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
Keystone Mainline				
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
Keystone Mainline				
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.

Collision and electrocution impacts on bald eagles resulting from the Keystone Project would be reduced if electrical service providers agree to implement mitigation measures, such as incorporation of:

- 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.
- A minimum 60-inch separation between conductors 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.

To avoid impacts on nesting or winter roosting bald eagles, **the following measures are recommended:**

- **Keystone should complete pre-construction surveys of suitable habitats within the pipeline ROW and along access roads and power line ROWs (John Cochnar, USFWS, April 28, 2006).**

- **Keystone should not construct within 1 mile of active bald eagle nests or within 0.5 mile of winter roosting sites identified during pre-construction surveys or from historical databases (John Cochnar, USFWS, April 28, 2006).**
- **Keystone should require all electric service providers to implement avian protection measures, including raptor proof designs in areas of bald eagle activity (John Cochnar, USFWS, May 27, 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.

Piping Plover and Interior Least Tern

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 piping plovers and least terns, resulting in diminished reproduction. Reduction of instream flow rates in the Platte River, Nebraska has negatively affected piping plovers and least terns by reducing water levels surrounding river bars where they nest, thereby allowing terrestrial predators to access the nests.

Piping plovers and least terns are known to nest on the major river systems in South Dakota, Nebraska, and Kansas—including rivers that would be crossed by the Keystone Project (the Platte, Missouri, and Arkansas Rivers). Least terns also use habitats along the Mississippi River in Illinois. After consultation with federal and state resource agencies, these species were determined to potentially occur at the following locations:

- Missouri River – Yankton County, South Dakota –Mainline Project MP 434.9 to 435.1;
- Missouri River – Cedar County, Nebraska – Mainline Project MP 436;
- Platte River – Colfax County, Nebraska – Mainline Project MP 542;
- Elkhorn River – Stanton County, Nebraska – Mainline Project MP 502;
- Mississippi River – Madison County, Illinois – Mainline Project MP 1017;
- Sooner Lake – Noble County, Oklahoma – Cushing Extension MP 253.3; and
- Cimarron River – Payne County, Oklahoma – Cushing Extension MP 289.5.

These locations will be surveyed during the nesting period in 2007 and 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 Platte, Arkansas, Missouri, 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 for hydrostatic testing;

- Direct mortality of adults, juveniles eggs or young; and
- Disturbance of nests.

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.

Keystone has committed to implementing measures to protect pipeline plovers and least terns (Sara Stribley, ENSR, March 5, 2007):

- Contracting a qualified biologist to conduct a survey of breeding bird habitat within 0.25 mile from the construction ROW during April 15 to September 15. 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 an active nest is located during 2008 pre-construction surveys, a 0.25-mile buffer area will be established to prevent direct loss of the nest and indirect impacts from human-related disturbance.
- If an active nest is found in the survey area, Keystone will suspend planned activity for at least 37 days or 7 days post-hatching.
- If a brood of flightless chicks is observed, Keystone will suspend planned activity for at least 7 days.
- If an active nest is documented during the survey, Keystone will work with USFWS and other applicable regulatory authorities to determine whether any additional protection measures will be needed.

To avoid impacts on nesting or chick-raising plovers or terns, **the following measures are recommended:**

- **Prior to construction in potential habitats between April 15 and September 15, qualified biologists should conduct surveys according to USFWS protocols at the river crossing locations and adjacent gravel pits in the vicinity of the Platte, Arkansas, Missouri, and Mississippi Rivers (John Cochnar, USFWS, April 28, 2006).**
- **No construction would be allowed within 0.25 mile of any known active least tern or pipeline plover nest (John Cochnar, USFWS, April 28, 2006).**
- **Keystone should consult with individual states concerning potential water withdrawal from the Platte River drainage and avoid water withdrawal during February 1 through July 31 in the Lower Platte region (from Columbus, Nebraska to the Missouri River) (John Cochnar, USFWS, February 5, 2007).**

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

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 Platte, Arkansas, and Missouri Rivers;
- Habitat fragmentation from ROW crossings through floodplains of large rivers;
- Habitat degradation from invasion of noxious species; and
- Direct mortality of adults and juveniles by collisions with construction vehicles or power lines.

To avoid impacts on whooping cranes, **the following measure is recommended:**

- **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 must cease immediately and Keystone must 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 (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.

