Stribley, Sara

From: Doyle Brown [Doyle.Brown@mdc.mo.gov]
Sent: Thursday, July 13, 2006 12:23 PM
To: Stribley, Sara
Subject: Survey Protocol for Decurrens false aster and Running BuffaloClover

Sara,

There may be more for these two plants that will be distributed at the meeting, however this is the basics.

Doyle

Doyle F. Brown
Policy Coordinator
Missouri Department of Conservation
P.O. Box 180
2901 West Truman Blvd.
Jefferson City, MO 65109
(573) 522-4115 Ext 3355
Doyle.brown@mdc.mo.gov

MO Survey Protocols for: **Decurrent False Aster** – *Boltonia decurrens*
Running Buffalo Clover – *Trifolium stoloniferum*

Useful References: *Missouri Plants of Conservation Concern,* 47 pp. color illustrated booklet published by MO Dept. of Conservation (2000)

Running Buffalo Clover, 4 pp. illustrated pamphlet printed by MO Dept. of Conservation (1990?)

Decurrent False Aster
Most likely Missouri occurrence would be in Mississippi River/Missouri River floodplain in the eastern half of St. Charles Co. Flowering probable from late August through Sept. but has been documented from July through October. An expert could identify the species without flowers but most efficient surveying should be conducted during the flowering period. Found in low areas subject to periodic flooding. This could include agricultural fields; ruderal sites; roadside ditches; base of levees near standing water; sloughs; pond margins; wet prairies; edges of, or openings within, floodplain forests.

Running Buffalo Clover
Most likely occurrence would be on first terraces above banks of larger streams or rivers. This clover formerly occurred in the southern two-thirds of Missouri and in recent years has appeared in several Ozark and Ozark Border counties. It's appearance within the state has been unpredictable. Flower heads would normally be present in May but can also be found from mid-April to June. Fruiting heads may persist into July. The species is superficially similar to several, very common, introduced clovers from Europe. It is recommended that surveyors develop a search image for running buffalo clover based on field observation at a known site. The species grows best in partial sun under a high canopy or in small canopy gaps or near edges of riparian forests. It can occur in mowed areas such as lawns, picnic areas or other somewhat shaded sites. Periodic disturbance from flooding, game trail usage, logging, grazing or mowing can benefit the plant by reducing competition and providing exposed soil where stolons can root.

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FOR INTERNAL KEYSTONE PROJECT USE ONLY

TransCanada – Keystone Pipeline
Contact Summary Form

Location of Meeting	ENSR
Date/Time of Meeting	7/13/06
Keystone Team Member(s)	Sara Stribley

Contact Information:

Name	Doyle Brown
Title	Policy Coordinator
Organization	Missouri Dept. of Conservation
Address	P.O. Box 180 Jefferson City, MO 65102
County	
Phone	573-751-4115
E-mail address	Doyle.Brown@mdc.mo.gov

Meeting Information:

Type of Contact (phone, in-person, etc.): E-mail

Issue: Bird Species Survey Protocols

Concern Level: High___Moderate___Low_____

Description:

Doyle sent a file containing survey protocols for several bird species of concern. See following attachment:

Attachment:

Doyle,

Here are some basic guidelines/links for surveying for the listed species.

Bald Eagle-

guidelines for mgmt., etc. have been drafted by the FWS for this species. They are available at http://www.fws.gov/migratorybirds/issues/BaldEagle/Mgmt.Guidelines.2006.pdf

King Rail-

for description of natural history, habitat, etc. on this species-

http://www.mdc.mo.gov/documents/nathis/endangered/kingrail.pdf

A survey protocol has also been released by the FWS for monitoring marshbirds, including King Rails, by FWS. It is available at-

http://www.fws.gov/birds/waterbirds/monitoring/conway_and_nadeau_SSP_marsh_bird_final_report.pdf

The protocol is in "Appendix 2"

Interior Least Tern-

for a description of natural history, habitat, etc.-

http://www.mdc.mo.gov/documents/nathis/endangered/i_tern.pdf

The monitoring protocol used by USACOE is available at this link-

http://el.erdc.usace.army.mil/elpubs/pdf/doere17.pdf

Barn Owl

for a description of natural history, habitat, etc.-
http://www.mdc.mo.gov/documents/nathis/endangered/barnowl.pdf

Survey Protocol-

No standardized protocol that I am aware of. A good approach would be to visit any old buildings, barns that are in the path of the pipeline between March and June, and look for nesting birds in the upper portions of the structure. Best time to see birds is often just before dark, when adults are leaving to begin hunting. If birds/signs of birds (pellets, rodent bones, etc.) are present, preserve the structure if possible. If the structure must be destroyed, do it outside of the aforementioned nesting season, and provide alternative nesting structures using barn owl boxes in the area. Also preserve existing tracts of grasslands whenever possible.

Northern Harrier

for a description of natural history, habitat, etc.-
http://www.mdc.mo.gov/documents/nathis/endangered/n_harrier.pdf

Survey Protocol-

No standardized protocol that I am aware of. I'd suggest surveying tracts of grasslands, marshes, or other open, grassy habitats for presence of adults and/or nests/young between May and July, preferably June to early July (the birds tend to nest late), anytime during the day, although morning is probably the best time to see hunting birds. If birds are present, restrict project activities between the aforementioned nesting season, and preserve tracts of the aforementioned habitats whenever possible.

Andrew Forbes
Ornithologist
Missouri Dept. of Conservation/Audubon Missouri
phone: 573-447-2249
fax: 573-447-2428

Issue:_____ **Concern Level: High__Moderate__Low__.**

Description:

Stribley, Sara

From: Doyle Brown [Doyle.Brown@mdc.mo.gov]
Sent: Thursday, July 13, 2006 2:19 PM
To: Stribley, Sara
Subject: Fwd: Pipeline birds

Sara,

I am forwarding the protocols for the birds that you listed. Some are links to USFWS and we follow those.

Let me know if this is sufficient and I will continue to forward you the others as I receive them.

Doyle

Doyle F. Brown
Policy Coordinator
Missouri Department of Conservation
P.O. Box 180
2901 West Truman Blvd.
Jefferson City, MO 65109
(573) 522-4115 Ext 3355
Doyle.brown@mdc.mo.gov

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FOR INTERNAL KEYSTONE PROJECT USE ONLY

TransCanada – Keystone Pipeline
Contact Summary Form

Location of Meeting	ENSR
Date/Time of Meeting	7/12/06
Keystone Team Member(s)	Sara Stribley

Contact Information:

Name	Doyle Brown
Title	Policy Coordinator
Organization	Missouri Dept. of Conservation
Address	P.O. Box 180 Jefferson City, MO 65102
County	
Phone	573-751-4115
E-mail address	Doyle.Brown@mdc.mo.gov

Meeting Information:

Type of Contact (phone, in-person, etc.): E-mail

Issue: Greater Prairie Chicken Survey Protocol

Concern Level: High___Moderate___Low_____

Description:
Doyle sent the following information for Greater Prairie Chicken surveys:

Greater Prairie-Chicken Population Monitoring in Missouri

1997-2006

The Missouri Department of Conservation has monitored greater prairie-chicken populations annually since 1945 (Christisen 1985). Population monitoring consists of spring surveys of booming grounds within 1 mile of permanent survey routes, within 1 mile of public prairies, and additional informal surveys of birds on private lands scattered throughout the northern and southwestern prairie regions. Forty-two routes were originally established by Charles Schwartz in the 1940s. Some of these routes have since been modified; many have been discontinued as local populations have been extirpated. Surveys are now conducted along 13 routes and within a 1-mi. radius of 28 public grassland areas. These 1-mi radii overlap where public grasslands are clustered resulting in 17 public prairie "survey zones" that encompass from 1 to 4 public prairies.

Surveys are conducted by driving survey routes or cruising roads in survey zones between 15 March and 10 April each spring (see Appendix). Standard survey protocols call for observers begin 15 minutes before sunrise and end 1 hr after sunrise, stopping every ½ mile or from favorable vantage points along the route that are located away from sources of noise. Observers are instructed to listen and scan for leks for 2 to 3 minutes at each stop. Counts along each route, or within each survey zone, are conducted 3 times each spring. Observers record the numbers of males and females observed at each lek.

