fork River – eagle nest about 2 miles from transmission line.

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

### *Interior Least Tern and Piping Plover*

Channel constrictions caused by bridges, causeways, bridge approaches, roadway embankments, bank stabilization, levees, and other unnatural obstructions can result in the loss of broad, shallow, unobstructed channel and sandbar complexes used as feeding and nesting habitat by least terns and piping plovers. Poorly timed human activities in the vicinity of such feeding and nesting habitats can disturb least terns and piping plovers, resulting in diminished reproduction. Reduction of instream flow rates in the Platte River, Nebraska has negatively affected least terns and piping plovers by reducing water levels surrounding river bars where they nest, thereby allowing terrestrial predators to access the nests.

Interior least terns and/or piping plovers are known to nest on the major river systems in South Dakota, Nebraska, Missouri, Illinois and Oklahoma—including rivers that would be crossed by the Keystone Project (the Platte, Missouri, Mississippi, Elkhorn, and Cimarron Rivers). After consultation with federal and state resource agencies, field surveys for these species were conducted at habitats likely to support these species along the Keystone Project (Table 3.8.1-9).

**TABLE 3.8.1-9**
**Occurrence and Habitat Surveys for the Interior Least Tern and Piping Plover along the Keystone Mainline Project and Cushing Extension (2007)**

| State | County | Water Body | Occurrence | Habitat |
|---|---|---|---|---|
| **Mainline Project** | | | | |
| South Dakota /Nebraska | Yankton /Cedar | Missouri River | No least terns<br>One pair of piping plovers | Suitable least tern and piping plover nesting and foraging habitat available at crossing location |
| Nebraska | Stanton | Elkhorn River | No least terns<br>No piping plovers | Marginally suitable least tern and piping plover nesting and foraging habitat available at crossing location |
| Nebraska | Colfax /Butler | Platte River | No least terns<br>No piping plovers | Suitable least tern and piping plover nesting and foraging habitat available at crossing location |
| **Cushing Extension** | | | | |
| Oklahoma | Noble | Sooner Lake | No least terns | No suitable least tern nesting habitat available at crossing location |
| Oklahoma | Payne | Cimarron River | No least terns | No suitable least tern nesting habitat available at crossing location (only one bank was surveyed) |

Sources: ENSR 2007i, p.

Least tern nesting attempts have occurred north of the Keystone Project area on Ellis Island, in St. Charles County in Missouri (USFWS, Marion, Illinois Ecological Services Field Office, November 2007).

No additional surveys are planned for these species. The locations above would be surveyed during the nesting period in 2008 if construction would occur during the nesting period from April 15 to September 15.

Potential impacts on piping plovers and least terns associated with the Keystone Project include:

- Long-term loss or alteration of potential breeding and foraging habitats from construction-related disturbance in the vicinity of large rivers or streams (especially in the vicinity of the Missouri, Elkhorn, Platte, Cimarron, and Mississippi Rivers);
- Habitat fragmentation from the ROW crossings through floodplains of large rivers;
- Habitat degradation from invasion of noxious species;
- Habitat degradation and declines of fish forage species due to water withdrawal and discharge for hydrostatic testing;
- Direct mortality of adults, juveniles eggs or young;
- Indirect mortality due to disturbance of nests;
- 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).

The critical period for water withdrawal from the lower Platte River in Nebraska from Columbus, Nebraska to the Missouri River confluence is from February 1 to July 31 (Carey Grell, NGPC, February 5, 2007). Water use for hydrostatic testing from the Platte River during this period may adversely affect riparian nesting habitats.

To protect interior least terns and piping plovers Keystone would:

- Prior to construction, contract a qualified biologist to conduct a survey of breeding bird habitat according to USFWS protocols within 0.25 mile from the construction ROW at river crossings and adjacent gravel pits in the vicinity of the Missouri, Elk Horn, Platte, Cimarron, and Mississippi Rivers and Sooner Lake during April 15 to September 15. 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 an active nest is located during 2008 pre-construction surveys, establish a 0.25-mile buffer area to prevent direct loss of the nest and indirect impacts from human-related disturbance.
- If an active nest is found in the survey area, suspend planned activity for at least 37 days or 7 days post-hatching.
- If a brood of flightless chicks is observed, suspend planned activity for at least 7 days.
- If an active nest is documented during the survey, confer with USFWS and other applicable regulatory authorities to determine whether any additional protection measures would be needed.
- Coordinate water withdrawal with the appropriate USFWS Environmental Services field office when federally listed species inhabit or use the aquatic system.

- Return water withdrawn from the lower Platte River system for hydrostatic testing to the withdrawal location within the same calendar month.

Construction of the Mainline Project and Cushing Extension may affect nesting, brood-rearing, and foraging interior least terns and piping plovers and their habitats. Coordination with USFWS and state resource agencies should continue, with the goal of impact avoidance, minimization, or mitigation.

**Connected Actions**

Approximately 181 miles of new transmission lines and 22 miles of upgraded transmission lines would be required to power pumpstations along the Mainline, with about 12 miles of new lines for the Cushing Extension (see Section 2.14). New electrical power line segments would increase the collision potential for nesting and migrating interior least terns and piping plovers. Factors influencing collision risk are related to the avian species, the environment, and the configuration and location of lines (see Section 3.6.4). 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). Power poles and lines may provide perches for hunting raptors that offer a wide field of view above the surrounding terrain (APLIC and USFWS 2005); these vantage perches would be detrimental to ground-nesting least terns and piping plovers if they cross river bars and beaches where these birds nest.

Surveys for nesting least terns and piping plovers have not been completed for the proposed transmission line routes. Least terns and piping plovers may also use other riparian habitats during migration. Migrating terns and plovers would be most likely to collide with transmission lines during periods of poor visibility. Evaluation of the habitats crossed and data from existing sources and nearby Keystone ROW nesting least tern and piping plovers indicate that suitable habitats or the occurrence of least terns or piping plovers within several miles of the proposed transmission lines may occur at the following transmission line river crossing:

- MP 502 Mainline PS-25: Elkhorn River.

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

### *Whooping Crane*

Alterations to feeding and roosting habitats, human disturbance, and depletions of instream flows to the Platte River in Colorado, Wyoming, and Nebraska would negatively affect the whooping crane. Disturbance (flushing the birds) stresses the birds at critical times of the year, and USFWS recommends vigilance in not disturbing these birds. Generally disturbance can be reduced only by ceasing activity at sites where the birds have been observed. Because whooping cranes do not normally remain in one area for long periods during migration, this potentially would be feasible during construction.

Potential impacts to whooping cranes include:

- Long-term loss or alteration of potential foraging and roosting habitats from construction-related disturbances in the vicinity of large rivers or streams, especially in the vicinity of the Missouri, Platte, and Arkansas Rivers;
- Habitat fragmentation from ROW crossings through floodplains of large rivers;
- Habitat degradation from invasion of noxious species;
- Direct mortality of adults and juveniles by collisions with construction vehicles;
- 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).

The following measure would result in avoidance of impacts on whooping cranes:

- If construction of the proposed pipeline occurs during either the spring or autumn migration and whooping cranes use areas within 1 mile of pipeline construction activities, construction activities would cease immediately and Keystone would notify the USFWS respective state field office, including the Nebraska Field Office (which maintains the Cooperative Whooping Crane Tracking Project for the United States), to determine when construction can continue.

This measure is recommended for implementation for the Keystone Project by USFWS (John Cochnar, USFWS, April 28, 2006). Construction of the Mainline Project and Cushing Extension may affect migrating or foraging whooping cranes and their habitats. Coordination with USFWS and state resource agencies should continue, with the goal of impact avoidance, minimization, or mitigation.

#### Connected Actions

Approximately 181 miles of new transmission lines and 22 miles of upgraded transmission lines would be required to power pumpstations along the Mainline, with about 12 miles of new lines for the Cushing Extension (see Section 2.14). New electrical power line segments would increase the collision potential for migrating and foraging whooping cranes. Factors influencing collision risk are related to the environment, and the configuration and location of lines (see Section 3.6.4). 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).

Transmission lines supporting pump stations for the Keystone Project cross primarily cropland/pasture and cropland/grassland mosaic habitats (85 percent, 162.8 of 191.3 miles; see Table 3.5.5.5-1) in North Dakota, South Dakota, Nebraska, and Kansas. Whooping cranes may be attracted to croplands, pastures, and grasslands during spring and fall migrations—especially when the croplands are interspersed with riparian or emergent wetlands that provide roosting habitats. Transmission lines would cross approximately 3.7 miles of emergent and riparian wetlands (see Table 3.4.3.1-1).

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.

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

### Federally Protected Mammals

Potential impacts on protected mammal species generally would be as described for wildlife in Section 3.6.5. Table 3.8.1-2 lists federally and state-protected mammals. The Mainline Project and the Cushing Extension could affect protected mammals by:

- Habitat loss, alteration, and fragmentation;
- Loss of breeding success from exposure to construction and operations noise, and from increased human activity;
- Reduced survival or reproduction due to decreased abundance of forage species;
- Direct mortality from project construction and operation;
- 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 by exposure to toxic materials or crude oil releases (addressed in Section 3.13).

In addition to these general impacts, specific impacts and mitigation measures have been identified for the species described below.

### *Gray Bat*

Currently, Keystone has no plans to complete surveys for gray bats in Missouri or Illinois as a result of consultations with federal and state resource agencies, although Keystone committed to implementing the following measures in its CMR Plan (Appendix B) to protect gray bats:

- Prior to surface disturbance activities in karst terrain, a geological investigation would be completed to determine the presence and type of karst features. The investigation would identify the location, distribution, and dimensions of rock cavities in the potential influence zone of construction.
- A qualified biologist would conduct surveys for exposed caves that may contain bat roosts within 0.25 mile from surface disturbance activities.
- In the event that cave features or bat roosts are identified, USFWS or appropriate state wildlife agency would be contacted and applicable mitigation measures would be developed.

Karst topography potentially would be crossed by the Mainline Project at the following locations within the range of the gray bat:

- Caldwell County, Missouri – MP 790 to 814;
- Lincoln County, Missouri – MP 954 to 981;
- St. Charles County, Missouri – MP 981 to 1021; and
- Madison County, Illinois – MP 1022 to 1025.

Blasting may coincide with karst topography in Caldwell and Lincoln Counties in Missouri. To avoid habitat alteration or loss or disturbance to this species, Keystone would conduct a search for this species prior to any activity that would affect caves in Madison County, Illinois or in Lincoln County, Missouri.

Construction of the Mainline Project may affect, but is not likely to adversely affect, gray bats or their habitats. Because the Cushing Extension is west of the current distribution of gray bats, construction of this pipeline would not affect this species. Coordination with USFWS and state resource agencies should continue, with the goal of impact avoidance, minimization, or mitigation.

#### Connected Actions

Approximately 0.3 mile of new or converted transmission lines would be necessary to power pump stations along the pipeline ROW (see Sections 2.1.1.2 and 2.1.2.2) within the range of the gray bat in Missouri and Illinois. New electrical power line segments would increase the collision potential for habitat and collision impacts for the gray bat. Factors influencing collision risk are related to the environment and to the configuration and location of lines (see Section 3.6.4). 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).

Transmission lines supporting pump stations for the Keystone that would be located within the areas identified as potentially containing gray bats include:

- MP 982 Mainline PS-36 in Lincoln County, Missouri (<0.1 mile); and
- MP 1027 Mainline PS-37 in Madison County, Illinois (0.3 mile).

Because neither of these transmission lines would cross forested floodplains or other riparian lands (see Table 3.4.3.1-1) likely to be used by the gray bat for foraging, no effect to this species is expected from construction or operation of these transmission lines. Electrical service providers and RUS, where applicable, would coordinate with the appropriate state and federal resource agencies to identify specific locations for flight deterrents or other avoidance or minimization measures if necessary.

### *Indiana Bat*

Indiana bats are assumed present from April 1 to September 30 in all Missouri and Illinois counties. An Indiana bat was captured in Randolph County, Missouri in May 2007 during mist-net surveys for the collocated REX-West pipeline. This bat was equipped with a radio transmitter, and subsequent surveys indicated that the bat was not using roost sites within 5 miles of the capture location. Known occurrences in Illinois include captures of two adult lactating females and three juvenile Indiana bats in 1986, and two adult lactating female Indiana bats in 1987 in Bond County. One or two maternity colonies of Indiana bats also are thought to occur in the Carlyle Lake WMA.

The Keystone Project would affect a total of 713 acres of upland and riparian forests, 63 acres of riverine or open water, and 94 acres of emergent or scrub-shrub wetlands that could provide habitat for Indiana bats in Missouri and Illinois. Habitat suitability evaluations for the Keystone Project were completed in Missouri and Illinois during August, September, and December 2006 and in February 2007 to identify potentially affected summer Indiana bat habitats within 331 forest crossings greater than 200 feet in length (BHE 2006a, 2006b, 2007a, 2007b). Habitat suitability was assessed by densities of less than 14 potential roost trees (greater than or equal to 22 centimeters diameter at breast height and 3 meters height, no overarching canopy, no understory canopy within 2 meters of the trunk, greater than or equal to 25 percent of the tree covered by exfoliating bark, and the bole of tree free of obstructing vines) per hectare. Of the 331 woodlots initially identified for assessment, 195 woodlots were assessed during field investigations. Of these, 90 woodlots (51 in Missouri and 39 in Illinois) were identified as containing suitable habitat for Indiana bats (Table 3.8.1-10). The dominant roost tree species were shagbark hickory, oaks, and American elm.

**TABLE 3.8.1-10**
**Indiana Bat Habitats Potentially Affected by the Keystone Project Route**

| Milepost | State, County | Total Area[a] (acres) | Forest Cover within 3.5 km (%) | Comments[b] |
|---|---|---|---|---|
| 760.4–760.9 | Missouri, Buchanan | 6.0 | 31 | 4 potential roost trees (3 hickory, l unknown), habitat suitability = 0.7 |
| 61.5–761.6 | Missouri, Buchanan | 1.5 | 29 | 11 potential roost trees (1 black walnut, 4 elm, 1 red oak, 4 unknown dead), habitat suitability = 0.7 |
| 762.9–760.3 | Missouri, Buchanan | 2.0 | 22 | 1 potential roost tree (elm), habitat suitability = 0.7 |
| 765.8–763.1 | Missouri, Buchanan | 1.6 | 15 | 7 potential roost trees (2 honey locust, 1 basswood, 4 unknown), habitat suitability = 1.0 |
| 775.3–775.4 | Missouri, Clinton | 0.9 | 15 | 6 potential roost trees (1 box elder, 1 silver maple, 4 cottonwoods), habitat suitability = 1.0 |
| 775.7–776.0 | Missouri, Clinton | 3.7 | 14 | 3 potential roost trees (1 black walnut, 1 ash, 1 unknown), habitat suitability = 1.0 |
| 784.1–784.2 | Missouri, Clinton | 2.1 | 17 | 16 potential roost trees (16 shagbark hickory), habitat suitability = 0.7 |
| 788.1–788.5 | Missouri, Clinton | 6.7 | 19 | 42 potential roost trees (22 elm, 20 shagbark hickory), habitat suitability = 0.6 |
| 789.4–789.5 | Missouri, Clinton | 1.5 | 16 | 2 potential roost trees (2 elm), habitat suitability = 1.0 |
| 789.6–789.7 | Missouri, Clinton | 1.2 | 16 | 2 potential roost trees (1 hawthorn, 1 black walnut), habitat suitability = 0.6 |
| 790.8–790.9 | Missouri, Clinton | 1.1 | 16 | 3 potential roost trees (1 unknown snag, 2 honey locust), habitat suitability = 1.0 |
| 793.8–793.9 | Missouri, Caldwell | 0.5 | 18 | 2 potential roost trees (1 elm, 1 shingle oak), habitat suitability = 1.0 |
| 796.9–797.1 | Missouri, Caldwell | 2.7 | 21 | 2 potential roost trees (1 post oak, 1 shagbark hickory), habitat suitability = 0.7 |
| 799.1–799.2 | Missouri, Caldwell | 0.8 | 22 | 1 potential roost tree (1 elm), habitat suitability = 0.7 |
| 799.2–799.2 | Missouri, Caldwell | 1.7 | 22 | 1 potential roost tree (1 shagbark hickory), habitat suitability = 0.7 |
| 800.8–800.9 | Missouri, Caldwell | 0.5 | 18 | 2 potential roost trees (2 dead hackberry), habitat suitability = 1.0 |
| 801.5–801.6 | Missouri, Caldwell | 2.5 | 14 | 2 potential roost trees (2 elm), habitat suitability = 0.7 |
| 801.7–801.8 | Missouri, Caldwell | 0.8 | 15 | 1 potential roost tree (1 elm snag), habitat suitability = 0.7 |
| 810.3–810.5 | Missouri, Caldwell | 2.5 | 19 | 3 potential roost trees (1 shagbark hickory, 1 elm, 1 unknown), habitat suitability = 1.0 |
| 810.5–810.7 | Missouri, Caldwell | 1.6 | 20 | 2 potential roost trees (1 honey locust, 1 oak), habitat suitability = 0.7 |

**TABLE 3.8.1-10 (Continued)**

| Milepost | State, County | Total Area[a] (acres) | Forest Cover within 3.5 km (%) | Comments[b] |
|---|---|---|---|---|
| 810.8–810.9 | Missouri, Caldwell | 3.5 | 21 | 2 potential roost trees (2 shagbark hickory), habitat suitability = 0.7 |
| 818.1–818.2 | Missouri, Carroll | 2.0 | 23 | 1 potential roost tree (1 elm), habitat suitability = 0.7 |
| 818.4–818.8 | Missouri, Carroll | 3.9 | 21 | 3 potential roost trees (2 elm, 1 black walnut), habitat suitability = 1.0 |
| 823.1–823.2 | Missouri, Carroll | 0.8 | 27 | 4 potential roost trees (4 elm), habitat suitability = 1.0 |
| 824.3–824.6 | Missouri, Carroll | 4.0 | 40 | 14 potential roost trees (4 shagbark hickory, 7 oak, 2 black walnut, 1 elm), habitat suitability = 1.0 |
| 824.7–824.9 | Missouri, Carroll | 2.4 | 41 | 9 potential roost trees (5 shagbark hickory, 2 bitternut hickory, 2 unknown), habitat suitability = 1.0 |
| 825.4–825.7 | Missouri, Carroll | 4.0 | 41 | 15 potential roost trees (7 shagbark hickory, 5 white oak, 3 oak), habitat suitability = 1.0 |
| 825.8–825.9 | Missouri, Carroll | 1.2 | 40 | 3 potential roost trees (2 white oak, 1 elm), habitat suitability = 1.0 |
| 825.9–826.3 | Missouri, Carroll | 4.8 | 40 | 15 potential roost trees (6 shagbark hickory, 6 oak, 3 honey locust), habitat suitability = 1.0 |
| 827.4–827.6 | Missouri, Carroll | 1.9 | 33 | 6 potential roost trees (4 shagbark hickory, 2 elm), habitat suitability = 1.0 |
| 828.6–828.8 | Missouri, Carroll | 1.7 | 25 | 1 potential roost tree (1 shagbark hickory), habitat suitability = 0.7 |
| 828.7–828.8 | Missouri, Carroll | 0.9 | 24 | 4 potential roost trees (1 osage-orange, 3 shagbark hickory), habitat suitability = 0.9 |
| 843.1–843.2 | Missouri, Carroll | 2.5 | 14 | 3 potential roost trees (1 elm, 1 silver maple, 1 pecan), habitat suitability = 1.0 |
| 879.8–880.1 | Missouri, Randolph | 3.5 | 25 | 111 potential roost trees (106 shagbark hickory, 4 oak, 1 unknown snag), habitat suitability = 1.0 |
| 882.5–882.6 | Missouri, Randolph | 1.2 | 37 | 1 potential roost tree (1 elm), habitat suitability = 0.7 |
| 882.7–882.8 | Missouri, Randolph | 1.9 | 37 | 7 potential roost trees (6 shagbark hickory, 1 white oak), habitat suitability = 1.0 |
| 883.2–883.3 | Missouri, Randolph | 2.0 | 37 | 3 potential roost trees (1 elm, 2 shag-bark hickory), habitat suitability = 1.0 |
| 883.5–883.6 | Missouri, Randolph | 0.9 | 38 | 4 potential roost trees (3 shagbark hickory, 1 elm snag), habitat suitability = 0.8 |
| 918.2–918.4 | Missouri, Audrain | 1.5 | 14 | 2 potential roost trees (2 oak), habitat suitability = 1.0 |
| 945.9–946.8 | Missouri, Montgomery | 10.5 | 19 | 9 potential roost trees (6 oak, 3 shagbark hickory), habitat suitability = 1.0 |

**TABLE 3.8.1-10 (Continued)**

| Milepost | State, County | Total Area[a] (acres) | Forest Cover within 3.5 km (%) | Comments[b] |
|---|---|---|---|---|
| 954.1–954.2 | Missouri, Montgomery | 2.7 | 22 | 18 potential roost trees (15 shagbark hickory, 2 honey locust, 1 silver maple), habitat suitability = 0.7 |
| 954.4–954.6 | Missouri, Montgomery | 2.0 | 22 | 30 potential roost trees (30 shagbark hickory), habitat suitability = 1.0 |
| 955.5–955.9 | Missouri, Montgomery | 4.1 | 34 | 17 potential roost trees (15 shagbark hickory, 2 elm), habitat suitability = 1.0 |
| 960.2–960.8 | Missouri, Lincoln | 8.5 | 54 | 7 potential roost trees (3 oak, 2 shagbark hickory, 1 elm, 1 cherry), habitat suitability = 1.0 |
| 961.0–961.7 | Missouri, Lincoln | 8.8 | 57 | 8 potential roost trees (7 white oak, 1 sugar maple), habitat suitability = 1.0 |
| 962.0–963.2 | Missouri, Lincoln | 14.9 | 54 | 17 potential roost trees (8 white oak, 6 shagbark hickory, 3 white ash), habitat suitability = 1.0 |
| 963.7–961.0 | Missouri, Lincoln | 4.8 | 55 | 10 potential roost trees (7 white oak, 2 elm, 1 shagbark hickory), habitat suitability = 1.0 |
| 965.0–966.3 | Missouri, Lincoln | 16.8 | 45 | 15 potential roost trees (14 oak, 1 elm), habitat suitability = 1.0 |
| 967.1–967.9 | Missouri, Lincoln | 10.2 | 33 | 15 potential roost trees (10 shagbark hickory, 5 white oak), habitat suitability = 1.0 |
| 968.6–968.8 | Missouri, Lincoln | 1.8 | 33 | 20+ potential roost trees (20+ shagbark hickory), habitat suitability = 1.0 |
| 969.5–969.6 | Missouri, Lincoln | 2.0 | 33 | 20+ potential roost trees (20+ shagbark hickory), habitat suitability = 1.0 |
| 1032.2–1032.6 | Illinois, Madison | 5.2 | 32 | 4 potential roost trees (oak), habitat suitability = medium |
| 1032.8–1032.0 | Illinois, Madison | 3.7 | 35 | 1 potential roost tree (red oak), habitat suitability = medium |
| 1033.1–1033.3 | Illinois, Madison | 4.1 | 35 | 7 potential roost trees (6 oak, 1 sycamore), habitat suitability = medium |
| 1033.8–1033.9 | Illinois, Madison | 1.5 | 36 | 3 potential roost trees (2 oak, 1 cottonwood), habitat suitability = medium |
| 1033.9–1034.1 | Illinois, Madison | 2.4 | 37 | 1 potential roost tree (1 oak), habitat suitability = medium |
| 1035.1–1035.2 | Illinois, Madison | 1.5 | 34 | 1 potential roost tree (1 American elm), habitat suitability = medium |
| 1035.4–1036.3 | Illinois, Madison | 12.4 | 30 | 9 potential roost trees (4 black walnut, 2 oak, 1 box elder, 2 cottonwood), habitat suitability = medium |
| 1036.7–1037.1 | Illinois, Madison | 5.3 | 22 | 29 potential roost trees (19 unknown snags, 6 honey locust, 4 shagbark hickory), habitat suitability = medium |