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; 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 Mitigation Plan to protect gray bats:

- Prior to surface disturbance activities in karst terrain, a geological investigation will be completed to determine the presence and type of karst features. The investigation will identify the location, distribution, and dimensions of rock cavities in the potential influence zone of construction.
- A qualified biologist will 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 will be contacted and applicable mitigation measures will 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, **the following measure is recommended:**

- **A search for this species should be made prior to any activity that would affect caves in Madison County, Illinois or in Lincoln County, Missouri (John Cochnar, USFWS, May 27, 2007).**

Construction of the Mainline Project may affect, but is not likely to 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.

Indiana Bat

Indiana bats are assumed present during summer in all Missouri and Illinois counties. Known occurrences are captures of non-reproductive Indiana bats in Madison and Bond Counties in Illinois. 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 1,078 acres of upland and riparian forests, 147 acres of riverine or open water, and 698 acres of emergent or scrub-shrub wetlands that could provide habitat for Indiana bats. 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, 73 woodlots were identified as containing suitable habitat for Indiana bats (Table 3.8.1-9). The dominant roost tree species were shagbark hickory, oaks, and American elm.

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. A total of 273 acres of surveyed forested habitats suitable for Indiana bats would be lost due to construction of the Mainline Project; no Indiana bat habitat has been identified along the Cushing Extension. Additional suitable habitats also may exist; slightly more than half of the identified woodlots were surveyed (BHE 2006a, 2006b, 2007a, 2007b).

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.

Two confirmed winter hibernacula are more than 5 miles south of the Mainline Project in Boone County, Missouri. USFWS also indicated a hibernacula 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).

Keystone has committed to implementing the following measures in its Mitigation Plan 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 will be completed to determine the presence and type of karst features. The investigation will 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 will 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 will be contacted and applicable mitigation measures will be developed.

TABLE 3.8.1-9
Indiana Bat Habitats Potentially Affected by the Keystone Project Route

Milepost	State, County	Total Area (acres)	Forest Cover within 3.5 km (%)	Comments[a]
757.9–758.4	Missouri, Buchanan	10.9	31	4 potential roost trees (3 hickory, 1 unknown), habitat suitability = 0.7
759.0–759.1	Missouri, Buchanan	2.7	29	11 potential roost trees (1 black walnut, 4 elm, 1 red oak, 4 unknown dead), habitat suitability = 0.7
760.1–760.3	Missouri, Buchanan	3.6	22	1 potential roost tree (elm), habitat suitability = 0.7
765.8–765.9	Missouri, Buchanan	2.9	15	7 potential roost trees (2 honey locust, 1 basswood, 4 unknown), habitat suitability = 1.0
772.8–772.9	Missouri, Clinton	1.7	15	6 potential roost trees (1 box elder, 1 silver maple, 4 cottonwoods), habitat suitability = 1.0
773.2–773.5	Missouri, Clinton	6.8	14	3 potential roost trees (1 black walnut, 1 ash, 1 unknown), habitat suitability = 1.0
786.2–786.3	Missouri, Clinton	1.7	17	2 potential roost trees (1 elm, 1 basswood), habitat suitability = 1.0
786.7–786.8	Missouri, Clinton	2.7	16	2 potential roost trees (2 elm), habitat suitability = 1.0
786.9–787.1	Missouri, Clinton	2.2	16	2 potential roost trees (1 hawthorn, 1 black walnut), habitat suitability = 0.6
788.1–788.2	Missouri, Clinton	1.9	16	3 potential roost trees (1 unknown snag, 2 honey locust), habitat suitability = 1.0
789.5–789.7	Missouri, Clinton	6.1	17	2 potential roost trees (2 shagbark hickory), habitat suitability = 0.7
791.2–791.2	Missouri, Caldwell	1.0	18	2 potential roost trees (1 elm, 1 shingle oak), habitat suitability = 1.0
794.2–794.3	Missouri, Caldwell	4.8	21	2 potential roost trees (1 post oak, 1 shagbark hickory), habitat suitability = 0.7
796.4–796.5	Missouri, Caldwell	1.5	22	1 potential roost tree (1 elm), habitat suitability = 0.7
796.5–796.7	Missouri, Caldwell	3.2	22	1 potential roost tree (1 shagbark hickory), habitat suitability = 0.7
798.1–798.2	Missouri, Caldwell	1.0	18	2 potential roost trees (2 dead hackberry), habitat suitability = 1.0
798.7–798.9	Missouri, Caldwell	4.6	14	2 potential roost trees (2 elm), habitat suitability = 0.7
799.0–799.1	Missouri, Caldwell	1.5	15	1 potential roost tree (1 elm snag), habitat suitability = 0.7
807.6–807.7	Missouri, Caldwell	4.6	19	3 potential roost trees (1 shagbark hickory, 1 elm, 1 unknown), habitat suitability = 1.0
807.8–807.9	Missouri, Caldwell	2.9	20	2 potential roost trees (1 honey locust, 1 oak), habitat suitability = 0.7
808.1–808.3	Missouri, Caldwell	6.3	21	2 potential roost trees (2 shagbark hickory), habitat suitability = 0.7