When surveys were originally established, observers did not attempt to distinguish the sex of birds observed, therefore population trend data included both hens and cocks. To remain consistent in methods for calculating long-term trends, the total numbers of birds observed (including hens) is divided by the total area of the original survey routes (as modified in 1961), including those that no longer hold birds. Thus, trend data are expressed in numbers of birds per square mile. Examination of data from 2005 and 2006 showed that about 80% of the birds observed were cocks.

Missouri's prairie-chicken population has declined rapidly over the past 10 yrs (Figure 1). The total number of displaying males counted along survey routes, in survey zones around public grasslands, and in other areas on private lands has declined by about 70% since 1998 (Figure 2). Mechlin et al. (1999) suggested that, if the rate of decline remained constant, the greater prairie-chicken would be extirpated from Missouri by 2009. A long-term commitment to grassland and prairie-chicken recovery efforts will be required to reverse population trends and secure the species in the state.

References

Christisen, D.M. 1985. The greater prairie chicken and Missouri's land-use patterns. Terrestrial
Series 15. Missouri Department of Conservation, Jefferson City. 51 pages.

Mechlin, L.M., R.W. Cannon, and D.M. Christisen. 1999. Status and management of greater prairie chickens in Missouri. *In* The greater prairie chicken: A national look. Svedarsky, W.D., R.H. Hier, and N.J. Silvy, editors. Miscellaneous Publication 99. Minnesota Agricultural Experiment Station, University of Minnesota, St. Paul. 187 pages.

PRAIRIE-CHICKEN LEK SURVEY INSTRUCTIONS

KEY POINTS TO REMEMBER

- Conduct counts between 15 March and 10 April
- Survey each route/area 3 times
- Start surveys 15 minutes before sunrise to 1 hr after sunrise
- Run survey routes on clear, calm mornings
- Stop to listen every ½ mile and/or on high points
- Record data for all booming grounds detected
- Separate data for booming grounds within 1-mi survey zone and those "outside" zone

1) DESIRABLE WEATHER CONDITIONS

You should be able to hear birds booming from 1 mile away or greater from your stopping point. Surveys are **best done on calm mornings.** Clear, calm mornings after the passage of a weather front are probably the ideal conditions for surveys.

2) TIME

Late March is probably the ideal survey time for counting chickens in Missouri. Begin **15 minutes before sunrise and continue for up to 1 hr after sunrise**. Birds are less reliably present outside of this time frame. Sunrise times are available for your area at the web site below. *Daylight savings time begins April 2, 2006.*

http://www.sunrisesunset.com/usa/Missouri.asp

3) AREA TO BE SURVEYED

Census areas are delineated on the map/survey form. **Count all leks and birds within 1 mile of the route (i.e., the road). For public prairies and other surveyed areas, census all booming grounds within 1 mile of the perimeter of the area.**

4) PROCEDURE

Stop and shut off vehicle at **½ mile intervals.** Get out of the vehicle and stand a few yards away to get away from the noise of the cooling engine. **Listen for booming/cackling for 2 to 3 minutes at each stop.** Try to **stop on high points on the road away from houses, barking dogs, livestock, or other sources of noise.** Record the locations of booming grounds on the map using numbers. On the data form, write the number of the booming ground corresponding to the number you placed on the map. Record number of males, number of females and total the number of birds on the booming ground. Run each survey route 3 times **between 15 March and 10 April**.

NEW:
Please *record the local time at the beginning and end* of your survey runs.

As before, indicate locations and numbers of birds for birds/booming grounds off the official survey area when convenient but *use capital letters to label these booming grounds* and be sure to record the numbers of birds *in the space provided on the bottom of the survey form.*

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TransCanada – Keystone Pipeline
Contact Summary Form

Location of Meeting ENSR

Date/Time of Meeting 7/12/06

Keystone Team Member(s) Sara Stribley

Contact Information:

Name	Doyle Brown
Title	Policy Coordinator
Organization	Missouri Dept. of Conservation
Address	P.O. Box 180 Jefferson City, MO 65102
County	
Phone	573-751-4115
E-mail address	Doyle.Brown@mdc.mo.gov

Meeting Information:

Type of Contact (phone, in-person, etc.): Phone

Issue: Sensitive Species Survey Protocols

Concern Level: High___Moderate___Low_____

Description:

I spoke with Doyle Brown, and he said he was working with several biologists in his office to put together some survey recommendations for the species I had requested. He was going to send over information on the Prairie Chickens today, and was going to get the other information to me before our meetings in Missouri next week.

Issue:_____ **Concern Level: High__Moderate__Low__.**

Description:

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TransCanada – Keystone Pipeline
Contact Summary Form

Location of Meeting	ENSR
Date/Time of Meeting	6/30/06
Keystone Team Member(s)	Sara Stribley

Contact Information:

Name	Doyle Brown
Title	Policy Coordinator
Organization	Missouri Dept. of Conservation
Address	P.O. Box 180 Jefferson City, MO 65102
County	
Phone	573-751-4115
E-mail address	Doyle.Brown@mdc.mo.gov

Meeting Information:

Type of Contact (phone, in-person, etc.): E-mail

Issue: Additional Special Statues Species Survey Protocols

Concern Level: High___Moderate___Low_____

Description:
See attached email:

Issue:_____ Concern Level: High__Moderate__Low__.

Description:

Stribley, Sara

From: Stribley, Sara

Sent: Friday, June 30, 2006 8:39 AM

To: 'Doyle Brown'

Subject: Keystone Survey Protocols

Hi Doyle,
I have a few more species that could potentially need surveys for the Keystone Pipeline Project. Does the MDC have any recommended survey protocols for the following species?
Northern Harrier
Barn Owl
King Rail
Western Fox Snake
Plain Spotted Skunk/Eastern Spotted Skunk
I realize you are on vacation right now, so no need to reply immediately! Thanks for your continued assistance!
Happy 4th,
Sara

Sara Stribley
Staff Specialist
ENSR Corporation
1601 Prospect Pkwy
Fort Collins, CO 80525
970.493.8878 ext. 168
sstribley@ensr.com

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TransCanada – Keystone Pipeline
Contact Summary Form

Location of Meeting ENSR

Date/Time of Meeting 6/28/06

Keystone Team Member(s) Sara Stribley

Contact Information:

Name	Doyle Brown
Title	Policy Coordinator
Organization	Missouri Dept. of Conservation
Address	P.O. Box 180 Jefferson City, MO 65102
County	
Phone	573-751-4115
E-mail address	Doyle.Brown@mdc.mo.gov

Meeting Information:

Type of Contact (phone, in-person, etc.): E-mail

Issue: Greater Prairie Chicken Survey Protocol

Concern Level: High___Moderate___Low_____

Description:

See the attached email:

Stribley, Sara

From: Doyle Brown [Doyle.Brown@mdc.mo.gov]
Sent: Wednesday, June 28, 2006 3:46 PM
To: Stribley, Sara
Subject: Re: Survey Protocol For Greater Prairie Chicken

Sara,

I am checking with the recovery leader for Prairie Chickens. He does not believe there to be a current population, however I would think it wise to have a protocol inserted in your NEPA documentation.

I am on vacation currently and will be reply back after July 5th. Have a good 4th of July weekend and be safe.

Doyle

Doyle F. Brown
Policy Coordinator
Missouri Department of Conservation
P.O. Box 180
2901 West Truman Blvd.
Jefferson City, MO 65109
(573) 522-4115 Ext 3355
Doyle.brown@mdc.mo.gov
>>> "Stribley, Sara" <sstribley@ensr.aecom.com> 06/27/06 3:59 PM >>>
Hi Doyle,
Hope things are well with you? I am working on putting together survey information for the greater prairie chicken. There is a possibility that the Keystone Pipeline Project may cross or come within close proximity to greater prairie chicken booming grounds in Audrain county. I was hoping that you might be able to provide me with a recommended survey protocol/method for this species? Thanks for any help you can provide!
Sincerely,
Sara

Sara Stribley
Staff Specialist
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1601 Prospect Pkwy
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970.493.8878 ext. 168
sstribley@ensr.aecom.com <mailto:sstribley@ensr.aecom.com>

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Doyle Brown
Missouri Department of Conservation
P.O. Box 180
Jefferson City, MO 65102

Dear Mr. Brown:

Thank you for agreeing to meet with ENSR to discuss the proposed TransCanada Keystone Pipeline Project. To facilitate our meeting, ENSR is providing preliminary species tables and habitat information for your review to determine potential species survey requirements along the project route.