**TABLE 3.8.1-10 (Continued)**

| Milepost | State, County | Total Area[a] (acres) | Forest Cover within 3.5 km (%) | Comments[b] |
|---|---|---|---|---|
| 1037.4–1037.6 | Illinois, Madison | 1.7 | 17 | 1 potential roost tree (unknown snag), habitat suitability = medium |
| 1040.4–1040.8 | Illinois, Madison | 5.9 | 15 | 5 potential roost trees (2 elm, 3 silver maple), habitat suitability = medium |
| 1044.1–1044.1 | Illinois, Madison | 0.4 | 8 | 2 potential roost trees (1 black willow, 1 hackberry), habitat suitability = medium |
| 1044.9–1044.9 | Illinois, Madison | 0.4 | 13 | 1 potential roost tree (1 shingle oak), habitat suitability = medium |
| 1049.3–1049.4 | Illinois, Madison | 0.5 | 15 | 8 potential roost trees (1 shagbark hickory, 3 red oak, 1 cherry, 2 elm, 1 honey locust), habitat suitability = high |
| 1049.7–1049.9 | Illinois, Madison | 2.9 | 17 | 11 potential roost trees (2 unknown snags, 9 shagbark hickory), habitat suitability = medium |
| 1050.0–1050.1 | Illinois, Madison | 3.5 | 17 | 13 potential roost trees (13 shagbark hickory), habitat suitability = medium |
| 1050.1–1050.2 | Illinois, Madison | 2.0 | 17 | 20 potential roost trees (18 shagbark hickory, 2 unknown snags), habitat suitability = high |
| 1050.5–1050.6 | Illinois, Madison | 1.6 | 17 | 22 potential roost trees (22 shagbark hickory), habitat suitability = high |
| 1050.9–1051.1 | Illinois, Madison | 3.3 | 15 | 2 potential roost trees (2 unknown snags), habitat suitability = medium |
| 1052.9–1052.9 | Illinois, Madison | 0.4 | 3 | 2 potential roost trees (1 elm, 1 white oak), habitat suitability = medium |
| 1057.1–1057.4 | Illinois, Bond | 4.4 | 22 | 14 potential roost trees (9 shagbark hickory, 2 box elder, 2 oak, 1 elm), habitat suitability = medium |
| 1057.8–1057.9 | Illinois, Bond | 1.2 | 25 | 3 potential roost trees (1 box elder, 2 elm), habitat suitability = medium |
| 1060.0–1060.1 | Illinois, Bond | 0.5 | 16 | 1 potential roost tree (1 oak), habitat suitability = medium |
| 1062.5–1062.6 | Illinois, Bond | 1.9 | 14 | 2 potential roost trees (2 shagbark hickory), habitat suitability = medium |
| 1062.6–1062.7 | Illinois, Bond | 0.4 | 15 | 1 potential roost tree (1 shagbark hickory), habitat suitability = medium |
| 1063.0–1063.5 | Illinois, Bond | 6.9 | 17 | 21 potential roost trees (11 hickory, 2 hackberry, 2 cherry, 2 black locust, 2 oak, 2 unknown snag), habitat suitability = medium |
| 1063.8–1064.0 | Illinois, Bond | 2.4 | 19 | 1 potential roost tree (1 red oak), habitat suitability = medium |
| 1064.1–1064.3 | Illinois, Bond | 3.5 | 19 | 7 potential roost trees (2 shagbark hickory, 2 elm, 3 red oak), habitat suitability = medium |
| 1064.5–1064.8 | Illinois, Bond | 3.5 | 18 | 13 potential roost trees (13 shagbark hickory), habitat suitability = high |
| 1064.8–1064.9 | Illinois, Bond | 1.5 | 17 | 1 potential roost tree (1 elm), habitat suitability = medium |

**TABLE 3.8.1-10 (Continued)**

| Milepost | State, County | Total Area[a] (acres) | Forest Cover within 3.5 km (%) | Comments[b] |
|---|---|---|---|---|
| 1065.4–1065.4 | Illinois, Bond | 0.5 | 13 | 1 potential roost tree (black oak), habitat suitability = medium |
| 1069.8–1069.8 | Illinois, Bond | 0.1 | 3 | 1 potential roost tree (oak), habitat suitability = high |
| 1072.5–1072.6 | Illinois, Fayette | 0.2 | 16 | 1 potential roost tree (shingle oak), habitat suitability = high |
| 1073.2–1073.5 | Illinois, Fayette | 4.8 | 19 | 5 potential roost trees (1 box elder, 2 black walnut, 2 honey locust), habitat suitability = medium |
| 1073.9–1074.1 | Illinois, Fayette | 2.1 | 22 | 1 potential roost tree (1 black willow), habitat suitability = medium |
| 1075.0–1075.2 | Illinois, Fayette | 2.5 | 24 | 1 potential roost tree (black willow), habitat suitability = medium |
| 1075.4–1075.4 | Illinois, Fayette | 0.8 | 25 | 1 potential roost tree (black willow), habitat suitability = medium |
| 1075.6–1075.6 | Illinois, Fayette | 1.9 | 25 | 1 potential roost tree (pin oak), habitat suitability = medium |
| 1075.8–1075.9 | Illinois, Fayette | 0.8 | 24 | 2 potential roost trees (2 maple), habitat suitability = medium |
| 1080.8–1081.0 | Illinois, Marion | 2.9 | 14 | 5 potential roost trees (4 elm, 1 black cherry), habitat suitability = medium |

a Area calculated as distance crossed (BHE 2007d, e) and a 110-foot right-of-way width.

b Habitat suitability – 0 = not suitable, 1 = highly suitable. Values between 0 and 1 indicate a range of suitability of habitat for the species in question. For Illinois habitat suitability was rated as high or medium. Table includes only those surveyed habitats rated as ≥ 0.6, medium or high. Readers need to refer to the cited references to see how these evaluations were derived.

Sources: BHE 2007d, e, f.

Construction of the Keystone pipeline and associated extra work pads and access roads would affect these identified suitable Indiana bat habitats. Identified potential roost trees would be removed and would not be allowed to regenerate within the maintained ROW. An estimated 275 acres of surveyed forested habitats and 338 acres of surveyed and estimated habitats suitable for Indiana bats would be lost due to construction of the Mainline Project (Table 3.8.1-11). No Indiana bat habitat has been identified along the Cushing Extension. Removal of roosting habitats would result in disruption of foraging patterns and loss of travel corridors, and would add to energetic costs as bats would need to search for new roost sites. An estimated 570 potential roost trees would be removed; of these a landscape-scale assessment indicates that the Keystone Project may remove a maximum estimated 19 primary maternity roosts (ENSR 2007i).

Use of pesticides historically has led to decline of the species. Use of pesticides during ROW maintenance activities for the life of the Keystone Project could result in poisoning of bats due to direct exposure through ingestion, inhalation, or dermal absorption; or due to indirect exposure through consumption of contaminated insect prey. Indiana bats also would be indirectly affected by pesticides through reduced insect abundance, which reduces the amount of forage available to the species. The scale of potential impacts would depend on the type of pesticide, proposed use, and identification and implementation of BMPs.

**TABLE 3.8.1-11**
**Summary of Estimated Indiana Bat Habitats Potentially Affected by the Keystone Project**

| State, County | Habitat Area (acres) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | High HSI[a] | Medium HSI | Total Survey Suitable Habitat | Total Habitat Surveyed | Proportion Suitable (%) | Remaining Survey Area | Estimated Remaining Suitable Habitat | Estimated Total Suitable Habitat |
| Missouri, Buchanan | 11.1 | | 11.1 | 78.7 | 14 | | | 11.1 |
| Missouri, Clinton | 9.3 | 7.9 | 17.2 | 34.4 | 50 | 2.0 | 1.0 | 18.2 |
| Missouri, Caldwell | 17.1 | | 17.1 | 38.4 | 45 | 3.2 | 1.4 | 18.5 |
| Missouri, Carroll | 30.1 | | 30.1 | 43.9 | 69 | | | 30.1 |
| Missouri, Chariton | | | | 29.2 | 0 | 5.6 | 0.0 | 0.0 |
| Missouri, Randolph | 9.5 | | 9.5 | 44.8 | 21 | | | 9.5 |
| Missouri, Audrain | 1.5 | | 1.5 | 4.9 | 30 | | | 1.5 |
| Missouri, Montgomery | 19.3 | | 19.3 | 69.1 | 28 | 15.8 | 4.4 | 23.7 |
| Missouri, Lincoln | 67.8 | | 67.8 | 147.9 | 46 | 58.7 | 26.9 | 94.7 |
| Missouri, St. Charles | | | | | | 17.9 | 6.3 | 6.3 |
| *Missouri totals* | *165.7* | *7.9* | *173.6* | *491.3* | *35* | *103.2* | *40.1* | *213.7* |
| Illinois, Madison | 4.1 | 54.6 | 58.7 | 89.3 | 66 | 38.8 | 25.5 | 84.2 |
| Illinois, Bond | 3.6 | 23.2 | 26.8 | 61.7 | 43 | 3.5 | 1.5 | 28.3 |
| Illinois, Fayette | 0.2 | 12.9 | 13.1 | 33.2 | 39 | 0.3 | 0.1 | 13.2 |
| Illinois, Marion | | 2.9 | 2.9 | 5.0 | 58 | | | 2.9 |
| *Illinois totals* | *7.9* | *93.6* | *101.5* | *189.1* | *54* | *42.5* | *22.8* | *124.3* |
| **Keystone Project totals** | **173.6** | **101.5** | **275.1** | **680.4** | **40** | **145.7** | **62.9** | **338.0** |

a HSI = Habitat suitability index. Habitat suitability: High ≥ 0.7, Medium = 0.6. Area calculated as distance crossed (BHE 2007a, b) and 110-foot right-of-way width.

Sources: BHE 2007d, e.

Two confirmed winter hibernacula are more than 5 miles south of the Mainline Project in Boone County, Missouri. USFWS also indicated a hibernaculum in St. Louis County, Missouri, approximately 15 miles south of the Mainline Project. Karst topography would potentially be crossed by the Mainline Project at the following locations within the range for the Indiana bat:

- Caldwell County, Missouri – MP 790 to 814;
- Lincoln County, Missouri – MP 954 to 981;

- St. Charles County, Missouri – MP 981 to 1021; and
- Madison County, Illinois – MP 1022 to 1025.

Blasting may coincide with karst topography in Caldwell and Lincoln Counties in Missouri. IDNR has indicated that no known winter cave hibernacula are located near the Keystone Project in Illinois (Rick Pietruszka, IDNR, February 6, 2007). The nearest known winter hibernaculum in Illinois is more than 10 miles northeast of the Mainline Project in Jersey County.

Keystone has committed to implementing the following measures in its CMR Plan (Appendix B) to protect Indiana bats:

- Occurrence surveys would be completed during 2007 in coordination with USFWS, if the surveys are necessary.
- Prior to surface disturbance activities within karst terrain, a geological investigation would be completed to determine the presence and type of karst features. The investigation would identify the location, distribution, and dimensions of rock cavities within the potential influence zone of construction (John Cochnar, USFWS, April 28, 2006).
- A qualified biologist would conduct surveys for exposed caves that may be suitable as winter hibernacula for Indiana bats within 0.25 mile from surface disturbance activities.
- In the event that cave features suitable as winter hibernacula for Indiana bats are identified, USFWS or appropriate state wildlife agency would be contacted and applicable mitigation measures will be developed.

To avoid impacts on the Indiana bat, Keystone will also:

- Schedule cutting of identified potential roost trees in sites with a habitat suitability index of 0.6 or more in Missouri, in moderate or high-quality sites in Illinois, and in sites where habitat quality has not been assessed for Indiana bats in Missouri and Illinois during October 1 to March 31, when the species is not present..
- If any Indiana bat maternity roost trees are located, applicable mitigation would be developed in consultation with USFWS and state wildlife agency personnel.
- Implement conservation measures to address the loss of Indiana bat summer habitat by working with USFWS, Missouri Department of Conservation, and Missouri Department of Natural Resources, IDNR, and other potential cooperators in development of conservation measures to potentially include onsite/offsite, and in-kind/out-of-kind measures based on acres of habitat impacts at a 2:1 ratio for conservation lands giving consideration to actual habitat assessments and losses.
- Identify pesticides potentially proposed for use and any BMPs that would be implemented to minimize the impacts of pesticide use to maintain the pipeline ROW.

USFWS recommends that these additional measures be adopted as conditions for all federal permits issued for construction of the Keystone Project. Construction of the Mainline Project may affect Indiana bats and their habitats. A maximum total of 338 acres of surveyed and estimated forested habitats suitable for Indiana bats, as calculated above, would be lost due to construction of the Keystone Project—encompassing a maximum total of 19 primary maternity roosts (ENSR 2007i). Coordination with federal and state resource agencies should continue, with the goal of impact avoidance, minimization, or mitigation. The Keystone Project may affect, but is not likely to adversely affect, the Indiana bat because

of the inclusion of seasonal potential roost tree cutting and establishment of conservation lands at a ratio of 2 acres of conservation lands to 1 acre of habitat impact.

#### Connected Actions

Approximately 181 miles of new transmission lines and 22 miles of upgraded transmission lines would be required to power pumpstations along the Mainline, with about 12 miles of new lines for the Cushing Extension (see Section 2.14). New electrical power line segments would increase the collision potential for the Indiana bat and would potentially remove additional forested roosting habitat. Factors influencing collision risk are related to the environment, and the configuration and location of lines (see Section 3.6.4). 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).

Transmission lines supporting pump stations for the Keystone that would be located within the range of the Indiana bat in Missouri and Illinois include:

- MP 982 Mainline PS-36 in Lincoln County, Missouri;
- MP 1027 Mainline PS-37 in Madison County, Illinois; and
- MP 1053 Mainline PS-38 in Madison/Bond County, Illinois.

None of these transmission lines would cross forested floodplains or other riparian lands (see Table 3.4.3.1-1) likely to be used by the gray bat for foraging; therefore, impacts to this species are unlikely to occur. Electrical service providers and RUS, where applicable, would coordinate with the appropriate state and federal resource agencies to identify specific locations for flight deterrents or other avoidance or minimization measures, if necessary.

### *Gray Wolf*

The gray wolf is an occasional visitor to the Keystone Project area in North Dakota. The Mainline Project could affect gray wolves by interrupting foraging activities due to exposure to construction and operations noise, and from increased human activity.

To avoid construction-related disturbance impacts, if gray wolves are observed during construction Keystone will immediately contact USFWS to determine whether additional protection are required.

Construction of the Mainline Project is not likely to affect gray wolves or their habitats, as they are unlikely to occur regularly within the Project area. In addition, the gray wolf has been de-listed where they are most likely to occur within the Keystone Project area in North Dakota.

## Federally Protected Reptiles and Insects

Potential impacts on protected reptiles and insects generally would be as described for wildlife in Section 3.6.5. Table 3.8.1-3 lists federally and state-protected reptiles and insects. The Mainline Project and the Cushing Extension could affect protected reptiles and insects by:

- Habitat loss, alteration, and fragmentation;
- Loss of breeding success from exposure to construction and operations noise, and from increased human activity;
- Reduced survival or reproduction due to decreased abundance of forage species;

- Direct mortality from project construction and operation; and
- Loss of individuals and habitats by exposure to pesticides, toxic materials or crude oil releases (addressed in Section 3.13).

In addition to these general impacts, specific impacts and mitigation measures have been identified for the species described below.

### *Massasauga*

Massasauga (c.f. eastern or western) accounts have been recorded in the Keystone Project area within Chariton, Randolph, and St. Charles Counties in Missouri; and Bond, Fayette, and Madison Counties in Illinois. Habitats likely to support the massasauga in Missouri and Illinois were identified by reviewing maps and aerial photography; 134 of 144 identified sites have been evaluated during field surveys (BHE 2007d, 2007e). Of the 134 wetlands evaluated for habitat suitability, 34 sites totaling 5.2 miles were identified as containing habitats likely to support the massasauga in Missouri (Table 3.8.1-12), and 16 sites totaling 5.1 miles were identified as containing habitats likely to support the massasauga in Illinois (BHE 2006c). Most of the Missouri sites were surveyed for massasauga presence during April 2007 (BHE 2007f). No massasauga, Kirtland's, or fox snakes were located, although numerous frogs, turtles, other snakes, and lizards were documented, as indicated in Table 3.8.1-12 (BHE 2007f). The massasauga population at Carlyle Lake may be an endemic population, and possibly the most significant population in the Midwest (Chris Phillips, Illinois Natural History Survey, February 6, 2007).

Crossing occupied habitats during winter hibernation likely would lead to death of individual massasaugas, and crossing during breeding would cause interruption of the breeding cycle. Due to the low biological replacement rate for this species, small increases in adult mortality can cause irreversible declines.

To avoid construction-related impacts to the massassauga, Keystone will develop a mitigation plan and apply for an Incidental Take Authorization (ITA) for the massasauga in Illinois, with guidance from IDNR and the Illinois Natural History Survey. Keystone will also place biological monitors would be placed in areas of appropriate habitats to locate and remove snakes ahead of construction in order to prevent injury or destruction of the massasauga.

Construction of the Mainline Project may affect the eastern massasauga in Missouri and Illinois. Coordination with state and federal resource agencies should continue, with the goal of impact avoidance, minimization, or mitigation.

**TABLE 3.8.1-12**
**Massasauga, Kirtland's, and Fox Snake Habitats Potentially Affected by the Keystone Mainline Project Route**

| Approximate Milepost | State, County | Total Miles | Description of Habitat – Occurrence Survey Results[a] |
|---|---|---|---|
| 752.1–752.3 | Missouri, Buchanan | 0.2 | Wetland in agricultural field, crayfish burrows – not Surveyed |
| 754.7–755.0 | Missouri, Buchanan | 0.3 | Wetland in agricultural field, numerous crayfish burrows – none |
| 755.0–755.2 | Missouri, Buchanan | 0.2 | Wetland in woodlot, surrounded by agricultural field, crayfish burrows – snake |
| 759.2–759.3 | Missouri, Buchanan | 0.1 | Pond and associated wetland surrounded by pasture, crayfish burrows – frogs, turtle |
| 763.8 | Missouri, Buchanan | <0.1 | Wooded ditch surrounded by agricultural field, crayfish burrows – frogs |
| 765.4–765.5 | Missouri, Buchanan | 0.1 | Wetland surrounded by agricultural field, crayfish burrows – frogs |
| 765.5–765.6 | Missouri, Buchanan | 0.1 | Emergent/forested wetland surrounded by agricultural field, crayfish – frogs |
| 765.9 | Missouri, Buchanan | <0.1 | Emergent/forested wetland surrounded by agricultural field and pasture, crayfish burrows. – frogs, snake, lizard |
| 767.4–767.5 | Missouri, Buchanan | 0.1 | Wooded wetland surrounded by agricultural field, crayfish burrows – frog, snake, lizard |
| 767.9–768.0 | Missouri, Buchanan | 0.1 | Grassy wetland next to pond surrounded by agricultural field, crayfish burrows – frogs, snakes, turtles |
| 768.8 | Missouri, Buchanan | <0.1 | Wetland next to pond surrounded by agricultural field, crayfish burrows – frogs, snake |
| 822.1–822.2 | Missouri, Carroll | 0.1 | Wetland surrounded by agricultural field, crayfish burrows – snake |
| 823.5–823.6 | Missouri, Carroll | 0.1 | Grassy waterway in agricultural field, crayfish burrows – not surveyed |
| 832.5–832.7 | Missouri, Carroll | 0.2 | Wooded wetland, crayfish burrows –frog |
| 837.1–837.2 | Missouri, Carroll | 0.1 | Wetland in a field surrounded by patches of trees, crayfish burrows – none |
| 843.1–843.2 | Missouri, Carroll | 0.1 | Wooded wetland crossed by two seasonal streams, crayfish burrows – frog, snake |
| 843.8–843.9 | Missouri, Chariton | 0.1 | Emergent wetland next to stream, crayfish burrows – none |
| 843.9–844.0 | Missouri, Chariton | 0.1 | Emergent wetland next to stream by levee, crayfish burrows – frog, snakes |
| 844.3–844.4 | Missouri, Chariton | 0.1 | Wetland through agricultural field, emergent vegetation, crayfish burrows – frogs |
| 844.3–844.4 | Missouri, Chariton | 0.1 | Wetland through agricultural field, emergent vegetation, crayfish burrows – frogs |
| 845.2–845.6 | Missouri, Chariton | 0.4 | Wetland through agricultural field, emergent vegetation, crayfish burrows – frog, snake |
| 845.7 | Missouri, Chariton | <0.1 | Emergent scrub-shrub wetland near stream, surrounded by woodlot, crayfish burrows – frog |
| 849.7–849.8 | Missouri, Chariton | 0.1 | Riparian wetland/woodland surrounded by pasture, crayfish burrows – frog |
| 860.4–860.5 | Missouri, Chariton | 0.1 | Emergent wetland surrounding stream, crayfish burrows – frog |

**TABLE 3.8.1-12 (Continued)**

| Approximate Milepost | State, County | Total Miles | Description of Habitat with Occurrence Survey Results[a] |
|---|---|---|---|
| 861.3 | Missouri, Chariton | <0.1 | Farm pond in woodlot surrounded by pasture, crayfish burrows – frog |
| 864.3 | Missouri, Chariton | <0.1 | Wet area next to agricultural fields, crayfish burrows – frog, snakes |
| 864.3–864.5 | Missouri, Chariton | 0.2 | Wetland next to agricultural field, crayfish burrows – frog, snakes |
| 874.8–874.9 | Missouri, Chariton | 0.1 | Pond and wetland next to levee, crayfish burrows – frogs, toad, snake, turtles |
| 876.5 | Missouri, Chariton | <0.1 | Pond next to woodlot, crayfish burrows – not surveyed |
| 988.7–989.4 | Missouri, St. Charles | 0.7 | Series of ponds and forested wetlands, crayfish burrows – not surveyed |
| 992.5–992.8 | Missouri, St. Charles | 0.3 | Pond, emergent wetland surrounded by forest and agricultural field, crayfish burrows – not surveyed |
| 993.1 | Missouri, St. Charles | <0.1 | Emergent wetland surrounded by agricultural field, crayfish burrows – frog, turtle |
| 1006.7–1006.8 | Missouri, St. Charles | 0.1 | Wetland through agricultural field, crayfish burrows – turtle |
| 1024.6–1024.8 | Missouri, St. Charles | 0.2 | Emergent wetland next to levee, crayfish burrows – not surveyed |
| 1040.6–1041.0 | Illinois, Madison | 0.4 | Wetland in agricultural field, crayfish burrows. |
| 1041.7–1041.8 | Illinois, Madison | 0.1 | Wetland adjacent to stream, crayfish burrows. |
| 1044.8–1044.9 | Illinois, Madison | 0.1 | Wetland adjacent to stream, crayfish burrows. |
| 1046.5–1046.7 | Illinois, Madison | 0.2 | Wetland adjacent to stream, crayfish burrows. |
| 1049.9–1051.0 | Illinois, Madison | 1.1 | Wetland adjacent to lake, crayfish burrows. |
| 1060.6 | Illinois, Bond | <0.1 | Wetland adjacent to agricultural field, crayfish burrows. |
| 1060.9–1061.1 | Illinois, Bond | 0.2 | Wetland between two agricultural fields, crayfish burrows. |
| 1061.2–1061.3 | Illinois, Bond | 0.1 | Wetland adjacent to stream, crayfish burrows. |
| 1062.5–1062.6 | Illinois, Bond | 0.1 | Lowland next to road with pond, crayfish burrows. |
| 1063.2–1063.4 | Illinois, Bond | 0.2 | Woodlot next to agricultural field with stream, crayfish burrows. |
| 1069.3–1069.6 | Illinois, Bond | 0.3 | Wetland, stream bed, woodlot, crayfish burrows. |
| 1072.1–1072.3 | Illinois, Fayette | 0.2 | Pond next to agricultural field, crayfish burrows. |
| 1074.7–1076.0 | Illinois, Fayette | 1.3 | Wetland along river and ROW, crayfish burrows. |
| 1076.1–1076.5 | Illinois, Fayette | 0.4 | Wetland along ROW, crayfish burrows. |
| 1077.5–1077.7 | Illinois, Fayette | 0.2 | Wetland in pasture, crayfish burrows. |
| 1078.3 | Illinois, Fayette | <0.1 | Wetland next to stream in woodlot, crayfish burrows. |

[a] Includes sites with habitats evaluated as likely to support massasauga, Kirtland's, or fox snakes. Occurrence survey results (Missouri only) by herpetological group (frog, turtle, snake, lizard) with singular indicating one species found and plural indicating more than one species found. No massasauga, Kirtland's, or fox snakes were found during occurrence surveys.