TABLE 3.8.1-9
(Continued)

Milepost	State, County	Total Area (acres)	Forest Cover within 3.5 km (%)	Comments[a]
815.3–815.4	Missouri, Carroll	3.6	23	1 potential roost tree (1 elm), habitat suitability = 0.7
815.7–815.9	Missouri, Carroll	7.0	21	3 potential roost trees (2 elm, 1 black walnut), habitat suitability = 1.0
820.4–820.5	Missouri, Carroll	1.5	27	4 potential roost trees (4 elm), habitat suitability = 1.0
821.5–821.7	Missouri, Carroll	7.3	40	14 potential roost trees (4 shagbark hickory, 7 oak, 2 black walnut, 1 elm), habitat suitability = 1.0
822.0–822.1	Missouri, Carroll	4.4	41	9 potential roost trees (5 shagbark hickory, 2 bitternut hickory, 2 unknown), habitat suitability = 1.0
822.6–822.8	Missouri, Carroll	7.3	41	15 potential roost trees (7 shagbark hickory, 5 white oak, 3 oak), habitat suitability = 1.0
823.0–823.2	Missouri, Carroll	2.2	40	3 potential roost trees (2 white oak, 1 elm), habitat suitability = 1.0
823.2–823.6	Missouri, Carroll	8.7	40	15 potential roost trees (6 shagbark hickory, 6 oak, 3 honey locust), habitat suitability = 1.0
824.7–824.7	Missouri, Carroll	3.4	33	6 potential roost trees (4 shagbark hickory, 2 elm), habitat suitability = 1.0
825.9–825.9	Missouri, Carroll	3.2	25	1 potential roost tree (1 shagbark hickory), habitat suitability = 0.7
826.0–826.1	Missouri, Carroll	1.7	24	4 potential roost trees (1 osage-orange, 3 shagbark hickory), habitat suitability = 0.9
840.2–840.4	Missouri, Carroll	4.6	14	3 potential roost trees (1 elm, 1 silver maple, 1 pecan), habitat suitability = 1.0
848.7–848.9	Missouri, Chariton	4.6	19	2 potential roost trees (1 river birch, 1 red oak), habitat suitability = 1.0
849.3–849.8	Missouri, Chariton	10.4	19	3 potential roost trees (2 oak, 1 unknown snag), habitat suitability = 1.0
871.5–871.6	Missouri, Chariton	1.9	14	2 potential roost trees (2 silver maple), habitat suitability = 0.7
876.9–877.2	Missouri, Randolph	4.6	24	24 potential roost trees (20 shagbark hickory, 2 white oak, 2 elm), habitat suitability = 1.0
877.6–877.8	Missouri, Randolph	2.4	27	29 potential roost trees (24 shagbark hickory, 4 oaks, 1 sycamore), habitat suitability = 1.0
879.4–879.5	Missouri, Randolph	2.2	37	1 potential roost tree (1 elm), habitat suitability = 0.7
879.6–879.8	Missouri, Randolph	3.4	37	7 potential roost trees (6 shagbark hickory, 1 white oak), habitat suitability = 1.0
880.1–880.3	Missouri, Randolph	3.6	37	3 potential roost trees (1 elm, 2 shag-bark hickory), habitat suitability = 1.0

TABLE 3.8.1-9
(Continued)