As discussed in the January 24, 2006 letter, TransCanada is planning to construct and operate a 1,830-mile-long interstate crude oil transmission system from an oil supply hub near Hardisty, Alberta, Canada to destinations in the Midwestern United States (U.S). The proposed Project would consist of approximately 1,070 miles of new pipeline constructed from the U.S.-Canada border in Pembina County, North Dakota to terminals and refineries in Salisbury (Chariton County), Missouri, Wood River (Madison County), and Patoka (Marion County), Illinois. Approximately 283 miles would parallel the proposed Rockies Express Pipeline - West (REX-West) Project in Kansas and Missouri. In addition, TransCanada is considering the construction of a 291-mile pipeline extension that would extend the Keystone Pipeline south from the Nebraska/Kansas border to Cushing, Oklahoma. TransCanada proposes to begin construction of the new pipeline in early 2008, with the system in-service by the end of 2009. The project also will require the construction of pump stations, valves, meters, and other ancillary facilities. The hydraulic characteristics of the pipeline will determine pump station and valve locations. Electrical powerlines and facility upgrades will be required in some locations to provide power for the new pump stations.

At this time, ENSR is providing information regarding the Keystone Mainline portion of the project. As the Cushing Extension portion of the project develops, we will provide additional information for your review and input.

Attached for your review are state-specific special status species tables (i.e., federally listed, proposed and candidate species; state listed species) (**Tables 1 and 2**) that include a brief description of species habitat, miles of potential habitat crossed by the project, and approximate mileposts where potential habitat has been preliminarily identified along the project route. **Table 3** provides potential species habitat by state and county. Habitat for special status species was determined based on species habitat association, known distribution, and agency correspondence (e.g., U.S. Fish and Wildlife Service [FWS], state wildlife agencies, and National Heritage Program/NatureServe), in

combination with aerial habitat surveys, Land Use-Land Cover (LULC) data, and aerial photography. Survey data from the REX-West Project also was used to quantify potential habitat that would be crossed in Kansas and Missouri (Buchanan County through Randolph County).

Also attached for your review are 1:100,000-scale maps that identify areas along the pipeline route where potential grassland, wetland/riparian, and upland woodland/forests have been identified. Habitat data within these maps were obtained from LULC data and aerial photography. These preliminary habitat locations may be modified following further habitat analysis and consultations with federal and state agencies. In addition, some pipeline routing modifications continue to be developed and evaluated including those denoted by red "reroute" lines on the attached maps. As a result, habitat analysis and consultation will continue for these routing adjustments as needed in the future. Habitat related to powerlines has not been evaluated at this time.

We look forward to our visit in July. If you have any questions regarding the enclosed materials, please contact me at (970) 493-8878 ext. 181 or email cjohnson@ensr.aecom.com.

Sincerely,

Charles Johnson
Senior Wildlife Biologist

Enclosures: 1:100,000-scale maps
Tables 1 through 3

Table 1
Missouri Special Status Species
Habitat by County and Mainline Milepost
Keystone Pipeline Project

Species	Status	Habitat Association	Primary Habitat	County	Miles (mi) of Associated Habitat Crossed by Keystone Pipeline Project					Mainline Milepost(s)
					Grassland (mi)	Forests and Woodlands (mi)	Riparian (mi)	Nonforested Emergent Wetland (mi)[1]	Open Water (mi) (habitat crossed or within 0.5 mi)	
Eastern spotted skunk *Spilogale putorius*	MO-E	This species prefer forest edge and upland grassland prairie, especially if rock outcrops and shrubs are present. Their dens are located below ground in grassy banks, rocky crevices or along fence rows, as well as above ground in hay stacks, woodpiles, brushy heaps, hollow logs, and abandoned buildings or outbuildings. Young are born in May or June.	upland forests, grasslands, shrublands, agriculture edge	St.Charles	St. Charles: 1.1	St. Charles: 0				St. Charles: 997.9-998.0, 1010.8-1013.4
Gray bat *Myotis grisescens*	FE; MO-E	This species forages primarily within forested areas along streams and lakes. Winter roosts are in deep vertical caves with domed halls. Large summer colonies utilize caves that trap warm air and provide restricted rooms or domed ceilings. Matemity roosts typically are in caves with stream flow and are separate from summer bachelor roosts.	riparian woodlands, caves	St. Charles		St. Charles: 0	St. Charles: 0.6			St. Charles: 977.0-984.8, 991.2-991.3, 1016.6-1016.7
Indiana bat *Myotis sodalis*	FE; MO-E	This species forages primarily in riparian forests and flood-plains, as well as in upland forests, low field, and pastures. Maternity roosts are located beneath loose bark of living and dead trees (especially oak and hickory *spp*.). Young are generally born in June. Winter hibernacula occur in caves and mines with 85% of this species population hibernating in Shannon, Washington, and Iron counties, MO.	riparian woodlands, upland forests, pastures, caves	Audrain Buchanan Caldwell Carroll Chariton Clinton Lincoln Montgomery Randolph St.Charles		Audrain: 0.4 Buchanan: 4.3 Caldwell: 3.1 Carroll: 3.3 Chariton: 4.1 Clinton: 1.4 Lincoln: 2.0 Montgomery: 1.9 Randolph: 3.6 St.Charles: 0	Audrain: 3.4 Buchanan: 0.2 Caldwell: 0 Carroll: 0.1 Chariton: 0 Clinton: 0 Lincoln: 8.2 Montgomery: 2.7 Randolph: 0 St.Charles: 0.6			Audrain: 890.2-927.4 Buchanan: 743.4-761.3, Caldwell: 788.9-804.8 Carroll: 810.1-835.3 Chariton: 836.3-866.7 Clinton: 766.4-784.3 Lincoln: 949.1-976.2 Montgomery: 934.0-948.7 Randolph: 869.6-889.1 St. Charles: 977.0-984.8, 991.2-991.3, 1016.6-1016.7
Plains spotted skunk *Spilogale putorius interrupta*	MO-E	This species inhabits upland grassland prairie, brushy areas, cultivated land, and forests. Their dens are located below ground in grassy banks, rocky crevices or along fence rows, as well as above ground in hay stacks, woodpiles, hollow logs, trees, or on brushy heaps. Young are born from April to July.	grasslands, shrublands, upland forests, agriculture edge	Chariton	Chariton: 12.9	Chariton: 4.1				Chariton: 836.3-866.7

[1] Data pending; waiting on completion of wetland/waterbody surveys to determine total wetland habitat crossed.

Table 1
Missouri Special Status Species
Habitat by County and Mainline Milepost
Keystone Pipeline Project