Sources: BHE 2007d, e, f.

### *Dakota Skipper*

Table 3.8.1-13 lists specific locations where suitable habitat for the Dakota Skipper potentially would be affected by the Mainline Project route. Threats to Dakota skipper habitat include burning; haying;

grazing; pesticide use; and invasion by non-native plants, including exotic pasture grasses. Pipeline construction reduces native grassland areas by destroying the prairie sod. Once disturbed, this sod is extremely slow (over 100 years) to redevelop. Disturbing soil along the construction ROW encourages the establishment of exotic pasture grasses, especially smooth brome, and the establishment of noxious weeds.

**TABLE 3.8.1-13**
**Dakota Skipper Habitats Potentially Affected along the Keystone Mainline Project Route**

| Milepost | State | County | Habitat Quality | Summary |
|---|---|---|---|---|
| 127.2–127.5 | North Dakota | Barnes | High | High-quality native prairie, un-grazed site with mix of over 40 native forb species. |
| 258.3–258.4 | South Dakota | Day | High | High-quality native prairie, many native grasses and over 30 native forb species. No Dakota skippers found. |
| 266.0–267.1 | South Dakota | Day | High | High-quality native prairie, numerous native forbs. Two female Dakota skippers found. |
| 392.1–393.0 | South Dakota | Hutchinson | High | High-quality native prairie, rolling hills near Wolf Creek. May be outside of Dakota skipper range. |
| 422.3–422.7 | South Dakota | Yankton | High | High-quality native prairie, abundance of native forbs. May be outside of Dakota skipper range. |
| 423.8–424.1 | South Dakota | Yankton | High | High-quality native prairie, near James River. May be outside of Dakota skipper range. |

Source: ENSR 2006e.

A total of 3.0 miles (0.3 mile in North Dakota and 2.7 miles in South Dakota) of high-quality Dakota skipper habitats would be affected by construction of the Mainline Project. Successful restoration of destroyed (e.g., plowed) or severely degraded Dakota skipper native prairie habitats has not been demonstrated (USFWS 2005). Keystone completed Dakota skipper occurrence surveys during June 29, 2007, at two locations in Day County, South Dakota (Table 3.8.1-13). No Dakota skippers were found at one site, and two female Dakota skippers were found at one site (Table 3.8.1-13).

Keystone has committed to implementing the following measures in its CMR Plan (Appendix B) to protect Dakota skippers and their habitats:

- Keystone has contracted qualified biologists to conduct surveys of sensitive species associated with native tall-grass prairie. Locations of sensitive species found were documented; sensitive species were identified in the ROW and Keystone would continue to work with the relevant regulatory authorities to determine whether any additional protection measures are required.

- Disturbance native prairie would be reclaimed to native prairie species using native seed mixes specified by applicable state and federal agencies, with an objective of no-net-loss of native prairie habitat.

- Where avoidance of native tall-grass prairie by the pipeline ROW is not feasible, appropriate surveys were implemented to ensure that populations of Dakota skippers would not be affected.

- Keystone would restrict workspaces where the ROW crosses native prairie habitat.

- Keystone would salvage and segregate topsoil in native prairie to maintain the native seed sources for revegetation of the ROW in native prairie.

- Keystone would encourage landowners to revegetate native prairie with native seed sources.

- Keystone would reseed native prairie with applicable native seed mixes.

- Keystone would control noxious and invasive plant species as addressed in Keystone's Noxious Weed Management Plan (see Section 3.5.4)

To avoid impacts on Dakota skippers and their habitats, Keystone should encourage landowners to follow these BMPs and Keystone is encouraged to implement these BMPs in vegetation management on the ROW:

- Vegetation maintenance plans should include measures that encourage or enhance a healthy native prairie, such as (John Cochnar, USFWS, March 6, 2007; USFWS 2005):
    - Alternate-year late-summer haying after mid-August, with at least 8 inches of stubble remaining (to reduce woody vegetation encroachment).
    - Limited grazing – both in duration and intensity (to preserve nectar sources and vegetation for egg deposition and larval food).
    - Prescribed burning – schedule before May 1; allow at least 3 to 4 years between burns; do not burn entire habitat area in any single year; allow patchy burn pattern; consider other rare, prairie-dependent species.
    - Control weeds and invasive species – avoid broadcast applications of pesticides or herbicides, train field crews to recognize target weeds in order to avoid adverse effects to native species.
    - Manage vegetation to minimize the likelihood of invasion by weeds.

Construction of the Mainline Project may affect the Dakota skipper at one location and 3.0 miles of suitable native prairie habitats in North Dakota and South Dakota. Coordination with federal and state resource agencies should continue, with the goal of impact avoidance, minimization, or mitigation.

### Federally Protected Fish and Mollusks

Declines in big river fishes have been caused primarily by habitat alteration for navigation, channelization, and bank stabilization; and hydropower generation projects that have caused loss of the dynamic habitats once common in the Missouri and Mississippi Rivers. Dams have blocked spawning migrations, isolated populations, destroyed rearing and spawning habitats, and altered food supply, as well as changed flow, turbidity, and temperature regimes. Declines in intermediate- and small-stream

fishes are attributable to stream modifications, sediment deposition, pollution, overgrazing, and predation by introduced fish.

Declines in mussels along the Mississippi and Missouri Rivers are primarily caused by habitat loss and degradation. These losses have been documented since the mid-19th century; causes include impoundment, channelization, chemical contamination, dredging, and sedimentation. Mussel habitat loss and degradation due to gravel dredging and stream channelization destabilize stream substrates and alter water flows. Most of the remaining populations of mussels are small and isolated, making them more susceptible to expiration from a catastrophic event. Isolated populations also decrease the gene flow through each species, leading to inbreeding depression within populations. Spread of the exotic zebra mussel (*Dreissena polymorpha*) is a threat to native freshwater mussels. Zebra mussels attach themselves to native mussels and restrict feeding and reproductive activities of the native mussels. They quickly out-compete native species, sometimes leading to their suffocation.

Table 3.8.1-14 lists waters affected by the Keystone Project that potentially contain protected fish or mollusks, or their federally or state-designated critical habitats.

Potential impacts on protected fish and mollusk species generally would be as described for fisheries in Section 3.7.3. Table 3.8.1-4 lists federally and state-protected fish and mollusks. The Mainline Project and the Cushing Extension pipelines could adversely affect these protected fish and mollusks by:

- Impacts associated with stream crossings;
- Sedimentation due to trenching, backfilling, and streambank erosion;
- Loss of bank cover and habitats;
- Entrainment of small fish and forage species, altered water temperatures and water quality, and increased erosion and scour from withdrawal or discharge of water for hydrostatic testing; and
- Loss of individuals and habitats due to exposure to toxic materials or crude oil releases (addressed in Section 3.13).

Proposed construction mitigation measures for water body crossings are described in Sections 3.7.3 and 3.3.2. In general, HDD crossing methods would be preferred to avoid construction-related damage to protected aquatic species habitats. The HDD does carry a risk of “frac-out” (the escape of drilling fluid) that could result in short-term sediment transport, water quality impacts, and bottom disturbance at or near the crossing location. For various reasons, including protected species habitat, Keystone has committed to using HDD at 13 crossings along the Mainline Project route (Pembina River, Missouri River [two crossings], South Branch Park River, Platte River, Chariton River, Cuivre River [two crossings], Elkhorn River, Kaskaskia River, Silver Creek, Hurricane Creek, and Mississippi River); and four crossings along the Cushing Extension route (one each on the Republican, Arkansas, Salt Fork Arkansas, and Cimarron Rivers). See section 3.3 for details regarding HDD decision making process.

**TABLE 3.8.1-14**
**Water Body Crossings Containing Protected Fish or Mollusks along the Keystone Project Route**

| Approx. Milepost | County | State | Water Body (Type – Crossing[a]) Use | Species, Habitat – Occurence Survey Results |
|---|---|---|---|---|
| **Mainline Project** | | | | |
| 300.0 | Clark | South Dakota | North Fork Foster Creek (R4 – Dry) | Topeka shiner, suitable habitat – no Topeka shiners |
| 300.2 | Clark | South Dakota | South Fork Foster Creek (R4 – Dry) | Topeka shiner, marginal habitat – no Topeka shiners |
| 306.8 | Clark | South Dakota | Tributary of Shue Creek (PEM – 1) | Topeka shiner, unsuitable habitat – no fish survey |
| 310.7 | Beadle | South Dakota | Tributary of Shue Creek (R4 – OC) | Topeka shiner, unsuitable habitat – no fish survey |
| 314.3 | Beadle | South Dakota | Shue Creek (R4 – OC) | Topeka shiner, unsuitable habitat – no fish survey |
| 319.0 | Beadle | South Dakota | Middle Pearl Creek (R4 – Dry) | Topeka shiner, unsuitable habitat – no fish survey |
| 327.6 | Kingsbury | South Dakota | South Fork Pearl Creek (PEM – 2) | Topeka shiner, marginal habitat – no Topeka shiners |
| 336.4 | Kingsbury | South Dakota | Redstone Creek (R4 – OC) | Topeka shiner, unsuitable habitat – no fish survey |
| 338.7 | Kingsbury | South Dakota | West Redstone Creek (R4 – Dry) | Topeka shiner, unsuitable habitat – no fish survey |
| 344.4 | Miner | South Dakota | Redstone Creek (R4 – Dry) hydrostatic test water source | Topeka shiner, suitable habitat – 6 Topeka shiners |
| 363.6 | Miner | South Dakota | Rock Creek (R4 – Dry) | Topeka shiner, suitable habitat – no Topeka shiners |
| 377.2 | Hansen | South Dakota | Wolf Creek (R2 – OC) hydrostatic test water source | Topeka shiner, marginal habitat – no fish survey |
| 385.7 | McCook | South Dakota | Wolf Creek (R2 – Dry) | Topeka shiner, suitable habitat – no Topeka shiners |
| 392.8 | Hutchinson | South Dakota | Wolf Creek (R2 – OC) | Topeka shiner, marginal habitat – no fish survey |
| 393.2 | Hutchinson | South Dakota | Tributary of Wolf Creek (R2 – OC) | Topeka shiner, poor habitat – no fish survey |
| 396.6 | Hutchinson | South Dakota | Tributary of Wolf Creek (R4 – OC) | Topeka shiner, poor habitat – no fish survey |
| 419.7 | Yankton | South Dakota | Tributary of James River (R4 – OC) | Topeka shiner, poor habitat – no fish survey |
| 423.9 | Yankton | South Dakota | James River (R2 – OC) hydrostatic test water source | Topeka shiner, poor habitat – no fish survey |
| 425.7 | Yankton | South Dakota | Tributary of James River (R4 – OC) | Topeka shiner, poor habitat – no fish survey |
| 430.1 | Yankton | South Dakota | Beaver Creek (R2 – OC) | Topeka shiner, poor habitat – no fish survey |

**TABLE 3.8.1-14 (Continued)**

| Approximate Milepost | County | State | Water Body (Type – Crossing[a]) Use | Species, Habitat – Occurence Survey Results |
|---|---|---|---|---|
| **Mainline Project (continued)** | | | | |
| 437.6 | Yankton, Cedar | South Dakota, Nebraska | Missouri River (R2 – HDD) hydrostatic test water source, HDD water source | Topeka shiner, poor habitat – no fish survey<br>pallid sturgeon, lake sturgeon, sturgeon chub, sicklefin chub, blacknose shiner, northern redbelly dace, finescale dace, Higgins' eye pearly mussel, scaleshell mussel – no mussel surveys |
| 544.2 | Colfax | Nebraska | Platte River (R2 – HDD) hydrostatic test water source, HDD water source | Pallid sturgeon, sturgeon chub, sicklefin chub, suitable habitat – no fish survey |
| 661.2 | Marshall | Kansas | North Elm Creek (R2 – OC) | Topeka shiner (SCH), suitable habitat – no fish survey |
| 662.0 | Marshall | Kansas | Tributary of North Elm Creek (R4 – OC) | Topeka shiner, marginal habitat – no Topeka shiners |
| 664.6 | Marshall | Kansas | North Elm Creek (R2 – Dry) | Topeka shiner (SCH), suitable habitat – 142 Topeka shiners |
| 667.1 | Marshall | Kansas | Tributary of North Elm Creek (R4 – OC) | Topeka shiner (SCH), no access |
| 691.9 | Nemaha | Kansas | South Fork Big Nemaha River (R2 – OC) | Western silvery minnow (SCH), flathead chub (SCH), no fish survey |
| 750.8 | Doniphan, Buchanan | Kansas, Missouri | Missouri River (R2 – HDD) hydrostatic test water source, HDD water source | Pallid sturgeon, sturgeon chub, sicklefin chub, chestnut lamprey, no fish surveys |
| 775.3 | Clinton | Missouri | Castile Creek (R2 – OC) | Topeka shiner, marginal habitat – no Topeka shiners |
| 783.3 | Clinton | Missouri | Little Platte River (R2 – OC) | Topeka shiner, suitable habitat – no Topeka shiners |
| 784.3 | Clinton | Missouri | Tributary of Little Platte River (R2 – OC) | Topeka shiner, suitable habitat – no Topeka shiners |
| 788.2 | Clinton | Missouri | Shoal Creek (R2 – OC) | Topeka shiner, suitable habitat – no Topeka shiners |
| 788.9 | Clinton | Missouri | Little Shoal Creek (R2 – OC) | Topeka shiner, poor habitat – dry |
| 797.0 | Caldwell | Missouri | Log Creek (R2 – Dry) | Topeka shiner, poor habitat – dry |
| 798.8 | Caldwell | Missouri | Tributary of Log Creek (R2 – OC) | Topeka shiner, poor habitat – no Topeka shiners |
| 798.9 | Caldwell | Missouri | Tributary of Log Creek (perennial – OC) | Topeka shiner, poor habitat – no Topeka shiners |
| 803.8 | Caldwell | Missouri | Brush Creek (R2 – Dry) | Topeka shiner, poor habitat – no Topeka shiners |
| 804.3 | Caldwell | Missouri | Tributary of Brush Creek (R2 – OC) | Topeka shiner, poor habitat – dry |
| 806.2 | Caldwell | Missouri | Tributary of Crabapple Creek (R4 – OC) | Topeka shiner, poor habitat – dry |
| 807.1 | Caldwell | Missouri | Crabapple Creek (R2 – OC) | Topeka shiner, poor habitat – no Topeka shiners |

**TABLE 3.8.1-14 (Continued)**

| Approximate Milepost | County | State | Water Body (Type – Crossing[a]) Use | Species, Habitat – Occurence Survey Results |
|---|---|---|---|---|
| **Mainline Project (continued)** | | | | |
| 874.7 | Chariton | Missouri | East Fork Chariton River (R2 – OC) | Topeka shiner, poor habitat – no Topeka shiners |
| 875.2 | Chariton | Missouri | Tributary to East Fork Chariton River (R4 – OC) | Topeka shiner, poor habitat – dry |
| 1024.7 | St. Charles, Madison | Missouri, Illinois | Mississippi River (R2 – HDD) hydrostatic test water source, HDD water source | Pallid sturgeon, no fish survey<br>Higgins' eye pearly mussel – no mussel surveys |
| 1075.9 | Fayette | Illinois | Kaskaskia River (R2 – HDD) hydrostatic test water source, HDD water source | Western sand darter, no fish survey |
| **Cushing Extension** | | | | |
| 51.2 | Clay | Kansas | Republican River (R2 – HDD) hydrostatic test water source, HDD water source | Arkansas River shiner, silver chub, speckled chub, no fish survey |
| 85 | Dickinson | Kansas | Carry Creek (R4 – OC) hydrostatic test water source | Topeka shiner (SCH), suitable habitat – no Topeka shiners |
| 87.0 | Dickinson | Kansas | Carry Creek (R2 – OC) hydrostatic test water source | Topeka shiner (SCH), suitable habitat– no Topeka shiners |
| 91.0 | Dickinson | Kansas | Tributary of W. Branch Lyon's Creek (R4 – OC) | Topeka shiner (SCH), suitable habitat– no Topeka shiners |
| 92.0 | Dickinson | Kansas | West Branch Lyon's Creek (R2 – Dry) | Topeka shiner (SCH), poor habitat– no Topeka shiners |
| 96.3 | Dickinson | Kansas | Tributary of Lyon's Creek (R4 – OC) | Topeka shiner, suitable habitat– no Topeka shiners |
| 96.8 | Dickinson | Kansas | Tributary of Lyon's Creek (R4 – OC) | Topeka shiner, suitable habitat– no Topeka shiners |
| 97.1 | Dickinson | Kansas | Lyon's Creek (R2 – OC) | Topeka shiner, suitable habitat – no Topeka shiners |
| 98.8 | Dickinson | Kansas | Tributary of Lyon's Creek (R2 – OC) | Topeka shiner, suitable habitat– no Topeka shiners |
| 103.2 | Marion | Kansas | Tributary of Mud Creek (R4 – OC) | Topeka shiner (SCH), poor habitat– dry |
| 105.2 | Marion | Kansas | Tributary of Mud Creek (R4 – OC) | Topeka shiner (SCH), suitable habitat– no Topeka shiners |
| 106.3 | Marion | Kansas | Tributary of Mud Creek (R4 – OC) | Topeka shiner (SCH), suitable habitat– no Topeka shiners |
| 108.7 | Marion | Kansas | Tributary of Mud Creek (R4 – OC) | Topeka shiner (SCH), suitable habitat– no Topeka shiners |

**TABLE 3.8.1-14 (Continued)**

| Approximate Milepost | County | State | Water Body (Type – Crossing[a]) Use | Species, Habitat – Occurence Survey Results |
|---|---|---|---|---|
| **Cushing Extension (continued)** | | | | |
| 117.1 | Marion | Kansas | Cottonwood River (R2 – OC) | Neosho madtom, poor habitat – no Neosho madtoms<br>fawnsfoot, creeper mussel, suitable habitat – no live or fresh dead fawnsfoot or creeper mussels – other live mussels found |
| 205.7 | Cowley | Kansas | Arkansas River (R2 – HDD) hydrostatic test water source, HDD water source | Arkansas River shiner (SCH), silver chub (SCH), Arkansas River speckled chub (SCH), suitable habitat – no target species observed |
| 206.3 | Cowley | Kansas | Spring Creek (R2 – OC) | Arkansas darter, suitable habitat – no Arkansas darters |
| 288.5 | Payne | Oklahoma | Cimarron River (R2 – HDD) hydrostatic test water source, HDD water source | Arkansas River shiner (SCH), suitable habitat– no Arkansas river shiners |

FCH = Federally designated critical habitat.

SCH = State-designated critical habitat.

[a] Water body types: PEM = Palustrine emergent wetland, R2 = Perennial stream, R4 = Intermittent stream. Crossing techniques: OC = Open-cut construction techniques; Dry = Dry crossing techniques (flume or dam-and-pump methods); HDD = Horizontal directional drill method, as described in Keystone's Construction Mitigation and Reclamation Plan (CMR Plan); 1 = Soils within the wetland are anticipated to be dry at the time of construction, and mainline construction techniques will be implemented as described in the Project's CMR Plan (Appendix B).

Sources: TransCanada 2007b, d; ENSR 2006f, g; ENSR 2007d, e; f, g.

Keystone also has committed to implementing the following measures in its CMR Plan (Appendix B) to protect fish and mollusks:

- Keystone would coordinate water withdrawal with the appropriate USFWS Environmental Services field office when federally listed species inhabit or use the aquatic system.
- Throughout construction, contractors shall maintain adequate flow rates, such that small streams are not dewatered, to protect aquatic life and to prevent the interruption of existing downstream uses.
- Contractors shall locate all extra work areas (such as staging areas and additional spoil storage areas) at least 10 feet from the water's edge, if practicable.
- Prior to clearing, contractors shall flag the construction ROW at least 10 feet from the banks and ensure that riparian cover is maintained where practicable during construction.
- Temporary equipment crossings would be used, including portable bridges, bridges made from timber or mats, flumes, culverts, sand bags, subsoil, or coarse granular material and riprap.
- Contractors shall ensure that culverts and flumes of sufficient diameter are sized and installed to accommodate the existing flow of water and those that potentially may be created by sudden runoffs.