Milepost	State, County	Total Area (acres)	Forest Cover within 3.5 km (%)	Comments[a]
880.4–880.5	Missouri, Randolph	1.7	38	4 potential roost trees (3 shagbark hickory, 1 elm snag), habitat suitability = 0.8
915.1–915.2	Missouri, Audrain	2.7	14	2 potential roost trees (2 oak), habitat suitability = 1.0
950.8–951.1	Missouri, Montgomery	4.8	22	18 potential roost trees (15 shagbark hickory, 2 honey locust, 1 silver maple), habitat suitability = 0.7
951.2–951.4	Missouri, Montgomery	3.6	22	30 potential roost trees (30 shagbark hickory), habitat suitability = 1.0
1021.6–1021.7	Illinois, Madison	1.0	3	9 potential roost trees (9 white willow), habitat suitability = 1.0
1032.8–1033.2	Illinois, Madison	9.7	22	29 potential roost trees (19 unknown snags, 6 honey locust, 4 shagbark hickory), habitat suitability = 0.5
1033.5–1033.7	Illinois, Madison	3.2	17	1 potential roost tree (unknown snag), habitat suitability = 0.1
1045.4–1045.5	Illinois, Madison	1.9	15	4 potential roost trees (2 shagbark hickory, 1 shellbark hickory, 1 slippery elm), habitat suitability = 0.4
1045.8–1046.0	Illinois, Madison	5.3	17	11 potential roost trees (2 unknown snags, 9 shagbark hickory), habitat suitability = 0.4
1045.9–1046.2	Illinois, Madison	6.4	17	13 potential roost trees (13 shagbark hickory), habitat suitability = 0.4
1046.2–1046.3	Illinois, Madison	3.6	17	20 potential roost trees (18 shagbark hickory, 2 unknown snags), habitat suitability = 1.0
1046.6–1046.7	Illinois, Madison	2.9	17	22 potential roost trees (22 shagbark hickory), habitat suitability = 1.0
1046.9–1047.2	Illinois, Madison	6.1	15	2 potential roost trees (2 unknown snags), habitat suitability = 0.1
1048.9–1049.0	Illinois, Madison	0.7	3	2 potential roost trees (1 elm, 1 white oak), habitat suitability = 0.5
1055.2–1055.6	Illinois, Bond	10.2	25	3 potential roost trees (2 black walnut, 1 silver maple), habitat suitability = 0.1
1058.6–1058.7	Illinois, Bond	3.4	14	2 potential roost trees (2 shagbark hickory), habitat suitability = 0.1
1059.9–1060.1	Illinois, Bond	4.4	19	1 potential roost tree (1 red oak), habitat suitability = 0.6
1060.1–1060.4	Illinois, Bond	6.3	19	7 potential roost trees (2 shagbark hickory, 2 elm, 3 red oak), habitat suitability = 0.2
1060.6–1060.9	Illinois, Bond	6.3	18	13 potential roost trees (13 shagbark hickory), habitat suitability = 1.0
1060.9–1061.0	Illinois, Bond	2.7	17	1 potential roost tree (1 elm), habitat suitability = 0.1
1061.5–1061.5	Illinois, Bond	0.8	13	1 potential roost tree (black oak), habitat suitability = 0.2

TABLE 3.8.1-9 (Continued)

Milepost	State, County	Total Area (acres)	Forest Cover within 3.5 km (%)	Comments[a]
1065.9–1065.9	Illinois, Bond	0.2	3	1 potential roost tree (oak), habitat suitability = 0.7
1068.6–1068.7	Illinois, Fayette	0.4	16	1 potential roost tree (shingle oak), habitat suitability = 0.5
1069.3–1069.7	Illinois, Fayette	8.7	19	5 potential roost trees (1 box elder, 2 black walnut, 2 honey locust), habitat suitability = 0.1
1070.0–1070.2	Illinois, Fayette	4.8	22	6 potential roost trees (6 black willow), habitat suitability = 0.2
1070.2–1070.3	Illinois, Fayette	1.0	22	1 potential roost tree (black willow), habitat suitability = 0.2
1070.4–1070.5	Illinois, Fayette	1.7	22	1 potential roost tree (black willow), habitat suitability = 0.1
1072.1–1072.2	Illinois, Fayette	0.5	23	2 potential roost trees (silver maple), habitat suitability = 0.73
1072.3–1072.7	Illinois, Fayette	1.0	21	5 potential roost trees (3 river birch, 2 black willow), habitat suitability = 0.9
1076.9–1077.1	Illinois, Marion	5.3	14	5 potential roost trees (4 elm, 1 black cherry), habitat suitability = 0.2

a 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. Readers need to refer to the cited references to see how these numbers were derived.

Sources: BHE 2006a, 2006b 2007a, 2007b.