Species	Status	Habitat Association	Primary Habitat	County	Miles (mi) of Associated Habitat Crossed by Keystone Pipeline Project					Mainline Milepost(s)
					Grassland (mi)	Forests and Woodlands (mi)	Riparian (mi)	Nonforested Emergent Wetland (mi)[1]	Open Water (mi) (habitat crossed or within 0.5 mi)	
Bald eagle *Haliaeetus leucocephalus*	FT; MO-E	This species typically occurs near large bodies of water that support suitable roosting and foraging habitat. Nest sites typically occur in proximity to open water and generally are found in mature heterogeneous stands of multi-storied trees, but also may nest on cliffs. Winter habitat typically includes areas of open water, adequate food sources, and sufficient diumal perches and night roosts. Breeding season: January through July. Winter season: November 15 through March 15.	riparian forests, open water	Buchanan Carroll Chariton Clinton Lincoln Montgomery St.Charles					Buchanan: 0.2 (Missouri River, Muskrat Lake, Horseshoe Lake) Carroll: 0 Chariton: 0.7 (Grand River, Chariton River, E. Fork of Little Chariton River, Mussel Fork Brush Creek, Clinton: Middle Fork Little Chariton River, East Fork Little Chariton River) Lincoln: 0.2 (West Fort Cuivre River, Cuivre River) Montogomery: (Middletown Lake) St. Charles: 0.3 (Cuivre River Horseshoe Lake, Mud Lake, Fish Slough, Mississippi River, Missouri River)	Buchanan: 743.4-743.6 (Missouri River), 745.2-745.8 (Muskrat Lake), 745.0-745.7 (Horseshoe Lake) Carroll: N/A Chariton: 835.4-835.5 (Grand River), 852.4-852.5 (Mussel Fork Brush Creek), 857.2-857.3 (Chariton River), 862.9 (M.F. Little Chariton), 866.5 (E.F. Little Chariton) Clinton: N/A Lincoln: 950.3 (W.F. Cuivre River), 967.3-967.4 (Cuivre River) Montgomery: 938.2-338.4 (Middletown Lake) St. Charles: 980.5-981.5 (Cuivre River Horseshoe Lake), 981.5-982.0 (Mud Lake), 982.4-982.5 (Fish Slough), 980.5-1016.6 (Missouri/Mississippi River Floodplain)
Barn owl *Tyto alba*	MO-E	This cavity-nesting species is primarily a bird of open country - residential and agricultural areas, old fields and woodland edges. Nests in buildings, tree cavities, caves, cliff crevices, and cut bank burrows Breeding season: late winter, spring, and/or early summer.	grasslands, woodlands, agriculture	St.Charles	St. Charles: 1.1	St. Charles: 0	St. Charles: 0.6			St. Charles: 977.0-998.0, 1010.8-1016.7
Greater Prairie-chicken *Tympanuchus cupido*	MO-E	Prime habitat for this species includes mid-grass and tall-grass prairies bordered by open oak woodlands, oak forests, and cropland. In northeastern Colorado, they nest in sand-sage prairie and forage in corn and wheat fields. In Missouri, nesting habitat is limited to cropland and nearby prairies mainly on the Osage Plains. Breeding season: March through July.	shortgrass, tallgrass, agriculture	Audrain Carroll	Audrain: 5.9 Carroll: 13.0					Audrain: 890.3-926.7 Carroll: 810.7-834.7
Interior least tern *Stema antillarum athalassos*	FE; MO-E	Nesting habitat consists of sparsely vegetated sandy, gravelly, or silty, beaches and sandbars within wide, unobstructed river channels or salt flats along lake shorelines and irrigation reservoirs. Nest locations are generally away from the water's edge since nesting typically begins while river flows are high and relatively small amounts of sandy habitat is exposed. Breeding season: May 1 through August 15.	shorelines and sandbars of rivers, lakes, reservoirs	Chariton St.Charles				*Data pending* *Data pending*	Chariton: 0.7 (Grand River, Chariton River, E. Fork of Little Chariton River, Mussel Fork Brush Creek, Middle Fork Little Chariton River, East Fork Little Chariton River) St. Charles: 0.3 (Cuivre River Horseshoe Lake, Mud Lake, Fish Slough, Mississippi River, Missouri River)	Chariton: 835.4-835.5 (Grand River), 852.4-852.5 (Mussel Fork Brush Creek), 857.2-857.3 (Chariton River), 862.9 (M.F. Little Chariton), 866.5 (E.F. Little Chariton); data pending St. Charles: 980.5-981.5 (Cuivre River Horseshoe Lake), 981.5-982.0 (Mud Lake), 982.4-982.5 (Fish Slough), 980.5-1016.6 (Missouri/Mississippi River Floodplain); data pending

[1] Data pending; waiting on completion of wetland/waterbody surveys to determine total wetland habitat crossed.

Table 1
Missouri Special Status Species
Habitat by County and Mainline Milepost
Keystone Pipeline Project

Species	Status	Habitat Association	Primary Habitat	County	Miles (mi) of Associated Habitat Crossed by Keystone Pipeline Project					Mainline Milepost(s)
					Grassland (mi)	Forests and Woodlands (mi)	Riparian (mi)	Nonforested Emergent Wetland (mi)[1]	Open Water (mi) (habitat crossed or within 0.5 mi)	
King rail *Rallus elegans*	MO-E	This species inhabits fresh and brackish wetlands. King rails prefer wetlands with abundant grasses, sedges, rushes and cattails. Nest sites occur in herbaceous cover over shallow water in river floodplains. The adult King Rail molts completely after nesting and is flightless for nearly a month. Breeding season: April-June.	wetlands	Carroll Lincoln St.Charles				*Data pending* *Data pending* *Data pending*		Carroll: data pending Lincoln: data pending St.Charles: data pending
Northern Harrier *Cicus cyaneus*	MO-E	This species breeds in marshes, meadows, grasslands, and cultivated fields. Perches on ground or on stumps or posts. Nests on the ground, commonly near low shrubs, in tall weeds or reeds, sometimes in bog; or on top of low bush above water, or on knoll of dry ground, or on higher shrubby ground near water, or on dry marsh vegetation.	marshes, meadows, grasslands, cultivated fields	Carroll	Carroll: 13.0			*Data pending*		Carroll: 810.7-834.7; data pending
Lake sturgeon *Acipenser fulvescens*	MO-E	This species is generally bottom dwelling and occurs in large rivers and shallow areas of large lakes. They are most often associated with silt-free deep run and pool habitats of rivers (i.e., >5 ft deep), and generally avoid aquatic vegetation. Gravelly tributary streams of rivers and lakes serve as spawning habitat, although rocky, wave-swept areas near lake shores and islands serve as spawning habitat when preferred habitats are unavailable. Spawning period: late-spring.	large rivers and lakes, gravelly substrate	St. Charles					St. Charles: 1.1 (Mississippi River)	St Charles: 1016.5-1017.6 (Mississippi River)
Pallid sturgeon *Scaphirhynchus albus*	FE; MO-E	This species is distributed from the headwaters of the Missouri River (Fort Benton-Great Falls, Montana) through the Mississippi River to New Orleans, Louisiana. It inhabits bottom areas of large turbid rivers that have strong current and a firm sandy substrate. They also may be found along sandbars and behind wing dikes. Spawning period: April through August.	large, turbid rivers, sand substrate	Buchanan St. Charles					Buchanan: 0.2 (Missouri River) St. Charles: 1.1 (Mississippi River)	Buchanan: 743.4-743.6 (Missouri River) St. Charles: 1016.5-1017.6 (Mississippi River)

[1] Data pending; waiting on completion of wetland/waterbody surveys to determine total wetland habitat crossed.

Table 1
Missouri Special Status Species
Habitat by County and Mainline Milepost
Keystone Pipeline Project

Species	Status	Habitat Association	Primary Habitat	County	Miles (mi) of Associated Habitat Crossed by Keystone Pipeline Project					Mainline Milepost(s)
					Grassland (mi)	Forests and Woodlands (mi)	Riparian (mi)	Nonforested Emergent Wetland (mi)[1]	Open Water (mi) (habitat crossed or within 0.5 mi)	
Topeka shiner *Notropis topeka*	FE; MO-E	This species inhabits pool and run areas in the headwaters of small prairie streams with high water quality and cool temperatures. These streams generally exhibit intermittent flow during summer; however pools are maintained by spring or groundwater percolation. The substrate of these occupied streams consist mainly of clean gravel, however bedrock and clay hardpan overlain by a thin silt layer are not uncommon. Spawning period: late spring and summer.	small, cool, [often intermittent] prairie streams	Clinton Caldwell					Clinton: 0.3 (Castile Creek, Little Platte River, Shoal Creek) Caldwell: 0.3 (Log Creek, Brush Creek, Crabapple Creek)	Clinton: 767.7 (Castile Creek), 775.7 (Little Platte River), 780.4 (Shoal Creek) Caldwell: 790.3 (Log Creek), 796.0 (Brush Creek), 799.3 (Crabapple Creek)
Eastern massasauga *Sistrurus catenatus catenatus*	FC; MO-E	This subspecies prefers marshy and swamp areas dominated by cordgrass, sedges, and bulrushes, as well as lowland areas along river and lakes. The snakes hibernate singly in mammal burrows, crayfish burrows, and in crevices or rock piles close to water. Courtship and mating occurs in spring and young are born in late July through early September.	wetland, riparian	Chariton				*Data pending*	Chariton: 0.7 (Grand River, Chariton River, E. Fork of Little Chariton River, Mussel Fork Brush Creek, Middle Fork Little Chariton River, East Fork Little Chariton River)	Chariton: 835.4-835.5 (Grand River), 852.4-852.5 (Mussel Fork Brush Creek), 857.2-857.3 (Chariton River), 862.9 (M.F. Little Chariton), 866.5 (E.F. Little Chariton); data pending
Western fox snake *Elaphe vulpine vulpina*	MO-E	This species inhabits cultivated fields, along wooded stream valleys and in natural prairies that adjoin marshes. This species is active between late April and October. Small mammal burrows and brush piles are used as den sites during winter hibernation. Mating begins in April and females lay eggs under logs or leaf litter in May or June. Young hatch in August or September.	agriculture, riparian woodlands, prairies, wetlands	St.Charles	St. Charles: 1.1		St. Charles: 0.6	*Data pending*		St. Charles: 977.0-998.0, 1010.8-1016.7; data pending
Western massasauga *Sistrurus catenatus tergeminus*	MO-E	This subspecies is found in open sagebrush prairie, rocky prairie hillsides, and prairie marsh habitats, usually near a water source. The snakes hibernate singly in rodent burrows. Courtship and breeding occur both in the Spring and Fall. Young are born during July or August.	sagebrush, shrubland, wetland	Chariton	Chariton: 12.9			*Data pending*		Chariton: 842.2-866.3; data pending

[1] Data pending; waiting on completion of wetland/waterbody surveys to determine total wetland habitat crossed.