- Clearing and grubbing for temporary vehicle access and equipment crossings shall be carefully controlled to minimize sediment entering the water body from the construction ROW.
- Clearing and grading shall be performed on both sides of the water body prior to initiating any trenching work. All trees shall be felled away from watercourses.
- Plant debris or soil inadvertently deposited within the high water mark shall be promptly removed in a manner that minimizes disturbance of the water body bed and bank. Excess floatable debris shall be removed above the high water mark from areas immediately above crossings.
- Vegetation adjacent to water bodies that would be crossed by HDD wouldl not be disturbed, except by hand clearing as necessary for drilling operations.
- The contractor shall install sediment barriers immediately after any initial disturbance of the water body or adjacent upland.
- Streambank contours shall be reestablished. All debris shall be removed from the streambed and banks.
- Streambanks would be stabilized to prevent erosion using rock riprap, gabions, stabilizing cribs, or bio-stabilization measures to protect backfill prior to reestablishing vegetation cover.
- Any water obtained or discharges for hydrostatic testing would comply with permit notice requirements. Withdrawal rates may be limited as stated by permit.
- The contractor shall locate hydrostatic test manifolds 100 feet outside wetlands and riparian areas to the maximum extent practicable.
- Staging/work areas for filling pipeline with water shall be located a minimum of 50 feet from the water body or a wetland boundary.
- The contractor shall install temporary sediment filter devices adjacent to all streams where runoff may enter.
- Contractors shall screen the intake hose to prevent the entrainment of fish or debris. The hose shall be kept off the bottom of the water body.
- Contractors shall not use chemicals in the test water and shall not discharge any water containing oil or other substances that are in sufficient amounts to create a visible color film or sheen on the surface of the receiving water.
- Contractors shall not discharge into water bodies that provide habitat for federally listed threatened or endangered species unless appropriate federal, state, and local permitting agencies grant written permission.

Specific impacts and mitigation measures have been identified and developed for the species discussed separately below.

### *Pallid Sturgeon*

River habitats used by the pallid sturgeon are not likely to be adversely affected by construction of the Keystone Project because Keystone plans to use HDD crossings at all major river crossings where pallid sturgeon may occur (Section 3.3). HDD does carry a risk of the escape of drilling fluids into rivers at the crossings, which could result in short-term sediment transport and water quality impacts that could adversely affect the pallid sturgeon. The use of significant amounts of surface waters for hydrostatic testing of the pipeline that would diminish Platte River flows could adversely affect pallid sturgeon in the lower Platte River. In addition, water withdrawal for HDD and hydrostatic testing from the Missouri

River at the Nebraska/South Dakota border, the Platte River in Nebraska, and the Mississippi River at the Missouri/Illinois border could entrain larval fish and uptake eggs of the pallid sturgeon.

To avoid impacts on pallid sturgeon, Keystone would:

- Consult with individual states and acquire all necessary permits needed for water withdrawal from the Lower Platte River drainage.

- Periodically check screened intake ends of water pumps for entrainment of fish. Withdrawal rates would be low, with velocities at the intake of less than 15 centimeters per second (cm/s), which would further reduce the potential for entrainment or entrapment. If a pallid sturgeon should become entrained, Keystone would immediately stop operations and contact USFWS to determine whether additional protection measures are required.

- Complete hydrostatic testing after August 1, when water use would be from water sources containing sensitive aquatic species.

- Return water used for hydrostatic testing back to its source within a 30-day period; this temporary water use would not be considered a "depletion" by USFWS.

The critical period for water withdrawal in the Lower Platte region (Columbus, Nebraska to the Missouri River) is February 1 through July 31 (Carey Grell, NGPC, February 5, 2007). Thus Keystone should avoid water withdrawals during February 1 through July 31 in the Lower Platte region (Columbus, Nebraska to the Missouri River) (John Cochnar, USFWS, February 5, 2007).

Construction of the Mainline Project and Cushing Extension may affect, but would not likely adversely affect the pallid sturgeon. Coordination with state resource agencies should continue concerning potential water withdrawal from the Lower Platte River drainage, with the goal of habitat impact avoidance, minimization, or mitigation.

### *Arkansas Darter*

The distribution of the Arkansas darter is south and west of the Mainline Project, so construction of the Mainline Project would have no affect this species. The Cushing Extension crosses one tributary of the Arkansas River where the Arkansas darter has been identified in Kansas. Surveys for the Arkansas darter at this location indicated that the habitat was poorly suited for the species, and no Arkansas darters were captured.

To avoid impacts on the Arkansas darter, Keystone would:

- Not conduct construction activities, if suitable habitat exists within the ROW, during the Arkansas darter spawning period March 1 to May 31 at the Arkansas River or the unnamed tributary of the Arkansas River unless dry crossing or HDD methods are used.
- Implement erosion control measures and monitor the measures daily during construction to ensure effectiveness, particularly after storm events.

- Restore beds and banks of streams, as described in Keystone's CMR Plan (Appendix B).

Construction of the Mainline Project would not affect the Arkansas darter. Construction of the Cushing Extension would not likely affect the Arkansas darter at the stream crossing discussed above.

Coordination with state and federal resource agencies should continue concerning the potential to affect the Arkansas darter and its habitat at this crossing, with the goal of habitat impact avoidance, minimization, or mitigation.

### *Arkansas River Shiner*

The distribution of the Arkansas River shiner is generally found south and west of the Mainline Project, so construction of the Mainline Project would not affect this species. The Cushing Extension crosses the Republican River, the Arkansas River and the Cimarron River where the Arkansas River shiner has been identified in Kansas and Oklahoma. The Arkansas River is designated critical habitat for this species. Habitat surveys were completed during August 2007 at the Arkansas River and Cimarron River crossing locations of the Cushing Extension. Habitat was considered suitable for this species at both of these locations, although no Arkansas River shiners were captured at either location.

Designated critical habitat in the Arkansas and Cimarron Rivers would be crossed using HDD. Water withdrawal for HDD and hydrostatic testing are planned at both of these rivers. Although intake ends would be screened, the pelagic eggs or young larvae of the Arkansas River shiner drifting in these rivers could be entrained and destroyed during water withdrawal for HDD, which may occur during the Arkansas River shiner's spawning period. Water withdrawal for hydrostatic testing would require much larger volumes but generally would be completed after August 1, unless specific approval is obtained in advance from the appropriate resource agencies.

To avoid impacts on the Arkansas River shiner and its critical habitats, Keystone would:

- Not conduct construction activities for HDD crossings described above, which constitute suitable habitat, during the Arkansas River shiner spawning period from March 1 to May 31.
- Periodically check screened intake ends of HDD water pumps for entrainment of fish. Withdrawal rates and total water consumption would be low, with uptake velocities of less than 15 cm/s, which would further reduce the potential for entrainment or entrapment.
- Periodically check screened intake ends of hydrostatic testing water pumps for entrainment of fish. Because withdrawal rates and total water use for hydrostatic testing are greater than those for HDD, hydrostatic testing generally would occur after August 1 in waterbodies where sensitive species are located in order to avoid entrainment of larval fish and eggs.

Construction of the Mainline Project would not affect the Arkansas River shiner. Construction of the Cushing Extension would not likely adversely affect the Arkansas River shiner or its designated critical habitat in the Arkansas and Cimarron Rivers, because these crossings would be completed using HDD with additional planned mitigation. Coordination with state and federal resource agencies should continue concerning the potential to affect the Arkansas River shiner and its habitats at these crossings, with the goal of impact avoidance, minimization, or mitigation.

### *Topeka Shiner*

Keystone completed habitat assessment surveys at each pipeline stream crossing in areas designated by USFWS-South Dakota, SDGFP, KDWP, and MDC for the Mainline Project and the Cushing Extension. The Mainline Project surveys assessed suitability of these habitats based on the current understanding of life history requirements for Topeka shiners (Table 3.8.1-14). Presence/absence surveys then were conducted to determine the relative abundance of fish species, with emphasis on determining whether Topeka shiner populations were present (Table 3.8.1-14). Topeka shiner habitat was assessed at 51 stream crossings: 39 stream crossings of the Mainline Project and 12 stream crossings of the Cushing

Extension (Table 3.8.1-14). Occurrence surveys were completed at 28 crossings with habitat suitable for supporting Topeka shiners: 17 Mainline Project crossings and 11 Cushing Extension crossings. Topeka shiners were found at two Mainline Project crossings: Redstone Creek in Miner County, South Dakota and North Elm Creek in Marshall County, Kansas (Table 3.8.1-14). Crossings at both of these locations would be completed using dry open-cut crossing methods, as described in Keystone's CMR Plan. Additional crossings potentially containing Topeka shiners along the Mainline Project that have been identified for dry open-cut crossings include North Fork and South Fork Foster Creek (Clark County), West Redstone Creek and Rock Creek (Minor County), Wolf Creek (McCook County), and Wolf Creek (Hutchinson County) in South Dakota; North Elm Creek (one of two crossings) (Marshall County) in Kansas; and Log Creek and Brush Creek (Caldwell County) in Missouri (Table 3.8.1-14). No Topeka shiners were found at the stream crossings for the Cushing Extension (Table 3.8.1-14). The West Branch Lyon's Creek (Dickson County) in Kansas along the Cushing Extension also has been identified for a dry open-cut crossing method (Table 3.8.1-14).

Topeka shiners can be affected by direct habitat impacts, such as channel degradation or water quality impacts from increased sedimentation, which also can include riparian vegetation impacts. Topeka shiners also may be affected by water withdrawal during hydrostatic testing at identified water sources in South Dakota on Redstone Creek (Miner County), Wolf Creek (Hansen County), and James River (Yankton County) for the Mainline Project; and in Kansas on Carry Creek (Dickinson County) for the Cushing Extension.

To avoid impacts on the Topeka shiner, Keystone would:

- To protect the Topeka shiner from significant impacts associated with the Project, prohibit all work within the bed or banks of identified Topeka shiner streams annually during the species' spawning season of May 15 through July 31.
- Conduct salvage and relocation efforts at all crossings outside of the spawning season. For this work the following provisions would be implemented by a qualified biologist who has obtained the necessary state and federal collecting permits:
    - The salvage and relocation efforts would occur within 2 weeks prior to commencing work within the bed and banks of each identified stream. Repeated salvage and relocation efforts would be completed if high-water events delay construction activities more than 2 weeks following the initial salvage and relocation efforts.
    - Salvage efforts would occur in all pools of affected streams that contain suitable habitat for the Topeka shiner within the ROW.
    - Extensive effort would be made to collect all individuals of the species, including multiple seine attempts within pools upstream and downstream.
    - Temporary cofferdams would be used to block off the work area in which salvage operations occur.
    - Relocation activities would occur during ambient weather conditions suitable to ensure survivorship during relocation. Collection and relocation efforts would be performed in the early daytime hours to avoid ambient air temperatures that exceed 80 ºF.
    - Individual Topeka shiners would be held in proper transfer containers that ensure suitable water quality conditions. This includes using aeration equipment and ensuring that water temperatures in transfer containers do not exceed ambient water temperatures. Ambient water temperature would be collected at a depth no more than 60 percent of maximum pool depth from the pools in which salvage efforts are attempted.

- Salvage and relocation efforts would be implemented rapidly to avoid excessive holding time prior to relocation.
- The relocation site would be upstream (if feasible) and include pool(s) of similar size and depth as pools from which Topeka shiners are collected. No significant differences in habitat conditions (including riparian canopy cover) or water quality would occur between the salvage pools and the relocation pools.

- Implement erosion control measures as described in Keystone's CMR Plan. Erosion and sediment controls would be monitored daily during construction to ensure effectiveness, particularly after storm events.
- Restore banks and streambeds using erosion control and revegetation measures as described in Keystone's CMR Plan.
- Withdraw no more than 10 percent of the ambient stream flow and maintain adequate flow rates in the waterbody to protect aquatic life and provide for downstream uses.
- Avoid water withdrawal for hydrostatic tests until after August 1, unless specific approval is obtained in advance from the appropriate regulatory or resource agency.
- During operation of the pipeline and during routine inspection and maintenance, ensure that crews are aware of the location of populations of Topeka shiners within the ROW and clearly mark locations on maps and in described in maintenance orders.

The Mainline Project would cross state-designated critical habitats at North Elm Creek in two locations and at a tributary to North Elm Creek in Marshall County, Kansas (Table 3.8.1-14). Based on the accumulated site information, construction of the Mainline Project would not result in any foreseeable negative effects on the Topeka shiner at the stream crossings surveyed in Missouri (Table 3.8.1-14). The Cushing Extension would cross state-designated critical habitats at Carry Creek (two crossings), West Branch Lyon's Creek, and a tributary to West Branch Lyon's Creek in Dickson County, Kansas; and Mud Creek (including four Mud Creek tributary crossings) in Marion County, Kansas.

Construction of the Mainline Project may affect, but is not likely to adversely affect state-designated critical habitat in Kansas; the Topeka shiner in Missouri; and the Topeka shiner at the two stream crossings where they occur: Redstone Creek (Miner County) in South Dakota and North Elm Creek (Marshall County) in Kansas. Construction of the Cushing Extension may affect, but is not likely to adversely affect state-designated critical habitat for the Topeka shiner in Kansas. Coordination with federal and state resource agencies should continue concerning the documented occurrences and the state-designated critical habitats for the Topeka shiner, with the goal of habitat impact avoidance, minimization, or mitigation.

### *Neosho Madtom*

The distribution of the Neosho madtom is generally found south of the Mainline Project; therefore, construction of the Mainline Project would not affect this species. The Cushing Extension would cross the Cottonwood River where the Neosho madtom has been identified in Kansas. The mainstem Cottonwood River is state-designated as critical habitat for this species, from where it enters Chase County downstream to its confluence with the Neosho River. The crossing of the Cushing Extension in Marion County would be upstream from the state-designated critical habitat for this species. No federal critical habitat has been designated for the Neosho madtom. The Cottonwood River would be crossed using wet open-cut methods, as described in Keystone's CMR Plan (Appendix B). The Cottonwood River was not identified as a potential water source for hydrostatic testing.

Keystone completed a habitat assessment at the Cottonwood River crossing for the Cushing Extension and found that the habitat was poorly suited for the Neosho madtom. Occurrence surveys were completed and no Neosho madtoms were collected at or near the crossing location (ENSR 2007f).

Construction of the Mainline Project would not affect the Neosho madtom. Construction of the Cushing Extension would not affect the Neosho madtom or potential habitat in the Cottonwood River because this species was not found to occur at this location.

#### *Higgins' Eye Pearlymussel and Scaleshell Mussel*

These large river mollusks may occur at the following crossing locations on the Mainline Project:

- Yankton, South Dakota – MP 437.6 – Missouri River;
- Doniphan, Kansas – MP 750.8 – Missouri River; and
- St. Charles, Missouri – MP 1024.7 – Mississippi River.

Construction of the Keystone pipeline across the Missouri and Mississippi Rivers would use the HDD method; therefore, benthic habitats for these mussels would not be affected by pipeline construction. Hydrostatic test waters would be returned to the same location from which it was withdrawn. All equipment used to pump water would be thoroughly cleaned between locations where water would be withdrawn for HDD and hydrostatic testing to prevent any movements of zebra mussels. Because the mussels are not expected at any other river or stream crossings, no effects on these species are anticipated from construction of the Mainline Project or Cushing Extension pipelines.

### Federally Protected Plants

Potential construction- and operations-related impacts on special-status plant species generally would be the same as those described for vegetation communities in Section 3.5.5, including:

- Temporary and permanent modification of vegetation community composition and structure from clearing and operational maintenance;
- Increased risk of soil erosion from lack of vegetative cover;
- Expansion of invasive and noxious weed populations along the pipeline ROW as a result of construction and operational vegetation maintenance;
- Loss of plant species and habitats as a result of construction clearing and grading;
- Soil and sod disturbance (mixing of topsoil with subsoil with altered biological activities and chemical conditions that could affect reestablishment and natural recruitment of listed plant species after restoration);
- Compaction and rutting of soils from movement of heavy machinery and transport of pipe sections, altering natural hydrologic patterns, inhibiting seed germination, or increasing siltation; and
- Alteration in vegetation productivity and phenology because of increased subsurface soil temperatures associated with heat loss from the pipeline.

Keystone has committed to implement the following measures in its CMR Plan (Appendix B) for native prairie species:

- Contracting a qualified biologist to conduct a survey of sensitive species associated with native tall-grass prairie.
- Working with regulatory authorities if sensitive species are identified in the construction ROW, to determine whether any additional protection measures would be required.
- Once construction is complete, disturbance in native prairie would be reclaimed to native prairie species using native seed mixes specified by applicable state and federal agencies with the intent there will be no net loss of native prairie habitat.
- To minimize impacts to native prairie, no permanent developments, such as access roads or pump stations, would be constructed in native prairie tracts if feasible.

In addition to these general impacts and mitigation measures, specific impacts and mitigation measures have been identified for the species described below.

### *Decurrent False Aster*

In the Keystone Project area, the decurrent false aster is known to occur in the floodplains of the Missouri and Mississippi Rivers. A number of populations are known from the Missouri River and Mississippi River floodplains in St. Charles County, Missouri and in Madison County, Illinois. Surveys for the decurrent false aster in the Mississippi River floodplain in Confluence State Park, St. Charles County Missouri identified no decurrent false asters within the Keystone Project ROW.

The Missouri Department of Conservation has developed Best Management Practices (BMPs) for projects in areas where the decurrent false aster is likely to occur. USFWS recommends that Keystone follows these BMPs to minimize potential impacts to the decurrent false aster. These BMPs are voluntary and include:

- Survey for the presence of decurrent false aster during the August-to-October flowering period.
- Maintain open, moist, early successional habitat that receives periodic inundation from Mississippi River floodwater. Established populations need newly disturbed areas in which to spread.
- Avoid general application of non-specific herbicides. Monocot-specific herbicides can be spot-applied with minimal threat to decurrent false aster.
- Resurvey following significant flooding, as decurrent false aster populations are frequently redistributed by flood waters.
- Use cutting, prescribed burns, or herbicides to reduce colonization of sites by cottonwoods, willows, and other wetland woody species.
- Low, wet areas of agricultural fields occupied by decurrent false aster should be cultivated only with adequate frequency to prevent succession to heavy shade-producing species, perhaps every third year.
- Avoid any changes to drainage patterns that would lessen accessibility of sites to Mississippi River flood waters.
- Avoid mowing of decurrent false aster populations during the May-through-October growing period.

Keystone has developed a small route variation in consultation with USFWS and the Missouri Department of Natural Resources through the Confluence State Park to avoid an area of recently planted

hardwood trees and an area where decurrent false asters are located. To avoid impacts on the decurrent false aster, Keystone would:

- Conduct surveys prior to construction within suitable habitat during the flowering period.
- Reduce the width of the construction ROW in areas where populations have been identified, to the extent possible.
- Appropriately salvage and segregate topsoil where populations have been identified to preserve native seed sources in the soil for use in re-vegetation efforts.
- Restore habitat by using an approved seed mix provided by the NRCS or appropriate state agency.
- Collect seed to repopulate the ROW or an appropriate offsite location, or for creation of a nursery population until viable natural populations have established themselves.
- Avoid the population by rerouting around plants or boring under plants.
- Monitor populations for two years after construction to identify and remove exotic weed, grass, or legume species that could hinder the re-establishment of the decurrent false aster.

Construction of the Mainline Project in the Missouri River floodplain in St. Charles County, Missouri; and in the Mississippi River floodplain in Madison County, Illinois may affect, but is not likely to adversely affect the decurrent false aster with implementation of the measures listed above. Surveys for this species would aid in avoidance of the species, but suitable habitat areas may be crossed and altered by construction activities. Adopting conservation measures such as those recommended by the MDC could aid in minimizing effects on the decurrent false aster. Coordination with state and federal resource agencies should continue concerning the potential to affect the decurrent false aster and its habitats, with the goal of habitat impact avoidance, minimization, or mitigation.

### *Western Prairie Fringed Orchid*

Surveys along the proposed pipeline ROW for western prairie fringed orchid habitat were completed in September 2006 and May 2007. Occurrence surveys were completed in June and July 2007. An area was categorized as suitable for the western prairie fringed orchid if: (1) it was possible for the grassland to be sub-irrigated (sub-irrigation was evaluated by the proximity of wetlands to the grassland site); (2) the wetland area had upland inclusions; and (3) the site was in the range of where this orchid potentially could occur.

The surveys identified suitable habitats for the western prairie fringed orchid that would be affected by the Mainline Project at seven sites in South Dakota, and five sites in Nebraska (Table 3.8.1-15).

**TABLE 3.8.1-15**
**Western Prairie Fringed Orchid Habitats Potentially Affected along the Keystone Project Route**

| Milepost | State | County | Habitat Quality and Occurrence | Summary |
|---|---|---|---|---|
| 258.2–258.4 | South Dakota | Day | High – no WPFO | Abundance of native grasses, sedges, and over 30 native forbs |
| 278.0–278.8 | South Dakota | Clark | Medium – no WPFO | Mosaic of pasture/wetland and grassland |
| 279.4–280.0 | South Dakota | Clark | Medium – no WPFO | Mosaic of pasture/wetland and grassland |
| 385.3–385.8 | South Dakota | McCook | Medium to high – no WPFO | Smooth brome pasture with wetlands and native grassland on hills |
| 392.1–392.9 | South Dakota | Hutchinson | High – no WPFO | By Wolf Creek, rolling, native prairie hills |
| 422.3–422.7 | South Dakota | Yankton | High – no WPFO | Scattered little blue stem and abundance of native forbs |
| 392.1–392.9 | South Dakota | Yankton | High – no WPFO | Near James River, native prairie ridges between tree lined ravines |
| 439.8–440.2 | Nebraska | Cedar | Medium to high – no WPFO | Rolling hills with mix of native grasses |
| 505.8–506.9 | Nebraska | Stanton | High – no WPFO | High-quality native sandy prairie near Elkhorn River |
| 542.9–543.3 | Nebraska | Colfax | Medium to low – no WPFO | Native sedges in sandy oxbow are of Platt River, scattered native forbs |
| 624.3–624.4 | Nebraska | Jefferson | High – No WPFO | No access – mixed-grass native prairie site |
| 639.1–640.4 | Nebraska | Jefferson | Medium to high – No WPFO | Large tracts of native grasses and forbs |

WPFO = Western prairie fringed orchid.

Source: ENSR 2007h.

The Missouri Department of Conservation has developed Best Management Practices (BMPs) for projects in areas where the western prairie fringed orchid is likely to occur. These BMPs are voluntary and include:

- Survey high-quality prairies during the flowering period to determine whether the orchid is present.
- At known occurrences or sites where presence is expected, avoid herbicide use during the growing season unless spot spraying is used on target species.
- Do not mow during the orchid's growing season.
- Maintain or promote hydrologic conditions fostering prairie swales and bottomland prairies.
- Avoid any pesticide use at prairie sites that might affect the species' pollinators.