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Keystone Pipeline Project

Species	Status	Habitat Association	Primary Habitat	County	Miles (mi) of Associated Habitat Crossed by Keystone Pipeline Project					Mainline Milepost(s)
					Grassland (mi)	Forests and Woodlands (mi)	Riparian (mi)	Nonforested Emergent Wetland (mi)[1]	Open Water (mi) (habitat crossed or within 0.5 mi)	
Decurrent false aster *Boltonia decurrens*	FT; MO-E	The species grows in open muddy bottomlands and is dependent upon disturbance from cyclical flooding to maintain the habitat suitable for its survival. Historically, it was found on the shores of lakes and the banks of streams. Currently, it is most common in disturbed lowland areas where human-caused disturbance provides adequate habitat. Flowers: July-October.	riparian floodplains and muddy bottomlands subject to flooding	St.Charles				*Data pending*		St.Charles: 977.0-991.3, 1016.6-1016.7; data pending
Running buffalo clover *Trifolium stoloniferum*	FE; MO-E	This species is commonly found in areas of rich soils in the ecotone between open forest and prairie; and moist, partially shaded woodlands-sometimes along stream or river terraces. Also found in areas disturbed by grazing or mowing. This species historically grew along bison trails. Flowers: April-June.	riparian areas, woodland/prairie ecotones	Lincoln	Lincoln: 1.5	Lincoln: 2.0	Lincoln: 8.2	*Data pending*	Lincoln: 965.8-967.3 (W.F. Cuivre River Floodplain)	Lincoln: 948.7-976.2; data pending

[1] Data pending; waiting on completion of wetland/waterbody surveys to determine total wetland habitat crossed.

Table 2
Keystone Special Status Species
Total Habitat Crossed by State

Species	Status	Habitat Association	Primary Habitat	Habitat by County and State, and Total Distance (mi) Crossed											
				ND		SD		NE		KS		MO		IL	
Mammals															
Gray bat *Myotis grisescens*	FE; MO-E; IL-E	This species forages primarily within forested areas along streams and lakes. Winter roosts are in deep vertical caves with domed halls. Large summer colonies utilize caves that trap warm air and provide restricted rooms or domed ceilings. Maternity roosts typically are in caves with stream flow and are separate from summer bachelor roosts.	Riparian woodlands, caves											Madison	6.7
Indiana bat *Myotis sodalis*	FE; MO-E; IL-E	This species forages primarily in riparian forests and flood-plains, as well as in upland forests, low field, and pastures. Maternity roosts are located beneath loose bark of living and dead trees (especially oak and hickory *spp.*). Young are generally born in June. Winter hibernacula occur in caves and mines with 85% of this species population hibernating in Shannon, Washington, and Iron counties, MO.	Riparian woodlands, upland forests, pastures, caves									Audrain Buchanan Caldwell Carroll Chariton Clinton Lincoln Montgomery Randolph St. Charles	3.7 4.5 3.1 3.4 4.1 1.4 10.1 4.6 3.6 0.6	Bond Fayette Madison Marion	1.9 3.4 6.7 0.0
Gray wolf *Canis lupus*	FT; ND-SC	No particular habitat preference. Habitats may include: alpine, desert, conifer forest, hardwood forest, mixed forest, grasslands, savannas, shrubland/ chaparral, tundra, and woodlands.	Any	Cavalier Grnd Fks Nelson Pembina Sargent Walsh	0.0 0.0 0.2 2.9 8.4 1.7										
Fisher *Martes pennanti*	FC; ND-SC	This species inhabits upland and lowland forests, including coniferous, mixed, and deciduous forests. Fishers generally avoid areas with little forest cover or significant human disturbance and conversely prefer large areas of contiguous interior forest.	Forests and woodlands	Pembina	2.9										
Plains spotted skunk *Spilogale putorius interrupta*	SD-SC; MO-E	This species inhabits upland grassland prairie, brushy areas, cultivated land, and forests. Their dens are located below ground in grassy banks, rocky crevices or along fence rows, as well as above ground in hay stacks, woodpiles, hollow logs, trees, or on brushy heaps. Young are born from April to July.	Grasslands, shrublands, upland forests, agriculture edge									Chariton	17.0		
Eastern spotted skunk *Spilogale putorius*	KS-T; MO-E; SD-SC	This species prefers forest edge, prairie, brushy areas, and cultivated land, especially if rock outcrops and shrubs are present. Their dens are located below ground in grassy banks, rocky crevices or along fence rows, as well as above ground in hay stacks, woodpiles, brushy heaps, hollow logs, and abandoned buildings or outbuildings. Young are born in May or June.	Grasslands, shrublands, upland forests, agriculture edge							Brown Doniphan Marshall Nemaha	7.9 4.2 6.9 5.3	St. Charles	1.1		

[1] Data pending; waiting on completion of wetland/waterbody surveys to determine total habitat crossed (mi); totals likely to change.

Table 2
Keystone Special Status Species
Total Habitat Crossed by State

Species	Status	Habitat Association	Primary Habitat	Habitat by County and State, and Total Distance (mi) Crossed													
				ND		SD		NE		KS		MO		IL	
River otter *Lontra Canadensis*	IL-E	Key habitats are rivers, streams, lakes, ponds, marshes, estuaries, and beaver flowages, especially near waterbodies with wooded shorelines or nearby wetlands. When inactive, occupies hollow logs, spaces under roots, logs, or overhangs, abandoned beaver lodges, dense thickets near water, or burrows of other animals; such sites also are used for rearing young	rivers, streams, lakes, ponds, marshes, wetlands					Colfax Stanton	0.5 0.2					Bond Fayette	0.1 3.1
Birds																	
Least bittern *Ixobrychus exilis*	MO-SC; IL-T	Nest in freshwater wetlands with dense, tall growths of emergent vegetation (particularly *Typha* spp, *Carex* spp., *Scirpus* spp., or *Phragmites australis*) interspersed with some woody vegetation and open, fresh water. In the north-central U.S., breeding and nesting may occur from May-July. Incubation lasts for 17-20 days; young usually leave nest by the 13th-15th day.	Wetlands, lakes, open water											Fayette Madison	0.0[1] 0.0[1]
Bald eagle *Haliaeetus leucocephalus*	FT; ND-SC; SD-T; NE-T; KS-T; MO-E; IL-T; OK-T	This species typically occurs near large bodies of water that support suitable roosting and foraging habitat. Nest sites are located in proximity to open water and generally are found in mature heterogeneous stands of multi-storied trees, but also may nest on cliffs. Winter habitat typically includes areas of open water, adequate food sources, and sufficient diurnal perches and night roosts. Breeding season: January through July. Winter season: November 15 through March 15.	Riparian forests, open water	Barnes Cavalier Grnd Fks Nelson Pembina Ransom Sargent Steele Walsh	0.0 0.0 0.0 0.0 0.1 0.2 0.0 0.0 0.3	Beadle Clark Day Hanson Hutchinson Kingsbury Marshall McCook Miner Yankton	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.1	Butler Cedar Colfax Gage Jefferson Platte Saline Seward Stanton Wayne	0.0 0.2 0.5 0.0 0.0 0.0 0.2 0.1 0.2 0.0	Brown Doniphan Marshall Nemaha	0.0 0.2 0.1 0.0	Buchanan Carroll Chariton Clinton Lincoln Montgomery St. Charles	0.2 0.0 0.7 0.0 0.2 0.0 0.3	Bond Fayette Madison	0.1 3.1 1.1
Peregrine falcon *Falco peregrinus*	IL-T; NE-SC; KS-E	This species is found over a wide variety of habitats, but are generally located near open water or marshes that support high concentration of shorebirds or waterfowl. Nest sites occur on tall steep-walled cliffs, bridges, or buildings. Preferred foraging habitat includes lakes, rivers, and wet meadows. Breeding season: April 15 to July 15.	Wetlands, lakes, open water									Brown Doniphan Marshall Nemaha	0.0[1] 0.0[1] 0.0[1] 0.0[1]			Madison	2.1[1]
Greater Prairie-chicken *Tympanuchus cupido*	MO-E; ND-SC	Prime habitat for this species includes mid-grass and tall-grass prairies bordered by open oak woodlands, oak forests, and cropland. In western Kansas, they nest in sand-sage prairie and forage in corn and wheat fields. In Missouri, nesting habitat is limited to cropland and nearby prairies mainly on the Osage Plains. Breeding season: March through July.	Shortgrass, tallgrass, upland forest, agriculture											Audrain Carroll	5.9 13		
King rail *Rallus elegans*	MO-E; NE-SC	This species inhabits fresh and brackish wetlands. King rails prefer wetlands with abundant grasses, sedges, rushes and cattails. Nest sites occur in herbaceous cover over shallow water in river floodplains. The adult King Rail molts completely after nesting and is flightless for nearly a month. Breeding season: April-June	Wetlands											Carroll Lincoln St. Charles	0.0[1] 0.0[1] 0.0[1]		

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Table 2
Keystone Special Status Species
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Species	Status	Habitat Association	Primary Habitat	Habitat by County and State, and Total Distance (mi) Crossed											
				ND		SD		NE		KS		MO		IL	
Whooping crane *Grus americana*	FE; ND-SC; SD-E; NE-E; OK-E; KS-E	During migration, this species feeds and roosts in a variety of habitats including croplands, large and small freshwater marshes, the margins of lakes and reservoirs, and submerged sandbars in rivers. Spring and Fall migration through the project regions generally occurs from February through April and from October through November, respectively.	Wetlands, riparian, agriculture	Barnes Cavalier Nelson	0.0[1] 0.0[1] 0.2[1]	Beadle Clark Kingsbury Yankton	0.0[1] 0.0[1] 0.0[1] 0.1[1]	Colfax Saline Seward Stanton	0.5[1] 0.2[1] 0.1[1] 0.2[1]	Brown Doniphan Marshall Nemaha	0.0[1] 0.2[1] 0.1[1] 0.0[1]				
Snowy plover *Charadrius alexandrinus*	KS-T	This species inhabits open alkaline flats, mudflats, sandy shorelines, sandbars with little vegetation along rivers, lakes, ponds, and marshlands. Nesting often occurs on white saline flats. Breeding season: May 1 through August 15.	Shorelines, sandbars, wetlands, rivers, lakes, ponds							Brown Doniphan Marshall Nemaha	0.0[1] 0.2[1] 0.0[1] 0.0[1]				
Piping plover *Charadrius melodus*	FT; ND-SC; SD-T; NE-T; KS-T	This species inhabits open sandy areas and saline flats with little vegetation along rivers, lakes, ponds, and marshlands. It nests on sandbars and sand and gravel beaches with short, sparse vegetation along inland lakes, on natural and dredge islands in rivers, on gravel pits along rivers, and on salt-encrusted bare areas on interior alkali ponds and lakes. Sparse clumps of grass or herbaceous vegetation are important habitat components. Breeding season: May 1 through August 15.	Shorelines, sandbars, wetlands, rivers, lakes, ponds	Sargent		Clark Day Kingsbury Yankton	0.0[1] 0.0[1] 0.4[1] 0.1[1]	Butler Cedar Colfax Gage Jefferson Platte Saline Seward Stanton	0.0[1] 0.2[1] 0.5[1] 0.0[1] 0.0[1] 0.0[1] 0.2[1] 0.1[1] 0.2[1]	Brown Doniphan Marshall Nemaha	0.0[1] 0.2[1] 0.1[1] 0.0[1]				
Eskimo curlew *Numenius borealis*	FE; SD-E; KS-E	This species is a nearly extinct spring migrant that feeds and rests in burned-over prairies, agricultural areas, wetlands, and marshes.	Prairies, wetlands, agriculture			Clark	4.5[1]			Brown Doniphan Marshall Nemaha	4.9[1] 1.8[1] 5.6[1] 4.7[1]				
Interior least tern *Sterna antillarum athalassos*	FE; SD-E; NE-E; MO-E; OK-E; KS-E	Nesting habitat consists of sparsely vegetated sandy, gravelly, or silty beaches and sandbars within wide, unobstructed river channels or salt flats along lake shorelines and irrigation reservoirs. Nest locations are generally away from the water's edge since nesting typically begins while river flows are high and relatively small amounts of sandy habitat is exposed. Breeding season: May 1 through August 15.	Shorelines and sandbars or rivers, lakes, reservoirs			Clark Yankton	0.0[1] 0.1[1]	Butler Cedar Colfax Gage Jefferson Platte Saline Seward Stanton	0.0[1] 0.2[1] 0.5[1] 0.0[1] 0.0[1] 0.0[1] 0.2[1] 0.1[1] 0.2[1]	Brown Doniphan Marshall Nemaha	0.0[1] 0.2[1] 0.1[1] 0.0[1]	Chariton St. Charles	0.7[1] 0.3[1]		
Barn owl *Tyto alba*	MO-E; IL-E	This cavity-nesting species is primarily a bird of open country - residential and agricultural areas, old fields and woodland edges. Nests in buildings, tree cavities, caves, cliff crevices, and cut bank burrows Breeding season: late winter, spring, and/or early summer.	Grasslands, woodlands, agriculture									St. Charles	1.7	Fayette Marion	0.0 0.0
Loggerhead shrike *Lanius ludovicianus*	MO-SC; IL-T	This species is found in open areas with mixed shrub/brush hedgerows and scattered thorny trees. Thorny plant species (osage orange, honey locus, multiflora rose, wild crabapple) are important for impaling prey. In MO and IL, nesting peaks in late April, with a second peak in late May in MO.	Shriblands, uplands											Bond Fayette Marion	2.1 0.0 0.0

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Table 2
Keystone Special Status Species
Total Habitat Crossed by State

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				ND	SD	NE	KS	MO	IL
Henslow's sparrow *Ammodramus henslowii*	KS-SC; MO-SC; IL-E	This species breeds in a variety of grassland habitats with tall, dense grass and herbaceous vegetation. Meadows, open grasslands and weedy and abandoned fields, all with wet areas, dense grass-forb mosaics and scattered small woody growths appear to be essential. Breeding season: April-July.	Grasslands, meadows, shrublands						Madison 1.6
Yellow-crownded night heron *Nyctanassa violacea*	IL-E	This species nests on barrier islands, dredge spoil islands, and bay islands that contain forested wetlands or scrub/shrub thickets. Colonies may be located in dense shrubby thickets, forests with an open understory. They use similar habitat types for nesting and roosting, avoiding areas with insufficient cover. They hunt along the shores of tidal creeks and tide pools within salt and brackish marshes dominated by salt marsh cordgrass.	wetlands, scrub-shrub thickets,						Fayette 3.4[1]
Pied-billed grebe *Podilymbus podiceps*	IL-T	This species breeds on seasonal or permanent ponds with dense stands of emergent vegetation, bays and sloughs. Uses most types of wetlands in winter.	ponds, wetlands, sloughs						Fayette 6.5[1]
Northern Harrier *Cicus cyaneus*	MO-E	This species breeds in marshes, meadows, grasslands, and cultivated fields. Perches on ground or on stumps or posts. Nests on the ground, commonly near low shrubs, in tall weeds or reeds, sometimes in bog; or on top of low bush above water, or on knoll of dry ground, or on higher shrubby ground near water, or on dry marsh vegetation.	marshes, meadows, grasslands, cultivated fields					Carroll 13.0[1]	
Fish									
Chestnut lamprey *Ichthyomyzon castaneus*	KS-T	This species is found in moderate-sized rivers and large creeks. Spawning occurs in smaller tributary streams in swift shallow riffles where the gravel is clean. Eggs are laid in a nest in the river bottom. Spawning period: spring or summer.	Rivers and creeks				Doniphan: Missouri River		
Pallid sturgeon *Scaphirhynchus albus*	FE; SD-E; NE-E; KS-E; MO-E; IL-E	This species is distributed from the headwaters of the Missouri River (Fort Benton-Great Falls, Montana) through the Mississippi River to New Orleans, Louisiana. It inhabits bottom areas of large turbid rivers that have strong current and a firm sandy substrate. They also may be found along sandbars and behind wing dikes. Spawning period: April through August.	Large, turbid rivers, sand substrate		Yankton: James River Missouri River	Cedar: Missouri River Colfax: Platte River	Doniphan: Missouri River	Buchanan: Missouri River St. Charles: Mississippi River	Madison: Mississippi River Fayette: Kaskaskia River
Lake sturgeon *Acipenser fulvescens*	NE-T; MO-E; IL-E	This species is generally bottom dwelling and occurs in large rivers and shallow areas of large lakes. They are most often associated with silt-free deep run and pool habitats of rivers (i.e., >5 ft deep), and generally avoid aquatic vegetation. Gravelly tributary streams of rivers and lakes serve as spawning habitat, although rocky, wave-swept areas near lake shores and islands serve as spawning habitat when preferred habitats are unavailable. Spawning period: late-spring.	Large rivers and lakes, gravelly substrate		Yankton: Missouri River	Cedar: Missouri River		St. Charles: Mississippi River	