To avoid impacts on identified populations of the western prairie fringed orchid, Keystone would:

- Conduct preconstruction surveys within suitable habitat if construction activities were to occur during the flowering period.
- Reduce the width of the construction ROW in areas where populations have been identified, to the extent possible.
- Salvage and segregate topsoil where populations have been identified to preserve native seed sources in the soil for use in re-vegetation efforts.
- Restore habitat by using an approved seed mix provided by the NRCS or appropriate state agency.
- Collect seed to repopulate the ROW or an appropriate offsite location, or for creation of a nursery population until viable natural populations have established themselves.
- Avoid the population by rerouting around plants or boring under plants.
- Monitor populations for two years after construction to identify and remove exotic weed, grass or legume species that could hinder the re-establishment of the western prairie fringed orchid.

Construction of the Mainline Project in native wet prairie habitats in North Dakota, South Dakota, and Nebraska may affect, but is not likely to adversely affect the western prairie fringed orchid. Surveys for this species would aid in avoidance of the species, but suitable habitat areas may be crossed and altered by construction activities. Adopting conservation measures such as those recommended by MDC could aid in minimizing effects on the western prairie fringed orchid. Coordination with federal and state resource agencies should continue concerning the potential to affect the western prairie fringed orchid or suitable habitats, with the goal of impact avoidance, minimization, or mitigation.

**Connected Actions**

Approximately 181 miles of new transmission lines and 22 miles of upgraded transmission lines would be required to power pumpstations along the Mainline, with about 12 miles of new lines for the Cushing Extension (see Section 2.14). New electrical power line segments would potentially cross native grassland habitats where the western prairie fringed orchid may occur. Construction and vegetation maintenance for transmission lines could impact the western prairie fringed orchid if the species occurs within the transmission line ROW. Transmission lines supporting 16 Mainline Project pump stations and two Cushing Extension pump stations would be located within the range of the western prairie fringed orchid in North Dakota, South Dakota, Kansas, and Nebraska. Approximately 182 miles of transmission lines would affect approximately 22 acres of emergent wetland habitats in North Dakota, South Dakota, and Nebraska where the western prairie fringed orchid could occur (see Table 3.4.3.1-1).

In the modification or construction of transmission lines, servicing electric cooperatives or their contractors would locate The ROW to avoid sensitive vegetation conditions including wetlands where practical. If the wetlands are linear they would cross them at the least sensitive feasible point.

Electrical service providers and RUS, where applicable, would coordinate with the appropriate state and federal resource agencies to identify specific locations where avoidance or minimization measures for the western prairie fringed orchid would be necessary.

### *Running Buffalo Clover*

In the Keystone Project area, running buffalo clover is known to occur on the floodplain of the Cuivre River in Cuivre River State Park in Lincoln County, Missouri. The plant also may occur within the floodplains of the Missouri, Grand, Chariton, Middle Fork Chariton, East Fork Chariton, West Fork Cuivre, Cuivre, and Missouri/Mississippi Rivers. Potential suitable habitats for running buffalo clover within the floodplains of the West Fork Cuivre River and the Cuivre River in Missouri would be surveyed prior to construction. If these surveys identify running buffalo clover, Keystone would consult with USFWS to determine appropriate mitigation measures.

MDC has developed BMPs for projects in areas where running buffalo clover is likely to occur. USFWS recommends that Keystone follow these BMPs to minimize potential impacts to running buffalo clover. These BMPs are voluntary and include:

- Project activity in the vicinity of known running buffalo clover sites should be consistent with the maintenance of open woodland habitat. Moderate disturbances such as prescribed fire and grazing should be allowed to continue in order to maintain suitable habitat.
- Do not use herbicides at running buffalo clover sites unless all of the clover plants are located and spot spraying can be conducted without contacting the clover.
- Selective harvest of timber is acceptable if clover plants are protected from physical destruction and a partial tree canopy is maintained.
- Do not mow or otherwise disrupt plants during the period of sexual reproduction (April through August).

If required to avoid impacts on running buffalo clover, Keystone would:

- Reduce the width of the construction ROW in areas where populations have been identified, to the extent possible.
- Salvage and segregate topsoil appropriately where populations have been identified to preserve native seed sources in the soil for use in re-vegetation efforts in the ROW.
- Restore habitat by using an approved seed mix provided by the NRCS or appropriate state agency.
- Collect seed to repopulate the ROW or an appropriate offsite location, or for creation of a nursery population until viable natural populations have established themselves.
- Avoid the population by rerouting around plants or boring under plants.
- Implement procedures in the ROW maintenance plan that would not allow mowing or disruption of the plants during the period of sexual reproduction (April through August).

Construction of the Mainline Project in open woodland habitats in Missouri may affect, but is not likely to adversely affect running buffalo clover. Surveys for this species would aid in avoidance of this species, but suitable habitat areas may be crossed and altered by construction activities. Adopting conservation measures such as those recommended by MDC—along with any mitigation measures developed during continued consultation, if this species is identified within the Keystone ROW—would minimize any effects on running buffalo clover. Coordination with federal and state resource agencies should continue concerning the potential to affect running buffalo clover or suitable habitats, with the goal of impact avoidance, minimization, or mitigation.

### Platte River Basin Water Depletions

In addition to the effects described above for the federally protected species, water depletions to the Platte River system in Nebraska may affect the federally protected piping plover, interior least tern, pallid sturgeon, bald eagle, and western prairie fringed orchid. Depletions include evaporative losses and consumptive use, which often is characterized as diversions from the Platte River or its tributaries, less return flows. Facilities and activities that could be associated with depletions to the Platte River system include, but are not limited to, ponds (detention, recreation, irrigation storage, stock watering), lakes (recreation, irrigation storage, municipal storage, power generation), reservoirs (recreation, irrigation storage, municipal storage, power generation), created or enhanced wetlands, hydrostatic testing of pipelines, wells, diversion structures, dust abatement, and water treatment facilities. Any actions that may result in a water depletion to the Platte River system should be identified. Overall, if specific proposed project activities result in the consumptive use of Platte River system water, these activities would need to be identified and the amount and timing of the depletion calculated and provided to the USFWS.

Since 1978, USFWS has concluded in all of its ESA Section 7 consultations on water projects in the Platte River basin in Nebraska that the Platte River ecosystem is in a state of jeopardy, and that any federal action resulting in further water depletion to the Platte River system will further or continue deterioration of the stressed habitat conditions. Due to the cumulative effect of many water depletion projects in the Platte River basin, USFWS considers any depletion of flows (direct or indirect) from the Platte River system to be significant. Consequently, USFWS has adopted a jeopardy standard for all Section 7 consultation on federal actions that result in water depletions to the Platte River system in Nebraska, Colorado, and Wyoming. USFWS considers the Platte River and its associated wetland habitats to be resources of national and international importance.

The Keystone Project potentially would use water from the Lower Platte River basin, including the Elkhorn River (MP 505), and the Platte River (MP 543) for hydrostatic testing, which could result in an instream flow depletion to the lower Platte River. Such depletion would adversely affect federally listed species, as described above. USFWS's primary concern is the potential effects of hydrostatic testing on the Platte River system during the February-through-July period. Keystone anticipates that testing and discharge would occur during spring, summer, and fall months. For water bodies that contain sensitive species, Keystone will generally avoid withdrawal of hydrostatic test water until after August 1, unless specific approval is obtained in advance from the appropriate regulatory or resource agency(ies).

Keystone is responsible for acquiring all permits required by federal, state, and local agencies for procurement of water and for discharge of water used in the hydrostatic testing operation. Keystone anticipates that the pipeline would be hydrostatically tested in approximately 30-mile sections (maximum of 50-mile sections). This process includes filling the line with water, pressurizing the section to at least 1.25 times the maximum allowable operating pressure, and maintaining that pressure for a period of 8 hours. Water used for the testing then would be transferred to another pipe section for subsequent hydrostatic testing. Once testing is completed, the water would be returned to the drainage (discharged).

Assuming a 30-mile average test section length, the Mainline Project would require approximately 36 test sections. The volume of water required to test one 30-mile section of 30-inch-diameter pipeline is about 18 acre-feet. Assuming that test water could be reused in three test sections, 12 withdrawals would be required (36/3), and a total volume of approximately 216 acre-feet of water would be required for testing the entire Mainline Project. Assuming that approximately 150 miles of the Mainline Project through Nebraska would be hydrostatically tested using water from the Lower Platte River Basin; approximately 36 acre feet (five 30-mile test sections, and reuse of water to test three sections) would be required for a one-time use. Keystone has agreed that water withdrawn from the Lower Platte River basin for hydrostatic testing activities would be returned to the same location during a 30-day period.

Average monthly flow rates for potential water sources including the Elkhorn River, and the Platte River during 2000 to 2006 are presented in Table 3.8.1-16. The total volume required for testing this section of the Mainline Project as calculated above (36 acre-feet) represents between 6 and 11 percent of the average monthly flow as acre-feet/day for the Elkhorn River (Figure 3.8.1-1), and between 2 and 15 percent of the average flow for the Platte River (Figure 3.8.1-1) from August through January. Keystone's Draft Hydrostatic Test Plan (Appendix B), however, indicates estimated volumes of 26.6 acre-feet for the Elkhorn River and 1.1 acre-feet for the Platte River—or 8 percent and 1 percent, respectively, of the lowest daily flow rates for these water sources during August (Table 3.1.1-16).

For hydrostatic test withdrawal and discharge activities associated with the Platte River, Keystone would notify USFWS and the Nebraska Department of Natural Resources during construction of the anticipated hydrostatic test and withdrawal period. To avoid impacts on federally protected species in the Lower Platte River basin, Keystone would:

- Provide a detailed hydrostatic test plan that describes the specific test sections; quantities of water required by water source; location, timing, and duration of withdrawals; and location, timing, and duration of discharges including:
  - An estimate of the amount and timing of average annual water use (both historical and new uses) and the methods of arriving at such estimates;
  - The location of where water use or diversion occurs, as specifically as possible;
  - If and when the water would be returned to the system; and
  - For what purpose the water is being used.
- Maintain adequate flow rates in water bodies used for water withdrawal for HDD and hydrostatic testing by limiting withdrawal to not more than 10 percent of the ambient stream flow to protect aquatic life, provide for all water body uses, and provide for downstream withdrawals of water by existing users, in compliance with regulatory and permit requirements.
- Avoid water withdrawal from February 1 through July 31 in the Lower Platte region.
- Ensure that hydrostatic test water is withdrawn and discharged in the same watershed and that no chemicals are added to the hydrostatic test water.
- Ensure that no discharge of any water occurs that contains oil or other substances in a sufficient amount to create a visible color film or sheen on the surface of the receiving water.
- Ensure that the pipeline is cleaned prior to the hydrostatic testing.

**TABLE 3.8.1-16**
**Average Monthly Stream Flows for Potential Hydrostatic Test Water Sources in the Lower Platte River Basin along the Keystone Project Route**

| | Elkhorn River at Norfolk, Nebraska (USGS 06799000) | | | Platte River near Duncan, Nebraska (USGS 06774000) | | |
|---|---|---|---|---|---|---|
| | cfs | ac-ft/ day | ac-ft/ mo | cfs | ac-ft/ day | ac-ft/ mo |
| January | 295 | 585 | 17554 | 1,040 | 2,063 | 61,884 |
| **February** | **362** | **718** | **21,540** | **1,140** | **2,261** | **67,835** |
| **March** | **536** | **1,063** | **31,894** | **1,310** | **2,598** | **77,950** |
| **April** | **985** | **1,954** | **58,612** | **1,110** | **2,202** | **66,050** |
| **May** | **772** | **1,531** | **45,937** | **1,130** | **2,241** | **67,240** |
| **June** | **645** | **1,279** | **38,380** | **550** | **1,091** | **32,727** |
| **July** | **259** | **514** | **15,412** | **153** | **303** | **9,104** |
| August | 165 | 327 | 9,818 | 120 | 238 | 7,140 |
| September | 173 | 343 | 10,294 | 205 | 407 | 12,198 |
| October | 208 | 413 | 12,377 | 387 | 768 | 23,028 |
| November | 280 | 555 | 16,661 | 606 | 1,202 | 36,060 |
| December | 306 | 607 | 18,208 | 944 | 1,872 | 56,172 |

cfs = Cubic feet per second.
ac-ft/day = Acre-feet per day.
ac-ft/mo = Acre-feet per month.

Notes:

Values are monthly averages during the 6-year period from September 2000 to September 2006.

**Boldface text** indicates months of particular concern for water withdrawal (John Cochnar, USFWS, May 27, 2007)

Sources: USGS Surface-Water Monthly Statistics for the Nation. Data accessed online at <http://waterdata.usgs.gov/nwis> on May 31, 2007. Potential source waters identified by USFWS (John Cochnar, USFWS, May 27, 2007).

## 3.8.2 State-Listed Threatened and Endangered Species

In addition to the federally protected species described above, six of the seven states crossed by the Keystone Project maintain state statutes and lists of endangered and threatened animals and plants. The following sections describe species identified during consultation with state agencies as potentially occurring within the Keystone Project area that could be affected by Project construction and that are protected by the states as endangered or threatened species.

Keystone coordinated development of species surveys and avoidance, minimization, and mitigation measures with the following state wildlife agencies that have state statutes related to endangered and threatened animals or plants:

- South Dakota Game, Fish and Parks (SDGFP);
- Nebraska Game and Parks Commission (NGPC);
- Kansas Department of Wildlife and Parks (KDWP);

- Missouri Department of Conservation (MDC);
- Illinois Department of Natural Resources (IDNR); and
- Oklahoma Department of Wildlife Conservation (OKDWC).

Keystone coordinated development of species surveys and avoidance, minimization, and mitigation measures with North Dakota Game and Fish Department (NDGFD) for federally listed species occurring within North Dakota, which are described in the preceding section.

#### 3.8.2.1 State-Protected Birds

State-listed threatened and endangered birds include waterbirds (king rail, least bittern, and yellow-crowned night heron) raptors (northern harrier, osprey, and barn owl), loggerhead shrike, Henslow's sparrow, and greater prairie-chicken (Table 3.8.1-1). Habitat preferences, distribution, and lifecycles for these species are discussed below.

##### Waterbirds – King Rail, Least Bittern, and Yellow-Crowned Night Heron

The king rail, least bittern, and yellow-crowned night heron are state listed as threatened or endangered in Illinois or Missouri. King rails have been documented in Seward County, Nebraska; and suitable habitat for this species occurs along the ROW in Buchanan, Carroll, Chariton, Lincoln, and St. Charles Counties is Missouri. Least bittern have been documented in Buchanan, Chariton, Lincoln, and St. Charles Counties in Missouri, and in Madison and Fayette Counties in Illinois. Yellow-crowned night herons have been recorded within 5 miles of the pipeline ROW in Fayette County, Illinois; and a rookery is located in Pontoon Beach (ENSR 2006a).

Bitterns, and rails nest in wetland habitats with dense stands of emergent vegetation. King rails prefer extensive wetlands with abundant grasses, sedges, rushes, and cattails. Nest sites are in herbaceous cover over shallow water in river floodplains. Adult king rails molt completely after nesting and are flightless for nearly a month after breeding between April and June. Least bittern nest from May to July. The yellow-crowned night heron nests in trees, either singly or colonially. Nesting colony sites are used year after year.

##### Raptors – Northern Harrier, Osprey, and Barn Owl

The northern harrier is state listed as endangered in Missouri and Illinois, the osprey is state listed as threatened in South Dakota and as endangered in Illinois, and the barn owl is state listed as endangered in Missouri and Illinois. Raptor surveys along the Keystone Project ROW identified northern harriers in South Dakota. These birds are ground nesters; they use marshes, meadows, grasslands, and cultivated fields for nest sites. Harriers may perch on the ground, or on stumps or fence posts. Nests are commonly found near low shrubs, in tall weeds or reeds, and sometimes in bogs, on top of low shrubs above the water, or on knolls or shrubby ground near water.

Ospreys build large nests in living or dead trees, but will also use artificial structures such as telephone poles or microwave towers. No ospreys were identified by state resource agencies as occurring within the Keystone Project ROW. They are most likely to occur along the ROW as migrants, although there are two hack sites for the purpose of re-establishing this species at the Missouri River crossing of the Mainline Project ROW in Yankton County, South Dakota. Raptor surveys along the Mainline Project and Cushing Extension ROWs did not identify any natural osprey nests.

Barn owls nest in cavities, cliff crevices, cut bank burrows, or barns. They have been observed in the Carlyle Lake area of the Keystone ROW. The breeding season for barn owls is late winter, spring, and early summer. Barn owls feed primarily on rodents.

### Loggerhead Shrike

The loggerhead shrike is state listed as threatened in Illinois and is a species of conservation concern in Missouri. Loggerhead shrikes have been reported from Buchanan County in Missouri and Bond, Fayette, and Marion Counties in Illinois. Loggerhead shrikes may nest in the Carlyle Lake WMA, and Keystone plans to complete pre-construction surveys for this species at this location (ENSR 2006c).

The loggerhead shrike nests in open habitats with mixed shrublands and hedgerows with scattered thorny trees. Nesting peaks in late April in Missouri and in Illinois, with a second peak in late May in Missouri. Grasshoppers comprise a large portion of their diet and they are susceptible to pesticides—both through actions on their prey and through bioaccumulation.

### Henslow's Sparrow

The Henslow's sparrow is state listed as endangered in Illinois and is a species of conservation concern in Kansas and Missouri. The sparrow nests in tall-grass prairie habitats and has been reported from Butler, Dickinson, and Nemaha Counties in Kansas; Randolph and Clinton Counties in Missouri; and Marion County in Illinois. No large grassland habitats suitable for Henslow's sparrows would be crossed by the Keystone Project in Illinois, and Keystone does not plan to complete pre-construction surveys specific to this species. However, the species likely would be documented during general nesting surveys that would be required if construction occurred during the breeding season. Meadows, open grasslands, abandoned fields with wet areas, dense grass-forb mosaics, and scattered small woody shrubs appear are essential habitat for Henslow's sparrows. Nesting occurs from April to July.

### Greater Prairie-Chicken

The greater prairie-chicken is state listed as endangered in Missouri and is a species of conservation concern in North Dakota. Along the Keystone ROW, greater prairie-chickens have been reported from Sargent County in North Dakota and Audrain County in Missouri. Greater prairie-chickens nest in mixed-grass and tall-grass prairies bordered by oak forests and croplands; they are non-migratory. Prairie-chickens form leks during mating, with hens establishing nests in the vicinity of displaying males. This concentration of nesting and traditional use of habitats makes identification and preservation of lek habitats a priority in preservation of the species.

Summer diets are primarily insects, especially grasshoppers. At other times of the year prairie-chickens eat grains, fruit, leaves, flowers, shoots, and seeds. Population declines are attributed primarily to loss and fragmentation of tall-grass prairie, and competition from introduced ringneck pheasants.

## 3.8.2.2 State-Protected Mammals

The river otter is the only state-listed threatened and endangered mammal identified as potentially affected by the Keystone Project (Table 3.8.1-2). Habitat preferences, distribution, and lifecycle are discussed below.

### River Otter

The river otter is state listed as threatened in Nebraska and recently was removed from listing in Illinois. For the Keystone Project, river otters have been documented at the Elkhorn and Platte River crossings in Stanton and Colfax Counties in Nebraska. They are also known to occur within 5 miles of the ROW in Illinois.

River otters use rivers, streams, lakes, ponds, marshes, and beaver ponds—especially near water bodies with wooded shorelines or nearby wetlands. When resting or bearing young, river otters use hollow logs, spaces under roots, logs, or overhangs; abandoned beaver lodges; and dense thickets near water or burrows of other animals. Although otters are generally highly mobile, during the denning season (March to September), they are tied to a particular den site. In Nebraska, otter pups are born between March 1 and May 31 and do not leave the den for 2 months after birth. The pups may remain near the den site for a month after leaving the den. Otters may use dens built by beavers or other animals. Brush piles, root areas under large trees, and similar sites also may be used as temporary homes. The presence of beavers, existing dens, and the ponds they create provide ideal otter habitat.

## 3.8.2.3 State-Protected Amphibians and Reptiles

State-listed threatened and endangered amphibians and reptiles are shown in Table 3.8.1-3; these include the Illinois chorus frog, massasauga, Kirtland's snake, western fox snake, and false map turtle. The distribution, habitat preferences, and lifecycles for these species are discussed below.

### Illinois Chorus Frog

The Illinois chorus frog is state listed as threatened in Illinois and is found in sand prairies, sandy agricultural fields, and waste areas. Chorus frogs have been recorded within 5 miles of the ROW in Madison County, Illinois.

Chorus frogs burrow in the sand and emerge after heavy, early spring rains to breed in nearby flooded fields, ditches, and other vernal ponds. Chorus frogs may breed in other soil types and require ephemeral pools for breeding, which are often located at the edges of sand units. Breeding occurs between February and May but most often occurs in March and April in association with heavy (greater than 2.5 centimeter) rainfalls (ENSR 2006c).

### Massasauga

The massasauga rattlesnake is state listed as threatened in Nebraska. Nebraska lists the massasauga at a species level, using the common name for the western subspecies. Massasauga accounts have been recorded in the Keystone Project area within Jefferson and Gage Counties in Nebraska. See Section 3.8.1.3 for additional information presented for the eastern massasauga.

### Kirtland's Snake

The Kirtland's snake is state listed as threatened in Illinois and as a species of possible occurrence in Missouri based on a single recorded occurrence from 1964. Its distribution is limited to a few states, including Illinois and Missouri, and it may be found in the Keystone Project area. This species also has been recorded within 5 miles of the ROW in Fayette County, Illinois. Currently, the USFWS Endangered Species Office is assessing the population viability throughout the range.

The Kirtland's snake is a small, slender snake, characterized by a reddish belly with conspicuous dark spots and two lines of dark spots along each side of the body. It is a reclusive species—spending long periods under objects or underground, making its detection difficult. The snake commonly uses crayfish burrows for cover and underground passageways; this exposes them to less severe temperature extremes and provides food sources, such as earthworms and slugs.

The Kirtland's snake typically inhabits moist grassy areas close to water bodies. This includes prairie fens, wet meadows, wet prairies associated with lake plains, open and wooded wetlands, seasonal marshes, open swamps, sparsely wooded hillsides, and the vicinities of ponds and sluggish creeks. The snake also has been found in vacant lots of urban settings among debris in damp habitats.

Mating has been reported throughout the year, with females giving birth in summer or early autumn. Peak activity occurs in April and October. During winter, the snake often hibernates in crayfish burrows; it emerges in early spring, when mating has been observed.

Due to the loss of prairie wetland habitat, the Kirtland's snake is confined to the north-central Midwest. Its home range appears to be relatively small because of separation barriers, such as highways, bodies of water, and densely urbanized areas dominated by buildings and pavement. Although this species is difficult to survey and its range appears to be continuous, populations are isolated to remaining patches of suitable habitat. Many previous populations are considered extant from habitat loss and degradation.