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Table 2
Keystone Special Status Species
Total Habitat Crossed by State

Species	Status	Habitat Association	Primary Habitat	Habitat by County and State, and Total Distance (mi) Crossed					
				ND	SD	NE	KS	MO	IL
Flathead chub *Platygobio gracilis*	KS-T	This species occurs from the Rio Grande to the Arctic Circle in small creeks and the largest rivers that have turbid fluctuating water levels and unstable sand bottoms. This species relies on flood flows to spawn successfully. Spawning occurs after water levels have subsided after peak flows, when water temperatures are warmer and substrate is more stable. Relies on flood flows to spawn successfully. Spawns after rivers have subsided following peak flow.	Creeks and rivers with turbid, fluctuating flow and sandy substrates				Nemaha: S.F. Nemaha River Doniphan: Missouri River		
Sturgeon chub *Macrhybopsis gelida*	NE-E; KS-T MO-SC SD-T	This species prefers large turbid sandy rivers over substrate of small gravel and coarse sand. It is often found in areas swept by currents especially at heads of islands or exposed sandbars. Spawning period: late spring to midsummer.	Large sandy rivers, sand/gravel substrate		Yankton: Missouri River	Cedar: Missouri River Colfax County: Platte River	Doniphan: Missouri River	Buchanan: Missouri River	
Sicklefin chub *Macrhybopsis meeki*	NE-SC; KS-E MO-SC SD-E	This species requires continuously and heavily turbid waters of large rivers where it frequents areas of strong current flowing over sand or gravel substrate. Spawning period: spring (likely from late March and May).	Large turbid rivers, sand/gravel substrate		Yankton: Missouri River	Colfax: Platte River	Doniphan: Rock Creek Missouri River	Buchanan: Missouri River	
Western silvery minnow *Hybognathus vritis*	KS-T; MO-SC	This species prefers protected areas in large, turbid rivers and prairie streams. In streams they are typically found in water less than one foot deep and shallow shore water heavily vegetated with emergent grasses and reeds. In protected areas of larger rivers, they move in large schools of 50 to l00 individuals along the bottom in deep, quiet water. While little is known about spawning, this species probably scatters eggs on silt substrate in quiet water.	Protected areas of rivers and streams				Nemaha: S.F. Nemaha River Doniphan: Missouri River	Buchanan: Missouri River	
Blacknose shiner *Notropis heterolepsis*	ND-SC; NE-E; MO-SC	This species prefers clean weedy lakes and streams.	Lakes, streams			Cedar: Missouri River Stanton: Elkhom River	Doniphan: Missouri River		
Topeka shiner *Notropis topeka*	FE; SD-SC; KS-T; MO-E	This species inhabits pool and run areas in the headwaters of small prairie streams with high water quality and cool temperatures. These streams generally exhibit intermittent flow during summer; however pools are maintained by spring or groundwater percolation. The substrate of these occupied streams consist mainly of clean gravel, however bedrock and clay hardpan overlain by a thin silt layer are not uncommon. Spawning period: late spring and summer.	Small, cool (often intermittent) prairie streams		Miner: Wolf Creek Hanson: Wolf Creek Hutchinson: Wolf Creek Yankton: James River Missouri River	Cedar: Missouri River Saline: W.F. Big Blue River	Marshall: N. Elm Creek Doniphan: Missouri River	Clinton: Castile Creek Little Platte River Shoal Creek Caldwell: Log Creek Crush Creek Crabapple Creek	
Northern redbelly dace *'osomus eos*	NE-T	This species occurs in a variety of habitats ranging from streams to bog lakes.	Streams to bog lakes			Cedar: Missouri River			
Finescale dace *Phoxinus neogaeus*	NE-T	This species occurs a variety of habitats ranging from streams to bog lakes.	Streams to bog lakes			Cedar: Missouri River			

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Table 2
Keystone Special Status Species
Total Habitat Crossed by State

Species	Status	Habitat Association	Primary Habitat	Habitat by County and State, and Total Distance (mi) Crossed					
				ND	SD	NE	KS	MO	IL
Western sand darter *Ammocrypta clarum*	IL-E	This species occurs in medium and large rivers; most commonly in slight to moderate currents over sandy bottoms. It is known to inhabit areas of gravel or silt. The species has also been recorded from quiet margins of drainage canals and shallow backwaters, usually where there is enough current to keep the bottom largely free of silt. Buries in sand.	Medium to large rivers, sandy substrate						Fayette: Kaskaskia River
Reptiles									
Western fox snake *Elaphe vulpine vulpina*	MO-E	This species inhabits cultivated fields, along wooded stream valleys and in natural prairies that adjoin marshes. It is active between late April and October. Small mammal burrows and brush piles are used as den sites during winter hibernation. Mating begins in April and females lay eggs under logs or leaf litter in May or June. Young hatch in August or September.	Agriculture, riparian woodlands, prairies, wetlands					St. Charles 1.7[1]	
Smooth earth snake *Virginia valeriae*	KS-T	This species inhabits rocky hillsides in moist woodlands and woodland edges in river and stream valleys where they may be found on the slopes under leaf litter, rocks, or logs. During winter, it utilizes deep crevices on rocky hillsides. Mating begins in the spring after emergence from hibernation. Mating may also occur in the fall. Young hatch in August or September.	Riparian woodland, upland forest				Doniphan 2.4		
Eastern massasauga *Sistrurus catenatus catenatus*	FC; MO-E; IL-E	This subspecies prefers marshy and swamp areas dominated by cordgrass, sedges, and bulrushes, as well as lowland areas along river and lakes. The snakes hibernate singly in mammal burrows, crayfish burrows, and in crevices or rock piles close to water. Courtship and mating occurs in spring and young are born in late July through early September.	Wetland, riparian					Chariton 0.7[1]	
Western massasauga *Sistrurus catenatus tergeminus*	NE-T; MO-E	This subspecies is found in open sagebrush prairie, rocky prairie hillsides, and prairie marsh habitats, usually near a water source. The snakes hibernate singly in rodent burrows. Courtship and breeding occur both in the Spring and Fall. Young are born during July or August.	Sagebrush, shrubland, wetland			Gage 0.0[1] Jefferson 3.4[1]		Chariton 12.9[1]	
False map turtle *Graptemys pseudogeo-graphica*	SD-T	This species inhabits slow to swift current rivers and streams, river sloughs, oxbow lakes, ponds, impoundments, and backwaters. They are devoted baskers, often resting just below the surface on submerged branches from fallen trees and projecting logs.	Rivers, streams, sloughs, ponds, backwaters, impoundments		Yankton 0.1				
Kirtland's snake *Clonophis kirtlandi*	IL-T	This species inhabits prairie wetlands, wet meadows, and grassy edges of creeks, ditches, and ponds, usually in association with crayfish burrows. It also has been found in damp habitat remnants in vacant lots of urban settings. Secretive and nocturnal, it shelters beneath logs and surface debris, or in crayfish burrows, by day.	Wetlands						Fayette 0.0[1]

[1] Data pending; waiting on completion of wetland/waterbody surveys to determine total habitat crossed (mi); totals likely to change.