### Western Fox Snake

The western fox snake is state listed as endangered in Missouri, primarily because of habitat loss. The species has been found in northwestern Indiana, Illinois, Iowa, western Michigan, Minnesota, Missouri, Nebraska, South Dakota, and Wisconsin. In the Keystone Project area, western fox snakes have been recorded in Lincoln and Buchanan Counties in Missouri.

The western fox snake prefers the open forests, prairies, and croplands located near water sources. Although the fox snake is an exceptional climber, it spends the majority of its time on the ground or in burrows hunting rodents and amphibians. The home range of this species is relatively unknown; however, snakes in this family have been known to move several kilometers between suitable habitat sites. Peak activity occurs between late April and October. During the winter months, small mammal burrows are commonly used for hibernation dens. Mating occurs in April, with females laying eggs in May or June and hatchlings appearing in August or September.

### False Map Turtle

The false map turtle is state listed as threatened in South Dakota. The geographic range of the false map turtle extends from the eastern half of the United States and into Canada. In the United States, the turtles populate areas of the Mississippi and Missouri Rivers and their basins in Illinois, Kansas, Missouri, Nebraska, North Dakota, and South Dakota. Relative to the Keystone Project area, this species occurs near the Missouri River crossing in Yankton County, South Dakota. It also has been documented near Gavin's Point along the Missouri River.

The false map turtle is named from the web pattern covering their entire carapace, similar in appearance to a road map across the shell. The reptiles are particularly fond of large rivers and backwaters, but also may reside in bayous, oxbows, lakes, ponds, sloughs, drowned forests, and occasionally marshes. They prefer fresh water with slow currents, places to bask, and abundant aquatic vegetation. Oxbows and backwaters with emergent vegetation are important habitats for young-of-year turtles. Movement may be restricted by barriers such as highways or topography, and their limitation to aquatic or wetland habitats.

Mating occurs twice a year—once in April and again in October and November. Erosion along the Missouri River has removed sloping banks and sandy beach habitats that these animals prefer for nest sites. The turtles cannot climb up the steep or stabilized banks that remain.

Missouri and South Dakota have reported declining natural populations attributable to water pollution, river channelization, reduction in suitable nesting sites, siltation, and unlawful shooting. Populations also have been decimated due to the pet trade. For several river miles below Kansas City and St. Louis, Missouri, the false map turtle has become uncommon or extirpated.

#### 3.8.2.4 State-Protected Fish and Mollusks

State-listed endangered or threatened fish and mollusks that could be affected by the Keystone Project are listed in Table 3.8.1-4. The following sections describe the distribution, habitat, and lifecycles of these species.

##### Chestnut Lamprey

The chestnut lamprey is state listed as threatened in Kansas. Chestnut lampreys live in certain large streams and small rivers of the Red, St. Croix, and lower Mississippi River systems. Surveys have not been completed to determine whether these lampreys would be found in the Keystone Project area. Adults can be found in nearly any habitat in these streams, where they are often are found attached to the sides of their prey. Spawning occurs in smaller tributary streams in swift shallow riffles where the gravel is clean. Eggs are laid in a nest during spring or summer. The larvae bury themselves in soft silt and muck in areas of quiet water with some aquatic vegetation. Only active at night, during the day they hide from the light under rocks or under the cover of river banks. Areas suitable for spawning have diminished because of siltation and pollution. The deterioration of river environments threatens their food supply, and toxic chemicals can cause mortality. Eutrophication can cause mortality in the young.

##### Lake Sturgeon

The lake sturgeon is state listed as endangered in Missouri and Illinois, and as threatened in Nebraska. This species is generally bottom-dwelling and found in large rivers and shallow areas of large lakes. Surveys have not been completed to determine whether these fish would be found in the Keystone Project area.

The habitats most commonly associated with the species are silt-free deep-run and pool habitats of rivers—generally lacking aquatic vegetation. Over-fishing, habitat alteration, and pollution have turned this species from one of the most abundant large fishes into one of the rarest. Poor water quality and migration barriers (locks and dams) continue to prevent recovery in the lower Mississippi River.

The spawning season for lake sturgeon spans the months of April, May, and sometimes June. Males do not reach sexual maturity until they are 20 years old, and females are usually 25 years old before they spawn for the first time. Females spawn only every 4 to 6 years, while the males usually spawn every other year. Lake sturgeon generally migrate long distances to reach suitable spawning habitat. Dams and other navigation devices can interfere with this migration and force sturgeon to spawn in unsuitable areas. Spawning occurs in gravelly tributary streams of rivers and lakes, although rocky, wave-swept areas near islands can serve as alternative locations.

### Flathead Chub

The flathead chub is state listed as threatened in Kansas and as endangered in Missouri. It is found in large schools over shallow, sandy bars in smaller tributary streams. This fish can survive quite well in turbid water, which historically characterized the Missouri River. Currently, it is commonly found in pools and riffles in the river. In the Keystone Project area, the flathead chub is known to occur in the Missouri and South Fork Nemaha Rivers in Kansas.

The greatest threats to the flathead chub are non-point source pollution and mainstem impoundments affecting natural flow regimes. Other threats across its range include dewatering of rivers from irrigation and degradation of riparian areas.

This species relies on flood flows to spawn successfully. Spawning occurs from June 1 to August 15, after water levels have subsided from peak flows and when water temperatures are warmer and the substrate is more stable.

### Silver Chub

The silver chub is state listed as endangered in Kansas as of 2005 and as a species of conservation concern in Missouri. Its entire range is from Lake Erie south throughout the Mississippi, Ohio, and Alabama River drainage basins. In the Keystone Project area, silver chubs have been reported in streams in Cowley County, Kansas, and in Chariton County, Missouri. Once common in the Kansas River, there have been no records or their presence since 1980. Large reservoirs, predators, and competition have contributed to the decline of the silver chub.

The silver chub is considered a big river chub because it lives in large, sandy rivers. Little is known about the reproductive biology of this species, but it is believed to spawn from late May through June in open water areas of large streams and lakes.

### Sturgeon Chub

The sturgeon chub is state listed as threatened in South Dakota and Kansas, endangered in Nebraska, and as a species of conservation concern in Missouri. Sturgeon chubs have been reported from the Platte and Missouri Rivers in South Dakota, Nebraska, Kansas, and Missouri; they may occur in the Keystone Project area. The species once inhabited the Yellowstone and Missouri Rivers, the Mississippi River downstream from the mouth of the Missouri, and many of the large tributaries of the Yellowstone and Missouri Rivers. This distribution has been greatly reduced because of changes in the flow regime and turbidity, and non-point source pollution.

The sturgeon chub prefers large turbid sandy rivers over a substrate of small gravel and coarse sand. It is often found in areas swept by currents—especially at heads of islands or exposed sandbars. This chub is relatively short lived (4 years) and does not reproduce until it reaches its second year. The spawning period is from late spring to midsummer.

### Sicklefin Chub

The sicklefin chub is state listed as endangered in South Dakota and Kansas, and as a species of conservation concern in Nebraska and Missouri. In the Keystone Project area, these fish are found in South Dakota, Nebraska, Kansas, and Missouri in the Platte and Missouri Rivers. The populations have been on a serious decline from changes in impoundments, channelization, and regulated flow. Although

the species has been sampled in shallow water and rocky substrate, there seems to be a general preference for deeper, turbid water and sandy substrate. It is often found in association with the sturgeon chub.

The sicklefin chub reaches a maximum age of 4 years and generally becomes sexually mature in its second year. Spawning occurs in main channel areas of the large turbid rivers that they inhabit. The spawning period is in summer and probably occurs over a wide time span—similar to other big river species.

### Arkansas River Speckled Chub

The Arkansas River speckled chub is listed as endangered in Kansas. The species prefers shallow channels of perennial streams with clean fine sand. Speckled chubs avoid calm waters and silted stream bottoms. In the Keystone Project area, the chub is found in the lower Arkansas River and its major tributaries. Speckled chubs are broadcast spawners, producing nonadhesive, semibuoyant eggs that drift downstream. Spawning occurs during May 15 to August 31 after a sharp rise in stream flow, when water temperatures are above 70° F. Eggs drift downstream with the strong current.

### Western Silvery Minnow

The western silvery minnow is listed as threatened in Kansas and as a species of conservation concern in Missouri. Historically, the species' range in the United States extended from Montana to Ohio, and southward to the Gulf States. Today, it is common only in the Missouri River and adjacent creeks and backwaters, where the minnow is often found behind wing dikes, revetments, and other protected shoreline habitats. Western silvery minnows are known to occur in the Missouri and South Fork Big Nemaha Rivers in Kansas and in the Missouri River in Missouri; they may be found in the Keystone Project area.

The western silvery minnow prefers relatively deep, quiet waters with sluggish flow and bottoms of silt or sand in large, turbid rivers and prairie streams. In streams, they are typically found in water less than 1 foot deep and shallow shore water heavily vegetated with emergent grasses and reeds. In protected areas of large rivers, they move in large schools of 50 to 100 individuals along the bottom in deep, quiet water. The greatest threats to the western silvery minnow are non-point source pollution, water depletion from irrigation, degradation of riparian areas, and mainstem impoundments affecting natural flow regimes.

Western silvery minnows spawn from June 1 to August 15. Prior to spawning, adults migrate to well-vegetated lagoons or slow-moving lower reaches of tributary streams. The eggs probably are scattered on silt substrate in the quiet waters.

### Silverband Shiner

The silverband shiner is state listed as threatened in Kansas, where it has been documented in the Missouri River. The silverband shiner is found in the slow-flowing pools of large, turbid rivers, such as the Missouri and lower Mississippi Rivers. Surveys have not been completed to determine whether these fish would be found in the Keystone Project area.

Habitat changes that occurred after large rivers were dammed and channelized have been detrimental to the population of the silverband shiner and several other large river fish species.

This fish can tolerate extremely turbid conditions and is usually found in moderate to swift current near sandy or gravelly bars. It also may be found in schools with several other minnow species. Little information is known regarding its reproductive biology, but it probably spawns in late spring or summer.

### 3.8.2.5 State-Protected Plants

Table 3.8.1-5 provides the state-listed plant species potentially occurring in the Keystone Project area, including the small white lady's slipper, royal catchfly, prairie spiderwort, and spring ladies' tresses. The distribution, habitat preferences, and lifecycles for these species are discussed below.

#### Small White Lady's Slipper

The small white lady's slipper is state listed as threatened in Nebraska. This species is found in wet prairie habitats, mesic blacksoil prairie, wet blacksoil prairie, glacial till prairie hillsides, sedge meadows, calcareous fens, and glades. Known distributions of small white lady's slipper include wetland areas in the Keystone Project area in Nebraska. The plant is generally associated with calcareous soils and flowers from May to June.

#### Royal Catchfly

Royal catchfly is state listed as endangered in Illinois and has been recorded within 5 miles of the Keystone ROW in Madison County, Illinois. The royal catchfly is a large (2 to 5 feet) perennial herb that grows from a fleshy taproot. They produce scarlet-crimson flowers during late-May through October and primarily are pollinated by the ruby-throated hummingbird. The royal catchfly is found in mesic black soil prairies, openings in upland forests, savannas, scrubby barrens, and open areas along roadsides and railroads. This plant is endemic of tall-grass prairie habitats, with only a few, scattered remnant populations. Many of the remaining population remnants are found along roadsides, where they are vulnerable to construction and management of roadside vegetation.

#### Prairie Spiderwort

The prairie spiderwort is state listed as threatened in Illinois and has been recorded within 5 miles of the Keystone ROW in Madison County, Illinois. This plant is a perennial forb from 2 to 3 feet tall that prefers sandy soils and appears to be most abundant where grazing is light to moderate. The plant is found primarily in tall-grass prairie biome, generally in western Illinois and further west. Prairie spiderworts, typical of dry prairies and dry sand prairies, produce multiple 1- to 2-inch, three-petaled purple flowers from May 1 to June 1.

#### Spring Ladies' Tresses

Spring ladies' tresses are state listed as endangered in Illinois. This plant is a small (2 to 5 inches) perennial orchid that is typically found in upland dry to mesic forests, dry to mesic prairies, or cultivated fields. It produces white flowers in a spiraling pattern on upright bracts during June through August. Spring ladies' tresses have been documented within 5 miles of the Keystone ROW in Madison County, Illinois.

### 3.8.2.6 Potential Impacts and Mitigation for State-Protected Species

## State-Protected Birds

Impacts on state-listed birds (Table 3.8.1-1) and their habitats related to construction of the Keystone Project would be similar to the general impacts described for federally listed bird species (see Section 3.8.1.6). Any specific impacts or mitigation measures that have been identified for state-listed species are discussed below.

### *Waterbirds – King Rail, Least Bittern, and Yellow-Crowned Night Heron*

Table 3.8.2-1 describes four functionally intact or extensive wetland complexes based on wetland survey data along the Mainline Project ROW in Chariton, and Lincoln Counties, Missouri. Habitats were assessed for structural complexity with open water and vegetation dominated by sedges and cattails that may provide suitable habitat for the king rail; three of the four sites were surveyed for king rail occurrence.

**TABLE 3.8.2-1**
**King Rail, Least Bittern, and Yellow-Crowned Night-Heron Suitable Habitats Potentially Affected by the Keystone Project Route**

| Milepost | State, County | Wetland Description (Species) | Comments |
|---|---|---|---|
| 841.1 | Missouri, Chariton | Open water and emergent wetland – sedge (king rail) | Floodplain along the Grand River – no king rails found |
| 841.7 | Missouri, Chariton | Forested wetland transitions to emergent wetland – sedge (king rail) | Floodplain along the Grand River – no king rails found |
| 842.0 | Missouri, Chariton | Intermittent stream, emergent wetland – sedge (king-rail) | Floodplain along the Grand River – no king rails found |
| 973.8 | Missouri, Lincoln | Emergent wetland – rice cutgrass and bushy seedbox, pond (king rail) | Good habitat, open water and emergent vegetation – no survey |
| 1073.4–1077.4 | Illinois, Fayette | No wetland description available - (loggerhead shrike, least bittern, yellow-crowned night heron) | Carlyle Lake Wildlife Management Area – 70.4 acres Desktop survey only |

Sources: ENSR 2007b, k.

MDC has developed BMPs for projects in areas where the king rail is likely to occur. Applicable BMPs are voluntary and include:

- Avoid altering natural swales and other topographic features that are potential habitat for king rails.
- No work should be allowed below the high bank of streams or below water levels in wetlands between April 1 and July 15 to prevent disrupting breeding activities.
- Revegetate disrupted areas with native wetland species.
- Erosion and sediment controls should be implemented, maintained, and monitored for the duration of the project.

To reduce impacts to state-protected waterbirds, Keystone would:

- Restrict construction activities within a 0.25-mile buffer of an active nest during the appropriate breeding season.
- Conduct follow up surveys prior to resuming construction within 0.25 mile of an active nest site, to verify that the nest site is no longer active.
- Restore habitat to pre-construction conditions.

The following additional measures could further reduce impacts to state-protected waterbird species:

- Conducting surveys at the four sites identified in Table 3.8.2-1 for the presence of king rails during the first week of May or after April 20. Observers should be able to distinguish king rails from other rail species by sight and sound (Andrew Forbes, MDC, February 15, 2007).
- To prevent disrupting breeding activities, prohibiting construction between April 1 and July 15 if king rails are identified at the sites described above.
- Conducting surveys for least bittern and yellow-crowned night herons at Carlyle Lake in Fayette County, Illinois, as these species are known to occur at Carlyle Lake (Joe Smothers, COE, February 6, 2007).
- Avoiding construction in areas with documented nest sites until after young of these species have fledged (John Cochnar, USFWS, April 28, 2006).

Construction of the Mainline Project in Missouri and Illinois may affect, but is not likely to adversely affect nesting, brood-rearing, and foraging waterbirds and their habitats in the floodplain of the Grand River in Chariton County, Missouri and at the Carlyle Lake WMA in Fayette County, Illinois. Coordination with USFWS and state agency wildlife biologists should continue, with the goal of impact avoidance, minimization, or mitigation.

### *Raptors – Northern Harrier, Osprey, and Barn Owl*

Table 3.8.2-2 provides locations of raptor nests and breeding territories identified during aerial surveys of the floodplains of major rivers that potentially would be affected by the Keystone Project. A pair of barn owls is known to nest at the north end of Carlyle Lake, in the Carlyle Lake WMA in Fayette County, Illinois.

Keystone completed an aerial survey prior to leaf out in spring 2007 along the entire Keystone Project route to locate active and inactive raptor nest sites in deciduous trees and breeding territories within the Project ROW. No additional northern harriers, osprey, or barn owls were recorded during these surveys; however, survey design was not ideal for identification of ground- and cavity-nesting species such as the northern harrier and barn owl. In addition, pre-construction bird surveys would be conducted in tracts of grasslands, marshes, or other open grassy habitats for the presence of adult birds, young, or nests between May and July, if pipeline construction occurs during the breeding season.

**TABLE 3.8.2-2**
**Raptor Nests and Breeding Territories Potentially Affected by the Keystone Project Route**

| Milepost | State, County | Species | Activity | Summary |
|---|---|---|---|---|
| 271.6 | South Dakota, Day | Northern harrier | Probable occupied territory | Female flushed from cattails, high probability of nest in area |
| 286.9 | South Dakota, Clark | Northern harrier | Unknown | Female flushed from meadow, no nest observed |
| 435.5 | South Dakota, Yankton | Osprey | Hack site | 450 feet from ROW |
| 435.5 | South Dakota, Yankton | Osprey | Hack site | 750 feet from ROW |

Sources: ENSR 2006a, 2007a.

MDC has developed BMPs for projects in areas where the northern harrier is likely to occur. Applicable BMPs are voluntary and include:

- Prairies and native grass plantings should be maintained whenever possible.
- Open areas such as pastures, cropland, native grass plantings, and marshes where harriers nest should not be destroyed.
- Mowing earlier than August 1 should be avoided to lessen destruction of nests.
- Use of insecticides and rodenticides in nesting areas should be minimized. Harriers can act as a natural, biological control of unwanted insects and rodents.

MDC also developed BMPs for projects in areas where the barn owl is likely to occur. All of the BMPs developed for the northern harrier, except for mowing dates, apply to the barn owl. In addition:

- If available nesting structures must be removed, barn owl nest boxes should be placed in other areas to provide alternative nesting sites.

To avoid impacts to the northern harrier and barn owl, Keystone will conduct surveys for these birds within 330 feet of the ROW if construction were to proceed during the nesting season.

Construction of the Mainline Project in Missouri and Illinois may affect, but is not likely to adversely affect nesting, brood-rearing, and foraging northern harriers, osprey, and barn owls and their habitats. Coordination with USFWS and state agency wildlife biologists should continue, with the goal of impact avoidance, minimization, or mitigation.

### *Loggerhead Shrike and Henslow's Sparrow*

The loggerhead shrike was identified as a species that potentially nests within the Keystone Project ROW in the Carlyle Lake WMA (Table 3.8.2-1). Keystone plans to complete occurrence surveys within the ROW in the Carlyle Lake WMA during the nesting season (from March through June) 2007. Additional pre-construction surveys in 2008 would not be required if construction occurred outside of the breeding season.

Because no large grassland habitats suitable for Henslow's sparrows would be crossed by the Keystone Project in Illinois, there would be little chance of effects to this species during construction.

To avoid impacts on the loggerhead shrike, Keystone would:

- Complete pre-construction nest surveys in the Carlyle Lake WMA, Fayette County, Illinois during the appropriate breeding season (March 1 through June 15).
- If nesting birds are found, restrict construction activities within a 0.25-mile area around an active nest during the appropriate breeding season.
- Conduct follow-up surveys prior to resuming construction within the 0.25-mile area around an active nest to verify that the nest site was no longer active.
- Restore habitat to pre-construction conditions.

Construction of the Mainline Project in Illinois may affect, but is not likely to adversely affect nesting, brood-rearing, and foraging loggerhead shrike if construction takes place during the nesting season. Removal of trees may affect habitats used by the loggerhead shrike in the Carlyle Lake WMA. Coordination with USFWS and state agency wildlife biologists should continue, with the goal of impact avoidance, minimization, or mitigation.

### *Greater Prairie-Chicken*

Keystone consulted with MDC concerning an appropriate approach to address Project impacts on the greater prairie-chicken. Keystone completed a telephone survey of landowners in Audrain County, Missouri, for 21 tracts of land that were identified with potentially suitable greater prairie-chicken habitat based on agency correspondence, aerial habitat surveys, wetland field surveys, USGS Land Use Land Cover Data, and aerial photography (Table 3.8.2-3).

After review of the results of the telephone survey, MDC determined that construction of the Mainline Project would not likely affect the greater prairie-chicken (Doyle Brown, MDC, February 6, 2007).

Construction of the Mainline Project in Audrain County, Missouri is not likely to affect nesting, brood-rearing, or foraging greater prairie-chickens, as this species is not likely to occur within the project ROW. If the species is observed within the project ROW during construction, coordination with state agency wildlife biologists should continue, with the goal of impact avoidance, minimization, or mitigation.

**TABLE 3.8.2-3**
**Potentially Suitable Greater Prairie-Chicken Habitats in Audrain County, Missouri along the Keystone Project Route**

| Milepost | Miles | GPC Observed | Summary |
|---|---|---|---|
| 904.3 | | No | Landowner familiar with greater prairie-chickens, no greater prairie-chickens or sign observed |
| 908.3 | 0.5 | No | Landowner unfamiliar with greater prairie-chickens, no greater prairie-chickens or sign observed |
| 908.9 | 0.3 | No | Landowner familiar with greater prairie-chickens, nests on property 6 to 7 years ago, no greater prairie-chickens or sign observed since then |

**TABLE 3.8.2-3**
**Potentially Suitable Greater Prairie-Chicken Habitats in Audrain County, Missouri along the Keystone Project Route**

| Milepost | Miles | GPC Observed | Summary |
|---|---|---|---|
| 913.9 | 0.7 | No | Landowner familiar with greater prairie-chickens, no greater prairie-chickens or sign observed |
| 914.7 | | No | Landowner unfamiliar with greater prairie-chickens, no greater prairie-chickens or sign observed |
| 914.8 | | No | Landowner familiar with greater prairie-chickens, no greater prairie-chickens or sign observed |
| 914.9 | 0.2 | No | Landowner familiar with greater prairie-chickens, no greater prairie-chickens or sign observed |
| 915.2 | 0.3 | No | Landowner familiar with greater prairie-chickens, no greater prairie-chickens or sign observed |
| 915.7 | 0.3 | No | Landowner familiar with greater prairie-chickens, no greater prairie-chickens or sign observed |
| 917.0 | 0.3 | No | Landowner familiar with greater prairie-chickens, no greater prairie-chickens or sign observed |
| 917.6 | 0.8 | No | Landowner familiar with greater prairie-chickens, no greater prairie-chickens or sign observed |
| 918.4 | 0.1 | No | Landowner unfamiliar with greater prairie-chickens, no greater prairie-chickens or sign observed |
| 918.8 | 0.3 | No | Landowner familiar with greater prairie-chickens, no greater prairie-chickens or sign observed |
| 919.1 | 0.3 | No | Landowner familiar with greater prairie-chickens, no greater prairie-chickens or sign observed |
| 919.4 | 0.1 | No | Landowner familiar with greater prairie-chickens, no greater prairie-chickens or sign observed |

GPC = Greater prairie-chicken.

Source: ENSR 2007c.

### *Connected Actions*

Approximately 181 miles of new transmission lines and 22 miles of upgraded transmission lines would be required to power pumpstations along the Mainline, with about 12 miles of new lines for the Cushing Extension (see Section 2.14). Newly constructed power lines would cross habitats that would potentially be used by state-protected birds. The primary impacts on birds would be habitat loss due to removal of vegetation within the construction work area, collision and electrocution mortality, reduction in habitat quality due to habitat fragmentation and potential invasion by noxious weeds, and reduced productivity for ground-nesting birds due to increased depredation.

New transmission lines would potentially coincide with the occurrence of state-protected bird species at the following locations:

- MP 263 Mainline PS-20: Day County, South Dakota – about 10 miles from northern harrier sighting.
- MP 310 Mainline PS-31: Clark County, South Dakota – about 22 miles from northern harrier sighting.

- MP 454 Mainline PS-34: Yankton County, South Dakota – about 18 miles from osprey hack sites.
- MP 867 Mainline PS-33: Chariton County, Missouri – line runs parallel to an existing transmission line – about 26 miles from king rail habitat sites.
- MP 982 Mainline PS-36: Lincoln County, Missouri – about 10 miles from king rail habitat site.
- MP 1053 Mainline PS-38: Fayette County, Illinois – about 20 miles from loggerhead shrike, least bittern, and yellow-crowned nigh heron habitats at Carlyle Lake WMA.

New electrical power line segments would also 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. Transmission line poles would be used as vantage perches by raptors facilitating predation on ground-nesting birds. Location of poles across grassland habitats reduces habitat suitability for ground-nesting birds.

Collision and electrocution impacts on birds resulting from the 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 RUS, where applicable, would coordinate with the appropriate state and federal resource agencies to identify specific locations for flight deterrents or other avoidance or minimization measures.

### State-Protected Mammals

General impacts on state-listed mammals related to construction of the Keystone Project would be similar to those described for federally listed mammal species (see Section 3.8.1.6). Specific impacts and mitigation measures identified for the state-listed species are discussed below.

#### *River Otter*

The river otter may be affected by habitat alteration, primarily at river crossings where this species occurs. The buried river crossings have the potential to destroy dens along the shorelines that are used by river otters. Destruction of dens with otter young likely would result in their death. Disturbance near den sites may lead to abandonment of young, lost productivity, and displacement from preferred habitats. Increased sedimentation due to runoff from construction sites near rivers would increase turbidity, reducing foraging effectiveness by affecting the otter's ability to see underwater. River otters have been reported to occur at several rivers crossed by the Keystone Project. Habitats identified during consultations with state agencies were surveyed for the presence of river otters during the denning season between March and September 2007. No signs of river otters was found along the Platte River or Elkhorn River crossings (ENSR 2007l). These areas would be surveyed again in 2008 if construction would occur

during the denning season, within 0.25 mile upstream and downstream on both banks at each of the river crossings:

- Colfax County, Nebraska – MP 542, Platte River crossing (HDD); and
- Stanton County, Nebraska – MP 502, Elkhorn River crossing (open cut).

Construction of the Mainline Project in Nebraska may affect, but is not likely to adversely affect denning river otters. If river otters or signs of river otter activity (such as dens, slides, and feeding stations) are observed at the crossing locations identified above, coordination with state resource agencies should continue, with the goal of impact avoidance, minimization, or mitigation.

### State-Protected Reptiles and Amphibians

#### *Illinois Chorus Frog*

Even though chorus frogs have been recorded within 5 miles of the ROW, no individuals were identified during a survey of the ROW through Illinois (ENSR 2006c). No documented populations would be affected by Keystone Project construction.

#### *Massasauga*

Massasauga accounts have been recorded in the Keystone Project area within Jefferson and Gage Counties in Nebraska. No surveys for this species were required or completed in Nebraska. Crossing occupied habitats during winter hibernation would likely lead to death of individual massasaugas, and crossing during breeding would cause interruption of the breeding cycle. Due to the low biological replacement rate for this species, small increases in adult mortality can cause irreversible declines.

To avoid construction-related impacts to the massasauga in Nebraska, Keystone would:

- Place biological monitors in areas of appropriate native prairie/wet prairie habitats to locate and remove snakes ahead of construction to prevent injury or destruction.
- Provide results of the survey to the NGPC to determine whether specific actions are needed to avoid impacts to the massasauga.

Construction of the Mainline Project may affect the massasauga in Nebraska. Coordination with state resource agencies should continue, with the goal of impact avoidance, minimization, or mitigation.

#### *Western Fox Snake*

Approximately 5.2 miles of suitable western fox snake habitats occur in the Mainline Project survey corridor in Buchanan, Carroll, Chariton, and St. Charles Counties in Missouri (Table 3.8.1-11). Most of these habitats were evaluated for the presence of the western fox snake during spring hibernation emergence (BHE 2007f). No western fox snakes were found during this survey (BHE 2007f).

MDC has developed voluntary BMPs for projects in areas where the western fox snake is likely to occur, including:

- Avoid removing or destroying unique habitat features, such as downed trees, logs and brush piles, that provide habitat for the western fox snake or their prey.
- Avoid draining or destroying wetland habitat that is used by the snake.

- Avoid altering water levels in wetlands where western fox snakes are present.

Construction of the Mainline Project in Missouri may affect, but is not likely to adversely affect the western fox snake and its habitats. No western fox snakes were observed during hibernation emergence surveys at the habitats identified in Table 3.8.1-11, coordination with state resource agencies should continue, with the goal of impact avoidance, minimization, or mitigation.

### *Kirtland's Snake*

The proposed Keystone Project would affect 5.1 miles of suitable habitat for the Kirtland's snake in Madison, Bond, and Fayette Counties in Illinois (Table 3.8.1-11). Kirtland's snake is known to occur in the Carlyle Lake WMA. To avoid construction-related impacts to the Kirtland's snake, Keystone would develop a conservation plan and ITA for Kirtland's snake in Illinois, with guidance from IDNR and the Illinois Natural History Survey.

Construction of the Mainline Project in Illinois may affect the Kirtland's snake and its habitats. Coordination with state resource agencies should continue, with the goal of impact avoidance, minimization, or mitigation.

### *False Map Turtle*

The proposed Keystone pipeline would potentially affect approximately 0.2 mile of false map turtle habitat in Yankton County, South Dakota (MP 431.9–432.3). False map turtles would be affected by the Keystone Project if nesting areas (sandy beaches with gently sloping shorelines) were destroyed along the Missouri River. Because the crossing of the Missouri River at Yankton would use the HDD methods, false map turtles would not be affected by pipeline construction.

## State-Protected Fish and Mollusks

General impacts on state-listed fish and mollusks related to construction of the Keystone Project would be similar to those described for federally listed fish and mollusk species (see Section 3.8.1.6). Specific impacts and mitigation measures have been identified for the state-listed species discussed below.

### *Chestnut Lamprey*

The Mainline Project would cross state-designated critical habitat for the chestnut lamprey at the Missouri River crossing in Doniphan County, Kansas. Because this river would be crossed using HDD, no river channel habitat impacts are expected. Hoses used for water withdrawal for HDD and hydrostatic testing would be placed in the water column and would not affect larval lampreys living in the sediments. HDD does carry a risk of the escape of drilling fluids, which would potentially be harmful to the chestnut lamprey. However, construction would not likely affect the chestnut lamprey.

### *Lake Sturgeon*

Impacts on lake sturgeon from construction of the Keystone Project are not likely because Keystone plans to use HDD crossings at the Missouri and Mississippi River crossings where lake sturgeon may occur (Section 3.3). HDD does carry a risk of the escape of drilling fluids into rivers at the crossings. This could result in short-term sediment transport and water quality impacts that could adversely affect the lake sturgeon. Water withdrawal for HDD (generally during spring) and hydrostatic testing (generally after August 1 in habitats with sensitive species) could affect the lake sturgeon, if spawning grounds are located near the withdrawal locations in the Missouri (two locations) and Mississippi Rivers. Protections

for aquatic life during water withdrawal for HDD and hydrostatic testing that would be implemented at the Missouri and Mississippi River crossings would be as described for the federally-protected pallid sturgeon. Keystone pipeline construction across the Missouri and Mississippi River crossings, with the implemented measures, would not likely adversely affect the lake sturgeon.

### *Flathead Chub*

The Mainline Project would cross state-designated critical habitat for the flathead chub at the South Fork Big Nemaha River in Kansas (Nate Davis, KDWP, February 12, 2007). Crossing this river by the proposed wet open-cut method would degrade the designated critical habitat and negatively affect the flathead chub.

To avoid impacts on flathead chubs and state-designated critical habitat, Keystone will:

- Not conduct instream construction activities during the flathead chub spawning period from July 1 to August 15 within the South Fork Big Nemaha River channel or at other stream crossings where this species is found unless HDD methods are used.
- Outside the spawning season, if construction would disturb streams with pool depths of 3 feet or greater, seine the pools at least 1 week prior to construction, and relocate fish upstream to a pool or location of similar depth (see Topeka shiner description of salvage relocation for condition requirements and fish handling). If a streambed is dry, or only shallow pools (less than 3 feet in depth) exist, no sampling is required.
- As part of any request for fish habitat permit authorizations, describe and implement erosion control measures. Monitor erosion and sediment controls daily during construction to ensure effectiveness, particularly after storm events, and continue to use only the most effective techniques.
- Restore banks and streams beds to pre-construction conditions, as outlined in Keystone's CMR Plan (Appendix B).

Construction of the Cushing Extension in Kansas may affect, but is not likely to adversely affect the flathead chub and state-designated critical habitat in the South Fork Big Nemaha River, with implementation of the described mitigation measures. Coordination with state resource agencies should continue, with the goal of impact avoidance, minimization, or mitigation.

### *Silver Chub*

The Cushing Extension would cross state-designated critical habitat for the silver chub in the South Fork Big Nemaha River and the Arkansas River in Kansas. The South Fork Big Nemaha River would be crossed using the wet open-cut method, and the Arkansas River would be crossed using HDD. Habitat and sampling surveys for this species were attempted in summer 2007 at the Arkansas River crossing, but water levels were too high for seining. The Arkansas River would be used as a water source for HDD and hydrostatic testing. Protections for aquatic life during water withdrawal for HDD and hydrostatic testing that would be implemented at the Arkansas River crossing would be as described for the Arkansas River shiner.

To avoid impacts on state-designated critical habitat for silver chubs, Keystone has committed to the measures listed above for the flathead chub at the South Fork Big Nemaha River and the measures specified for the Arkansas River shiner.

Construction of the Cushing Extension in Kansas may affect, but is not likely to adversely affect the silver chub or designated critical habitat in the South Fork Big Nemaha River and the Arkansas River, with implementation of the measures described for the flathead chub and the Arkansas River shiner. Coordination with state resource agencies should continue, with the goal of impact avoidance, minimization, or mitigation.

### *Sturgeon Chub*

Because the Platte and Missouri Rivers, where sturgeon chubs have been observed, would be crossed using HDD methods, pipeline construction would not affect sturgeon chubs. Use of water for HDD and hydrostatic testing may alter habitats in the Platte River used by sturgeon chub. Protections for aquatic life during water withdrawal for HDD and hydrostatic testing that would be implemented at the Platte and Missouri River crossings would be as described for the pallid sturgeon.

To avoid impacts on sturgeon chub Keystone would consult with individual states concerning potential water withdrawals from the Platte River drainage and avoid water withdrawals during February 1 through July 31 in the Lower Platte region.

Construction of the Mainline Project may affect, but is not likely to adversely affect the sturgeon cub. Coordination with state resource agencies should continue concerning potential water withdrawal from the Lower Platte River drainage, with the goal of habitat impact avoidance, minimization, or mitigation.

### *Sicklefin Chub*

Sicklefin chubs have been reported from the Platte and Missouri Rivers in South Dakota, Nebraska, Kansas, and Missouri. Because crossings of these rivers would use HDD methods, pipeline construction would not affect sicklefin chubs. Use of water for hydrostatic testing may alter habitats in the Platte River used by sicklefin chub. Protections for aquatic life during water withdrawal for HDD and hydrostatic testing that would be implemented at the Platte and Missouri River crossings would be as described for the pallid sturgeon. To avoid impacts on sicklefin chub, Keystone would implement the measures identified above for the sturgeon chub.

Construction of the Mainline Project may affect, but is not likely to adversely affect the sicklefin chub. Coordination with state resource agencies should continue concerning potential water withdrawal from the Lower Platte River drainage, with the goal of habitat impact avoidance, minimization, or mitigation.

### *Arkansas River Speckled Chub*

The Cushing Extension would cross designated critical habitat for the Arkansas River speckled chub in the Arkansas River in Kansas. This crossing would use the HDD method, and no river channel habitat impacts are expected. Water withdrawal for HDD and hydrostatic testing from the Arkansas River would follow protections for aquatic life described for the Arkansas River shiner.

Construction of the Cushing Extension in Kansas may affect, but is not likely to adversely affect the Arkansas River speckled chub or its designated critical habitat in the Arkansas River. Coordination with state resource agencies should continue, with the goal of impact avoidance, minimization, or mitigation.

### *Western Silvery Minnow*

The Mainline Project would cross state-designated critical habitat for the western silvery minnow at the South Fork Big Nemaha River in Kansas. The proposed wet open-cut crossing method would degrade this state-designated critical habitat and would negatively affect the western silvery minnow.

To avoid impacts on the western silvery minnow and state-designated critical habitat in the South Fork Big Nemaha River, Keystone would:

- Not conduct in-stream construction during the western silvery minnow spawning period from June 1 to August 15 within the South Fork Big Nemaha River channel or at other stream crossings where this species is found, unless HDD methods are used.
- Outside the spawning season, if construction would disturb streams with pool depths of 3 feet or greater, seine the pools at least 1 week prior to construction, and relocate fish upstream to a pool or location of similar depth (see Topeka shiner description of salvage relocation for condition requirements and fish handling). If a streambed is dry, or only shallow pools (less than 3 feet in depth) exist, no sampling is required.
- As part of any request for fish habitat permit authorizations, describe and implement erosion control measures. Monitor erosion and sediment controls daily during construction to ensure effectiveness, particularly after storm events, and continue to use only the most effective techniques.
- Restore banks and streams beds to pre-construction conditions, as outlined in Keystone's CMR Plan (Appendix B).

Construction of the Cushing Extension in Kansas may affect, but is not likely to adversely affect the western silvery minnow or state-designated critical habitat in the South Fork Big Nemaha River, with implementation of the described protection measures. Coordination with state resource agencies should continue, with the goal of impact avoidance, minimization, or mitigation.

### *Silverband Shiner*

The Mainline Project would cross designated critical habitat for the silverband shiner at the Missouri River crossing in Doniphan County, Kansas. Because this river would be crossed using HDD, no river channel habitat impacts are expected. Water use for HDD and hydrostatic testing would follow the protection measures described for the pallid sturgeon, which would be protective for the silverband shiner. Construction of the Mainline Project may affect, but is not likely to adversely affect the silverband shiner.

## Plants

General impacts on state-listed plants related to construction of the Keystone Project would be similar to those described for federally listed plant species (see Section 3.8.1.6). Specific areas of impact have been identified for the state-listed species discussed below. All of the potential areas of occurrence are on privately owned lands; consequently, the regulatory authority for the states of Nebraska and Illinois to protect state-listed plants on private lands is unclear. As discussed above for federally protected plants, plants are considered to be the property of the landowner.

### *Small White Lady's Slipper*

The locations of potential habitats suitable for the small white lady's slipper that could be affected by the Keystone Project are shown in Table 3.8.2-4.

**TABLE 3.8.2-4**
**Small White Lady's Slipper Habitats Potentially Affected along the Keystone Project Route**

| Milepost | State | County | Habitat Quality | Summary |
|---|---|---|---|---|
| 436.0–436.1 | Nebraska | Cedar | Not evaluated | Potential native grassland – small white lady's slipper habitat |
| 503.4–503.5 | Nebraska | Stanton | Not evaluated | Potential native grassland – small white lady's slipper habitat |
| 540.9–541.2 | Nebraska | Colfax | Not evaluated | Potential native grassland – small white lady's slipper habitat |
| 548.1–548.2 | Nebraska | Butler | Not evaluated | Potential native grassland – small white lady's slipper habitat |
| 564.4–564.7 | Nebraska | Butler | Not evaluated | Potential native grassland – small white lady's slipper habitat |
| 594.8–595.1 | Nebraska | Saline | Not evaluated | Potential native grassland – small white lady's slipper habitat |
| 606.4–606.5 | Nebraska | Saline | Not evaluated | Potential native grassland – small white lady's slipper habitat |
| 622.2–622.4 | Nebraska | Jefferson | Not evaluated | Potential native grassland – small white lady's slipper habitat |
| 635.1–636.8 | Nebraska | Jefferson | Not evaluated | Potential native grassland – small white lady's slipper habitat |
| 637.0–637.4 | Nebraska | Jefferson | Not evaluated | Potential native grassland – small white lady's slipper habitat |

Source: ENSR 2006e.

Construction of the Mainline Project in Nebraska may affect the small white lady's slipper if this species is present along the project ROW. Specific mitigation measures for the species would be developed if the plant is found to occur in the Keystone ROW within the habitats identified in Table 3.8.2-4, if this species is identified on state or federally owned lands.

### *Royal Catchfly, Prairie Spiderwort, and Spring Ladies' Tresses*

Keystone would conduct surveys for these state-listed plants prior to construction within suitable habitats crossed by the Mainline Project, if it is found that the IDNR has the authority to protect state-listed plants on private lands.

Twenty-three areas totaling 14.4 miles of Mainline Project ROW were determined appropriate to survey for one or more of these plants in Madison County, Illinois during 2007 (Charles Johnson, Keystone Pipeline Project Proposed Survey Schedule for Illinois, January 17, 2007):

- Keystone MP 1022.0 to 1022.3, royal catchfly;
- Keystone MP 1022.1 to 1022.7, prairie spiderwort;
- Keystone MP 1022.7, royal catchfly;
- Keystone MP 1023.2 to 1024.2, spring ladies' tresses;
- Keystone MP 1023.8 to 1024.1, prairie spiderwort and royal catchfly;

- Keystone MP 1024.9 to 1027.9, spring ladies' tresses;
- Keystone MP 1025.3 to 1025.6, prairie spiderwort and royal catchfly;
- Keystone MP 1026.5 to 1027.0, prairie spiderwort;
- Keystone MP 1026.5 to 1027.4, royal catchfly;
- Keystone MP 1028.0 to 1033.1, royal catchfly;
- Keystone MP 1029.0 to 1033.1, prairie spiderwort and spring ladies' tresses;
- Keystone MP 1034.2 to 1034.3, prairie spiderwort, royal catchfly and spring ladies' tresses;
- Keystone MP 1036.7 to 1037.1, royal catchfly;
- Keystone MP 1037.8 to 1037.9, royal catchfly;
- Keystone MP 1040.6 to 1041.1, royal catchfly;
- Keystone MP 1040.7, prairie spiderwort;
- Keystone MP 1040.7 to 1041.2, spring ladies' tresses;
- Keystone MP 1042.5 to 1042.8, royal catchfly;
- Keystone MP 1042.8 to 1043.0, spring ladies' tresses;
- Keystone MP 1045.2 to 1048.0, spring ladies' tresses;
- Keystone MP 1045.5 to 1047.0, royal catchfly;
- Keystone MP 1049.0, royal catchfly; and
- Keystone MP 1049.0 to 1049.1, spring ladies' tresses.

Occurrence surveys would be completed, if required, by qualified botanists within appropriate habitats, including sandy areas along roadsides and gravel prairies for royal catchfly; disturbed areas near roads or railroad ballasts in sandy or gravelly soil for prairie spiderwort; and mesic and dry upland prairies, and roadsides through prairies for spring ladies' tresses. Surveys would be completed during the appropriate flowering period for each species, prior to construction during 2008. If any of these plants are found during the 2008 surveys, appropriate mitigation measures would be developed.

Construction of the Mainline Project in Illinois may affect the royal catchfly, prairie spiderwort, or spring ladies' tresses if these plants are present along the project ROW. Specific mitigation measures for these plants would be developed if they are found to occur in the Keystone ROW within the habitats identified above, if it is found that the state of Illinois has the authority to protect state-listed plants on privately owned property.

### 3.8.3 Species of Conservation Concern

Mammal, amphibian, reptiles, and invertebrate species of conservation concern along the Keystone Project ROW are described in Table 3.8.3-1. Many of these species are tied to woodland, wetland, or prairie habitats —habitats that historically have been converted to agricultural use throughout the Keystone Project area. These animals have been designated by state wildlife management agencies or state natural heritage organizations charged with conservation as being of conservation concern after review of abundance, population trends, distribution, number of protected sites, degree of threat to survival, suitable habitat trends, degree of knowledge about the species, and its life history. These designations do not constitute legal authority but are intended to assist with conservation planning and maintenance of the state's natural heritage.

Many resident and migratory birds are identified as species of conservation concern, primarily due to habitat loss, degradation, fragmentation, and associated declining population trends. Birds associated with native prairie habitats and wetlands that have been extensively altered by agriculture are included, as are birds that rely on forested floodplain habitats (Table 3.8.3-2).

### 3.8.3.1 Potential Impacts and Mitigation for Species of Conservation Concern

The pipeline ROW would cross habitats set aside for wildlife, as described in Table 3.6.5-1. The Mainline Project and Cushing Extension pipelines primarily would affect wildlife species of conservation concern 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; 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 magnitude and mechanisms for impacts to wildlife species are discussed in additional detail in Section 3.6.5. Potential impacts on small game animals include nest or burrow destruction and abandonment and loss of eggs or young, foraging, and cover habitat. Losses of active waterfowl nests, incubating adults, eggs, or young also could occur. 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, these losses would be long term because the permanent ROW would be maintained free of trees and large shrubs. Displacement or attraction of small game animals from disturbance areas would be short term, as animals would be expected to return following completion of construction and reclamation activities.