Table 2
Keystone Special Status Species
Total Habitat Crossed by State

Species	Status	Habitat Association	Primary Habitat	Habitat by County and State, and Total Distance (mi) Crossed											
				ND		SD		NE		KS		MO		IL	
Amphibians															
Illinois chorus frog *Pseudacris strecheri illino*	IL-T	Sand prairies and remnants such as sandy agricultural fields and waste areas. Burrows in sand and emerges after heavy, early spring rains to breed in nearby flooded fields, ditches, and other vernal ponds	Sand prairies											Madison	0.6
Invertebrates															
Dakota skipper *Hesperia dacotae*	FC; SD-SC, ND-SC	This species is considered an obligate of undisturbed native prairie. The butterfly inhabits wet lowland prairie dominated by bluestem grasses and dry upland prairie dominated by mixed bluestem and needle stem grasses. Both habitat types contain an abundance of flowering plants and have alkaline soils. Adults emerge in mid-June to early July, and mate during a flight period that lasts for about three weeks.	Lowland and upland prairie	Barnes Ransom Sargent	0.0 0.0 8.4	Clark Day Marshall Yankton	4.5 6.7 5.1 2.1								
American burying beetle *Nicrophorous americanus*	FE; KS-E	This species inhabits upland grasslands or near the edge of grassland/forest. Sandy/clay loam soils and food (carrion) availability are also important. The species appears to prefer loose soil in which to bury carrion. Reproduction occurs from late April through mid August. Reproductive activity includes the burial of a carcass, building of a chamber, and laying eggs.	Grasslands, upland forests							Brown Doniphan Marshall Nemaha	7.9 4.2 6.9 5.3				
aleshell mussel *ptodea leptodon*	FE; SD-SC; NE-E	Occurs in riffles with moderate to high gradients in creeks to large rivers. Typically associated with riffles, relatively strong currents, and substrate of mud, sand, or assemblages of gravel, cobble, and boulder. Restricted to rivers with relatively good water quality in stretches with stable channels. Little is known concerning the reproduction of this species.	Creeks and rivers with good water quality and stable channels			Yankton	0.2	Cedar	0.2						
Higgins' eye pearlymussel *Lampsilis higginsi*	FE; SD-SC	Found in substrates of mud with a mixture of gravel and stones. Prefers rapidly flowing water. The exact breeding season is unknown.	Fast flowing creeks and rivers, mud substrate			Yankton	0.2	Cedar	0.2						
Winged mapleleaf *Quadrula gragosa*	FE; SD-SC	The species is found in riffles with clean gravel, sand, or rubble bottoms.	Rivers, streams			Yankton	0.1								
Plants															
Decurrent false aster *Boltonia decurrens*	FT; MO-E; IL-T	The species grows in open muddy bottomlands and is dependent upon disturbance from cyclical flooding to maintain the habitat suitable for its survival. Historically, it was found on the shores of lakes and the banks of streams. Currently, it is most common in disturbed lowland areas where human-caused disturbance provides adequate habitat. Flowers: July-October.	Riparian floodplains and muddy bottomlands subject to flooding									St. Charles	0.0[1]	Madison	2.0[1]
Small white lady's-slipper *Cypripedium candidum*	NE-T	This species is found in wetland prairie habitats: mesic blacksoil prairie, wet blacksoil prairie, glacial till hill prairie, sedge meadow, calcareous fen, glade. Found on calcareous soils. Flowering occurs May-June.	Wetland prairie					Butler Cedar Colfax Stanton Wayne	0.0[1] 4.3[1] 0.8[1] 1.5[1] 1.3[1]						

[1] Data pending; waiting on completion of wetland/waterbody surveys to determine total habitat crossed (mi); totals likely to change.

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Keystone Special Status Species
Total Habitat Crossed by State

Species	Status	Habitat Association	Primary Habitat	Habitat by County and State, and Total Distance (mi) Crossed											
				ND		SD		NE		KS		MO		IL	
Eastern prairie fringed orchid *Platanthera leucophaea*	FT; IL-E	Mesic-wet calcareous tallgrass sand or silt loam prairie. May also be found in open graminoid portions of lake margins, sedge, meadows, and marshes, wet prairie or open swamps, or bogs and shores. Flowering begins late June to early July. Flowers do not appear annually.	Mesic-wet tallgrass prairie											Bond Fayette Madison Marion	0.0[1] 0.0[1] 0.0[1] 0.0[1]
Western prairie fringed orchid *Platanthera praeclara*	FT; ND-SC; SD-SC; NE-T	Occurs in mesic upland tallgrass prairie in the southern part of its range, often in swales, and wet-mesic tallgrass prairie and sedge meadows in the northern part of its range. Also known from prairies and swales in sand dune complexes that are fed by shallow underground water. Flowers June-July.	Tallgrass prairie, dune complexes	Ransom	0.0	Clark Day Yankton	4.5[1] 6.7[1] 2.1[1]	Butler Cedar Colfax Gage Jefferson Platte Saline Seward Stanton Wayne	0.0[1] 4.3[1] 0.8[1] 0.0[1] 3.4[1] 0.0[1] 0.3[1] 0.0[1] 1.5[1] 1.3[1]						
Prairie bush-clover *Lespedeza leptostachya*	FT; IL-E	In Illinois, this species is generally found on dry gravel prairies and dry-mesic prairies It is often found on north-facing prairie slopes. On these slopes, it typically occurs either in thin soil at the margins of rocks or in gravelly loamy soil. Flowers in July, August.	Prairie											Bond Fayette Madison Marion	0.8 0.0 0.6 0.0
Running buffalo clover *Trifolium stoloniferum*	FE; MO-E	This species is commonly found in areas of rich soils in the ecotone between open forest and prairie; and moist, partially shaded woodlands- sometimes along stream or river terraces. Also found in areas disturbed by grazing or mowing. This species historically grew along bison trails. Flowers: April-June.	Riparian areas, woodland/prairie ecotones									Lincoln	11.7[1]		
Royal Catchfly *Silene regia*	IL-E	This species is found in habitats that include mesic black soil prairies, openings in upland forests, savannas, scrubby barrens, and open areas along roadsides and railroads	Prairies, upland forests, savannas, open roadsides											Madison	1.6
Prairie Spiderwort *Tradescantia bracteata*	IL-T	Common spiderwort likes sandy soils and seems to be most abundant where grazing is light to moderate. Dry typical prairie and dry sand prairies	Grazed prairies, sandy soils											Madison	0.6
Spring Ladies' Tresses *Spiranthes vernalis*	IL-E	This species is typically found in upland dry to mesic forests, dry to mesic prairies, and successional cultured fields.	Upland/mesic forests											Madison	2.0[1]

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Table 3
Missouri Special Status Species Listed by County and Habitat Type

County	Grassland	Forests And Woodlands	Riparian	Emergent Wetland	Open Water
Audrain	Greater Prairie Chicken	Indiana Bat	Indiana Bat		
Buchanan		Indiana Bat	Indiana Bat		Bald Eagle, Pallid Sturgeon
Caldwell		Indiana Bat	Indiana Bat		Topeka Shiner
Carroll	Greater Prairie Chicken, Northern Harrier	Indiana Bat	Indiana Bat	King Rail, Northern Harrier	Bald Eagle
Chariton	Plains Spotted Skunk, Western Massasauga	Indiana Bat, Plains Spotted Skunk	Indiana Bat	Interior Least Tern, Eastern Massasauga, Western Massasauga	Bald Eagle, Interior Least Tern, Eastern Massasauga
Clinton		Indiana Bat	Indiana Bat		Bald Eagle, Topeka Shiner
Lincoln	Running Buffalo Clover	Indiana Bat, Running Buffalo Clover	Indiana Bat, Running Buffalo Clover	King Rail, Running Buffalo Clover	Bald Eagle, Running Buffalo Clover
Montgomery		Indiana Bat	Indiana Bat		Bald Eagle
Randolph		Indiana Bat	Indiana Bat		
St. Charles	Eastern Spotted Skunk, Barn Owl, Western Fox Snake	Eastern Spotted Skunk, Indiana Bat, Gray Bat, Barn Owl	Indiana Bat, Gray Bat, Barn Owl, Western Fox Snake	Interior Least Tern, King Rail, Western Fox Snake, Decurrent False Aster	Bald Eagle, Interior Least Tern, Lake Sturgeon, Pallid Sturgeon

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