**TABLE 3.8.3-1**
**Mammals, Amphibians, Reptiles, and Invertebrates of Conservation Concern along the Keystone Project Route**

| Species | Status[a] | Occurrence by State[b] | | | | | | | Habitat |
|---|---|---|---|---|---|---|---|---|---|
| | | ND | SD | NE | KS | MO | IL | OK | |
| **Mammals** | | | | | | | | | |
| Long-tailed weasel (*Mustela frenata*) | MO-SC<br>OK-SC | | | | | Randolph and Carroll Counties | | | Commonly found in woodlands, field edges, riparian grasslands, swamps, and marshes with preferred habitats in Missouri of woodlands and thickets near water. Dens are abandoned mammal burrows, rock crevices, brush piles, stump hollows, or spaces among tree roots. Breeding period is July–August, with litters born in April–May. |
| Southern flying squirrel (*Glaucomys volans*) | KS-SC | | | | Doniphan County | | | | Found in the eastern third of Kansas, restricted to thick stands of deciduous forest. Pine and hardwood trees provide suitable foraging and nesting habitats, with snags important for nesting. Breeding period is February–March and June–July, with a 40-day gestation and pups weaned at 5 weeks. |
| Southern bog lemming (*Synaptomys cooperi*) | KS-SC | | | | Nemaha and Brown Counties | | | | Two subspecies occur in Kansas. Lives in communities of thick matted ground cover with high overhead vegetation in forest and grassland, but not restricted to bogs. Favored habitats include vegetation surrounding springs, damp to wet grasslands, and marshes. Upland grasslands near wetland and riparian areas also are used. Breeds year-round, with peaks in April–September. |
| **Amphibians** | | | | | | | | | |
| Great Plains toad (*Bufo cognatus*) | MO-SC | | | | | Buchanan and Carroll Counties | | | Found in grasslands, semi-desert shrublands, open floodplains, and agricultural areas—typically in stream valleys. Burrows underground when inactive. Breeds after heavy warm rains in spring or summer. |

**TABLE 3.8.3-1**
**(Continued)**

| Species | Status[a] | Occurrence by State[b] | | | | | | | Habitat |
|---|---|---|---|---|---|---|---|---|---|
| | | ND | SD | NE | KS | MO | IL | OK | |
| **Amphibians (continued)** | | | | | | | | | |
| Northern cricket frog (*Acris crepitans*) | SD-SC | | Hanson, Hutchinson, and Yankton Counties | | | | | | Inhabits the edges of sunny marshes, marshy ponds, and small slow-moving streams in open country. May periodically range into adjacent non-wetland habitats. Eggs lain late spring–early summer. Hibernation sites underground on land near water; may hibernate communally. |
| Northern crawfish frog (*Rana areolata circulosa*) | MO-SC | | | | | Lincoln County | | | Generally found in grasslands, prairies, and woodlands near small creeks or marshes. Often in crayfish burrows or other animal burrows. Breeds February–April in early spring after heavy rains. |
| **Reptiles** | | | | | | | | | |
| Blanding's turtle (*Emydoidea blandingii*) | SD-SC, MO-SC | | Yankton County | | | St. Charles County | | | Found in productive, clean, shallow waters with abundant aquatic vegetation and soft muddy bottoms over firm substrates. Found in ponds, marshes, swamps, bogs, wet prairies, river backwaters, sloughs, slow-moving rivers, protected coves, and lake shallows and inlets. Extensive marshes bordering rivers provide excellent habitat. |
| Spiny softshell (*Apalone spinifera*) | SD-SC | | Yankton County | | | | | | Found in large rivers, impoundments, lakes, ponds along rivers, pools, along intermittent streams, and oxbows. Usually in areas with open sandy or mud banks and soft bottom. Basks on shores or on partially submerged logs. Burrows in bottom of pools during winter inactivity. Eggs are laid June–July in nests dug in open areas in sand, gravel, or soft soil near water. Eggs hatch September–October. |

**TABLE 3.8.3-1**
**(Continued)**

| Species | Status[a] | Occurrence by State[b] | | | | | | | Habitat |
|---|---|---|---|---|---|---|---|---|---|
| | | ND | SD | NE | KS | MO | IL | OK | |
| **Reptiles (continued)** | | | | | | | | | |
| Smooth softshell (*Apalone mutica*) | SD-SC | | James River and Yankton County | | | | | | Found in large rivers and streams with moderate to fast currents. Very infrequently found in lakes, impoundments, and shallow bogs. Prefers waterways with sandy bottoms and a few rocks or aquatic plants. Sandbars important for basking and egg-laying sites. They seem to prefer large rivers and live along certain portions in colonies. |
| Northern prairie skink (*Eumeces septentrionalis*) | ND-SC | Barnes, Ransom, and Sargent Counties | | | | | | | Found in open sandy areas of pine barrens and bracken grassland, grassy dunes, sandy banks of creeks and rivers and along roadsides, open grass-covered rocky hillsides near streams, and forest edges and woodland. Eggs are laid in shallow nests dug in loose moist soil under logs, boards, rocks, or other objects. Usually hatches in 1–2 months (mid- to late-July). |
| Eastern hognose snake (*Heterodon platirhinos*) | KS-SC | | | | Doniphan County | | | | Found in areas with sandy soil near water, wooded upland hillsides, fields, woodland meadows, prairie, forest-grassland ecotone, river valleys, and stream courses. Burrows into soil; overwinters in burrows. Eggs laid in May–August; hatches in 39–65 days. |
| Timber rattlesnake (*Crotalus horridus*) | KS-SC, NE-SC | | | Marshall and Doniphan Counties | | | | | In central midwest, optimum habitat is high, dry ridges with oak-hickory forest interspersed with open areas and deciduous forest, especially along hilltop rock outcrops in thick woods. Also may be found in swampy areas and floodplains. Mating season is early spring when emerging from hibernation. Young born from August to October. |

**TABLE 3.8.3-1**
**(Continued)**

| Species | Status[a] | Occurrence by State[b] | | | | | | | Habitat |
|---|---|---|---|---|---|---|---|---|---|
| | | ND | SD | NE | KS | MO | IL | OK | |
| **Reptiles (continued)** | | | | | | | | | |
| Ringneck snake (*Diadophis punctatus*) | SD-SC | | Yankton County | | | | | | Prefers moist habitats in prairie areas of the midwest. Occurs both in patches of woods and prairies. Found in open grassland, pasture, and prairie to forested areas—usually hardwoods but also in wooded areas. Prefers south- or west-facing hillsides and generally found under rocks or on rocky hillsides in forested areas. Requires rocks, logs, stumps, fallen bark; habitats are usually moist. Sometimes found in moist caves. |
| Fox snake (*Elaphe vulpine*) | SD-SC | | Yankton County | | | | | | Prefers moist areas, such as river valleys, marsh borders, river bottom forests, upland hardwoods, pine barrens, open prairies, scrub areas, and hedgerows. Rarely far from rivers or streams. May be abundant in heavily farmed prairie areas; frequently found in alfalfa fields and bromegrass. |
| **Invertebrates** | | | | | | | | | |
| Ottoe skipper (*Hesperia ottoe*) | SD-SC | | Day County | | | | | | Mixed- to tall-grass undisturbed prairies on the Great Plains. Strictly prairie habitat species. Nectar feeder—needs abundant sources to maintain a population. Adult males emerge before females in late June and July; females may be found as late as early August in some years. |
| Powesheik skipperling (*Oarisma powesheik*) | SD-SC | | Marshall and Day Counties | | | | | | Obligate resident of undisturbed tall-grass prairies. Primary habitat is virgin prairie, but also occurs in fens and grassy lakeshores. One brood between June and August. |

**TABLE 3.8.3-1 (Continued)**

| Species | Status[a] | Occurrence by State | | | | | | | Habitat |
|---|---|---|---|---|---|---|---|---|---|
| | | ND | SD | NE | KS | MO | IL | OK | |
| **Invertebrates (continued)** | | | | | | | | | |
| Regal fritillary (*Speyeria idalia*) | ND-SC, MO-SC | Sargent and Ransom Counties | | | | Buchanan, Randolph, and Caldwell Counties | | | Tall-grass prairie and other open sites, including damp meadows, marshes, wet fields, and pastures. Larvae are obligate feeders on Violets. One brood from mid-June to mid-August; most eggs are laid in August. Violets, including bird's foot violet are only suitable larval hosts. |
| Prairie mound ant (*Formica montana*) | MO-SC | | | | | Chariton County | | | Found in tall-grass prairies but occasionally also may occur in open oak or pine-dominated woodlands. |
| Wallace's deepwater mayfly (*Raptoheptagenia cruentata*) | KS-SC | | | | Doniphan County | | | | Microhabitat not documented. |

[a] SC = State species of conservation concern.

Source: ENSR 2006a.

**TABLE 3.8.3-2**
**Birds of Conservation Concern along the Keystone Project Route**

| Species | Status [a] | Residence [b] | | | | | | | Habitat |
|---|---|---|---|---|---|---|---|---|---|
| | | ND | SD | NE | KS | MO | IL | OK | |
| Red-necked grebe | SD-SC | N | N | | | | | | Herbaceous wetlands, lakes, and rivers |
| Pied-billed grebe | MO-SC | N | N | N | N | N/W | N/W | N/W | Herbaceous wetlands, ponds, lakes, and rivers |
| American white pelican | PIF | N | N | M | M | M | | M | Rivers, lakes, and reservoirs |
| American bittern | BCC | N | N | NE | M/N | N | N | M | Herbaceous wetlands, lake and pond edges, and riparian |
| Little blue heron | BCC | V | V | M | M | M | M | M | Wetlands and riparian |
| Great egret | MO-SC | M | M | M | M/N | N | M/N | M/N | Riparian woodlands, forested wetlands, and herbaceous wetlands |
| Northern harrier | BCC | N | N | N | N | N | N | N/W | Herbaceous wetlands, fens, meadows, grasslands, and croplands |
| Mississippi kite | BCC | | | | N | N | N | N | Riparian woodlands, shelterbelts, forested wetlands, and grasslands |
| Broad-winged hawk | SD-SC | M/N | M/N | M/N | M/N | N | N | M/N | Deciduous and mixed forests, wetlands, forest edge, and woodland roads |
| Cooper's hawk | MO-SC | N | N | N | N | N | N | N | Forests |
| Ferruginous hawk | BCC | -- | N | -- | -- | -- | -- | -- | Grasslands, cliffs, forested riparian, shrub steppe, and croplands |
| Red-shouldered hawk | MO-SC | | | | | | | | Riparian woodlands and wetlands |
| Swainson's hawk | BCC, PIF | -- | N | -- | N | -- | -- | -- | Grasslands, riparian, croplands, and shelterbelts |
| Peregrine falcon | BCC | | -- | N | -- | -- | N | -- | Herbaceous wetlands, riparian, and woodlands |
| Greater prairie-chicken | PIF | N | N | N | N | N | N | | Tall-grass prairie, croplands, and shelterbelts |
| Lesser prairie-chicken | BCC, PIF | | | E | -- | | | -- | Sand sagebrush and mixed grass-shrublands |
| Black rail | BCC, PIF | | | -- | -- | -- | -- | | Herbaceous wetlands, lake and pond edges, and wet meadows |
| Sora | MO-SC | N | N | N | M/N | M/N | M/N | M | Herbaceous wetlands, fens, wet meadows, and flooded fields |
| Yellow rail | BCC, PIF | -- | -- | | | | E | | Herbaceous wetlands, fen, riparian, and wet meadows |
| Mountain plover | BCC | E | E | -- | -- | | | -- | Short-grass prairie, croplands, and shelterbelts |

**TABLE 3.8.3-2**
**(Continued)**

| Species | Status [a] | Residence [b] | | | | | | | Habitat |
|---|---|---|---|---|---|---|---|---|---|
| | | ND | SD | NE | KS | MO | IL | OK | |
| American golden plover | BCC | M | M | M | M | M | M | M | Short-grass prairie, pastures, flooded croplands, and riparian |
| Snowy plover | BCC | | | | -- | | | -- | Salt flats, sand dunes, and riparian |
| Piping plover | PIF | N | N | N | -- | | | -- | Sand dunes, river islands, beaches, and riparian |
| Greater yellowlegs | BCC | M | M | M | M | M | M | M | Herbaceous wetlands, fens, riparian, bar habitats, and grasslands |
| Upland sandpiper | BCC | -- | N | N | N | M/N | M/N | M/N | Short-grass prairie, pastures, and hayfields |
| Buff-breasted sandpiper | BCC | M | M | M | M | M | M | M | Short-grass prairie, croplands, and riparian |
| Solitary sandpiper | BCC | M | M | M | M | M | M | M | Herbaceous wetlands, riparian, croplands, and woodlands |
| Stilt sandpiper | BCC | M | M | M | M | M | M | M | Herbaceous wetlands, riparian, and flooded croplands |
| Willet | BCC | N | N | N | | | | | Herbaceous wetlands, short-grass prairie, pastures, and riparian |
| Long-billed curlew | BCC, PIF | -- | -- | -- | -- | | E | -- | Herbaceous wetlands, grasslands, and riparian |
| Hudsonian godwit | BCC | | M | M | M | | | M | Herbaceous wetlands, grasslands, fens, and flooded croplands |
| Marbled godwit | BCC, PIF | N | N | M | M | M | M | M | Grasslands, herbaceous wetlands, riparian, and hayfields |
| Sanderling | BCC | M | M | M | M | M | M | M | Sand dunes, riparian, and lake shorelines |
| White-rumped sandpiper | BCC | M | M | M | M | M | M | M | Herbaceous wetlands, grasslands, riparian, and flooded croplands |
| Short-billed dowitcher | BCC | M | M | M | M | M | M | M | Herbaceous wetlands, fens, grasslands, riparian, and flooded croplands |
| Wilson's phalarope | BCC | N | N | N | M | M | M | M | Herbaceous wetlands, grasslands, fens, and croplands |
| Black tern | ND-SC, SD-SC, KS-SC | N | N | M/N | M/N | M | M | M | Herbaceous wetlands with open water, fens, wet meadows, and flooded fields |
| Common tern | BCC, SD-SC | -- | M | M | M | M | -- | M | Herbaceous wetlands, riparian, and river bars |
| Black-billed cuckoo | BCC, PIF | N | N | N | N | N | N | N | Woodlands, riparian, scrub/shrub, and shelterbelts |
| Short-eared owl | BCC, KS-SC, MO-SC | N | N | -- | -- | N | N | W | Grassland, herbaceous wetland, fens, croplands, and shelterbelts |

**TABLE 3.8.3-2**
**(Continued)**

| Species | Status [a] | Residence [b] | | | | | | | Habitat |
|---|---|---|---|---|---|---|---|---|---|
| | | ND | SD | NE | KS | MO | IL | OK | |
| Burrowing owl | BCC | N | N | N | N | | | N | Open grasslands, prairie, and savanna |
| Red-headed woodpecker | BCC | N | N | N | N | N | N | N | Open woodlands, orchards, and riparian forest |
| Pileated woodpecker | ND-SC | N | | | N | N | N | N | Dense deciduous, coniferous, and mixed forests and open woodland |
| Chuck-will's-widow | BCC | | -- | N | N | N | N | N | Forests, woodlands, scrub/shrub, and pastures |
| Whip-poor-will | BCC, KS-SC | -- | -- | -- | N | N | N | N | Forests and woodlands |
| Eastern wood-pewee | PIF | N | N | N | N | N | N | N | Forests, woodlands, orchards, and riparian |
| Acadian flycatcher | BCC | | | N | N | N | N | N | Forested wetlands, riparian, and woodlands |
| Scissor-tailed flycatcher | BCC, PIF | V | V | N | N | N | V | N | Grasslands, savanna, shrublands, croplands, and pastures |
| Loggerhead shrike | BCC, PIF | -- | -- | N | N | N | N | -- | Short-grass prairie, grasslands, pastures, shelterbelts, and croplands |
| Bell's vireo | BCC, PIF | | N | -- | N | -- | N | -- | Riparian, shrub-scrub, and woodlands |
| Bewick's wren | BCC | | | | N | -- | -- | N | Riparian, shrub-scrub, and woodlands |
| Sedge wren | PIF | N | N | N | M/N | N | N | M/N | Grasslands, herbaceous wetlands, fens, riparian, croplands, and shelterbelts |
| Wood thrush | BCC | N | -- | M/N | M/N | M/N | N | N | Forested wetlands, riparian, woodlands, orchards, and shrub thickets |
| Sprague's pipit | BCC, PIF, ND-SC | -- | -- | M | M | M | | | Short- grass and mixed-grass prairies, wet meadow, croplands, and shelterbelts |
| Cerulean warbler | BCC, PIF, KS-SC | | -- | -- | -- | -- | -- | -- | Forested wetlands, riparian, and woodlands |
| Prothonotary warbler | BCC | | | -- | N | N | N | N | Old-growth forested wetlands, riparian, and woodlands |
| Blue-winged warbler | BCC | | N | N | N | N | N | N | Forested wetlands, riparian, fen, shrublands, and woodlands |
| Swainson's warbler | BCC | | | | | -- | -- | | Forested wetland, riparian, and woodlands |
| Kentucky warbler | BCC | | | N | N | N | N | N | Forested wetland, riparian, woodlands, and shrublands |
| Worm-eating warbler | BCC | V | V | | N | N | N | | Forests, shrublands, and woodlands |
| Louisiana waterthrush | BCC | | | -- | N | N | N | N | Forested wetlands, riparian, and woodlands |
| Dickcissel | BCC, PIF | N | N | N | N | N | N | N | Grasslands, meadows, croplands, and shelterbelts |

**TABLE 3.8.3-2**
**(Continued)**

| Species | Status [a] | Residence [b] ND | SD | NE | KS | MO | IL | OK | Habitat |
|---|---|---|---|---|---|---|---|---|---|
| Cassin's sparrow | BCC | | | -- | -- | | | -- | West of Keystone Project area |
| Field sparrow | BCC, PIF | N | N | N | N | N/W | N/W | N/W | Shrublands, pastures, woodlands, and shelterbelts |
| Baird's sparrow | BCC, PIF, ND-SC | -- | -- | | | | | | Mixed-grass and tall-grass prairies and wet meadows |
| Nelson's sharp-tailed sparrow | BCC, PIF | N | -- | M | M | M | M | M | Herbaceous wetlands, grasslands, fens, and flooded croplands |
| Grasshopper sparrow | BCC | N | N | N | N | N | N | N | Grasslands and pasture |
| Le Conte's sparrow | BCC, PIF | -- | N | M | M | M/W | E | M/W | Herbaceous wetlands, fen, riparian, grasslands, and pastures |
| Henslow's sparrow | BCC, PIF | | -- | | N | N | N | -- | Grasslands, tall-grass prairie, meadows, shrub-scub, and pastures |
| Painted bunting | BCC, PIF | | | | N | | | N | Shrublands, riparian, pastures, woodlands, and shelterbelts |
| Harris's sparrow | BCC, PIF | M | M/W | M/W | W | M/W | M | W | Riparian, scrub-shrub, forested wetlands, and shelterbelts |
| Swamp sparrow | ND-SC | M/N | M/N | M/N | M/N | N | N | M/N | Herbaceous wetlands, and scrub-shrub wetlands |
| Chestnut-collared longspur | BCC | N | N | -- | M/W | | | M/W | Mixed-grass and short-grass prairies, pastures, and croplands |
| Smith's longspur | BCC, PIF | M | M | M | M/W | W | M/W | W | Grasslands, croplands, and pastures |
| McCrown's longspur | BCC, PIF | -- | -- | -- | | | | | West of Keystone Project area |
| Bobolink | PIF, KS-SC | N | N | N | -- | -- | N/M | M | Tall-grass prairie, herbaceous wetlands, and croplands |
| Rusty blackbird | BCC | M | M | M/W | W | W | W | W | Forested wetlands, riparian, scrub-shrub, and croplands |
| Yellow-headed blackbird | MO-SC | N | N | N | M/N | M | M | M | Herbaceous wetlands and prairie wetlands |
| Orchard oriole | BCC | N | N | N | N | N | N | N | Riparian, croplands, shelterbelts, and orchards |

[a] BCC = Birds of conservation concern (USFWS 2002), PIF = Partners in Flight Physiographic Area Plans (Rich et al. 2004), SC = State species of conservation concern.

[b] Based on range mapping from http://www.natureserve.org (Natureserve 2006).
-- = Species occurs in state; however, range does not include Keystone Project right-of-way.
E = Extirpated. M = Passage migration. N = Breeding (nesting) resident. W = Winter resident.

Sources: USFWS 2002, Rich et al. 2004, ENSR 2006a, NaturServe 2006.

All migratory birds are protected by the MBTA, as discussed in Section 2.6.4. As noted, golden eagles and their nests are further protected by the Bald and Golden Eagle Protection Act (16 USC 688-688d [a and b]). The destruction or disturbance of a migratory bird nest that results in the loss of eggs or young is a violation of the MBTA. Disturbance to bald or golden eagles is prohibited under the BGEPA and the MBTA.

Pipeline construction would be conducted in accordance with any required permits. Keystone has committed to implementing the following measures in its CMR Plan (Appendix B) to protect wildlife species of conservation concern:

- 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 would contract a qualified biologist to conduct a survey of species of conservation concern associated with native tall-grass prairie. Locations of species of conservation concern found would be documented; if species of conservation concern are identified in the ROW, Keystone would work with the relevant regulatory authorities to determine whether any additional protection measures would be required.
- Disturbance in native prairie would be reclaimed to native prairie species using native seed mixes specified by applicable state and federal agencies, to ensure no net loss of native prairie habitat.
- Where avoidance of native tall-grass prairie by the pipeline ROW is infeasible, appropriate surveys would be implemented to ensure that populations of species of conservation concern are not affected.
- Keystone would contract 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 will 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 USFWS Birds of Conservation Concern, a Partners in Flight Priority Bird Species, a State Species of Conservation Concern (Table 3.8.3-2), or a State Threatened or Endangered Species during the survey, Keystone would work with USFWS and state agency wildlife biologists to determine whether any additional protection measures would be required.
- Immediately prior to construction activities during the raptor breeding season (February 1–July 31), breeding raptor surveys would be conducted by a qualified biologist 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 develop mitigation measures. These measures

would be implemented on a site-specific and species-specific basis, in coordination with USFWS and state agency wildlife biologists.

Total habitat loss due to pipeline construction would be small in the context of total available habitat, because of the linear nature of the Keystone Project and because restoration would follow pipeline construction. However, if disturbance involved important remnant habitats, such as prairie-chicken leks or cricket frog marshes, habitat loss would significantly affect local populations. Normal operation of the pipelines would result in negligible effects on terrestrial wildlife. Direct impacts from maintenance activities, such as physical pipe inspections or ROW repair, 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.

To avoid impacts on wildlife species of conservation concern, Keystone would work with USFWS to identify measures to comply with the MBTA and the BGEPA and will work with both USFWS and state agency wildlife biologists to determine whether additional mitigation is needed for wildlife species of conservation concern.

### Connected Actions

Approximately 181 miles of new transmission lines and 22 miles of upgraded transmission lines would be required to power pumpstations along the Mainline, with about 12 miles of new lines for the Cushing Extension (see Section 2.14). Wildlife habitats affected by construction and operation of transmission lines and wildlife collision potential applicable to species of conservation concern are described in Section 3.6.4. In modifying or constructing transmission line substations to support the Keystone Project, Western would implement the following mitigation measures for species of conservation concern:

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

### 3.8.4 References


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