To avoid impacts on the Indiana bat, **the following measures are recommended:**

- **Keystone should schedule cutting of identified potential roost trees in woodlands with a habitat suitability index for Indiana bats of more than 0.6 prior to the arrival of Indiana bats by April 1 (Theresa Davidson, USFWS, January 23, 2007).**
- **Keystone should not clear trees in woodlands that have not been surveyed to determine habitat suitability from April 1 to September 30 (John Cochnar, USFWS, May 27, 2007).**
- **If any Indiana bat maternity roost trees are located, applicable mitigation should be developed in consultation with USFWS and state wildlife agency personnel (John Cochnar, USFWS, April 28, 2006).**
- **Keystone should implement conservation measures to address the loss of Indiana bat summer habitat by working with USFWS, MDC 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 (Theresa Davidson, USFWS, January 23, 2007).**
- **Keystone should identify pesticide potentially proposed for use and any BMPs that would be implemented to minimize the impacts of pesticide use to maintain the pipeline ROW (John Cochnar, USFWS, May 27, 2006).**

Construction of the Mainline Project may affect Indiana bats and their habitats. A total of 273 acres of forested habitats suitable for Indiana bats would be lost due to construction of the Keystone Project. Coordination with federal and state resource agencies should continue, with the goal of impact avoidance, minimization, or mitigation. 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 would result in the Keystone Project not being likely to adversely affect the Indiana bat (Charlie Scott, USFWS, January 23, 2007).

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:

- Interruption of foraging activities due to exposure to construction and operations noise, and from increased human activity.

To avoid construction-related disturbance impacts to the gray wolf, **the following measure is recommended:**

- **If gray wolves are observed during construction, Keystone should immediately contact USFWS to determine whether additional protection will be required (John Cochnar, USFWS, April 28, 2006).**

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.

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 Jefferson and Gage Counties in Nebraska; Chariton, Randolph, and St. Charles Counties in Missouri; and Bond, Fayette, and Madison Counties in Illinois. Habitats likely to support the massasauga were identified by reviewing maps and aerial photography. Of 78 areas identified for field habitat evaluations,

29 sites totaling 4.4 miles were identified as containing suitable habitats for the massasauga in Missouri (Table 3.8.1-10) and 35 sites totaling 8.1 miles were identified as containing potentially suitable habitats in Illinois (BHE 2006c). The Missouri sites will be surveyed for massasauga presence during April 2007 (ENSR, Survey Protocols for Missouri Special-Status Species, January 17, 2007). Habitat surveys will be completed in Illinois during spring 2007 (ENSR, Survey Protocols for Illinois Special-Status Species, January 17, 2007). 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, **the following measures are recommended:**

- **Keystone should develop a mitigation plan for the massasauga in Illinois with guidance from IDNR and the Illinois Natural History Survey (Rick Pietruszka, IDNR, February 6, 2007).**
- **If construction activity would occur in suitable habitat during the massasauga's active period (April through October) in Jefferson and Gage Counties in Nebraska, a survey of these habitats for the massasauga should be conducted by a qualified herpetologist, prior to construction in the year that construction will occur in the area. Surveys for suitable habitat are to include both summer use habitat and winter denning habitat. Results of the survey should be sent to the NGPC to determine whether actions are needed to avoid impacts to the massasauga (Rick Schneider, NGPC, June 16, 2006).**
- **Impacts on eastern massasauga and its associated habitats should be avoided (John Cochnar, USFWS, April 28, 2006).**

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

Dakota Skipper

Table 3.8.1-11 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 3.8.1-10
Massasauga, Kirtland's, and Fox Snake Habitats Potentially Affected by the Keystone Mainline Project Route

Milepost	State, County	Total Miles	Description of Habitat
752.2–752.5	Missouri, Buchanan	0.3	Wetland in agricultural field with numerous crayfish burrows and emergent vegetation; 2% canopy cover
752.5–752.7	Missouri, Buchanan	0.2	Wetland in woodlot, surrounded by agricultural field, crayfish burrows, and emergent vegetation; 5% canopy cover
756.7–756.8	Missouri, Buchanan	0.1	Pond and associated wetland surrounded by pasture, crayfish burrows, and root masses along pond banks; 10% canopy cover
761.3	Missouri, Buchanan	<0.1	Wooded ditch surrounded by agricultural field and crayfish burrows; 60% canopy cover
762.9–763.0	Missouri, Buchanan	0.1	Wetland surrounded by agricultural field and crayfish burrows; no tree canopy
763.0–763.1	Missouri, Buchanan	0.1	Emergent/forested wetland surrounded by agricultural field and crayfish burrows; 40% canopy cover
763.4	Missouri, Buchanan	<0.1	Emergent/forested wetland surrounded by agricultural field and pasture, crayfish burrows, and root masses; 20% canopy cover
764.9–765.0	Missouri, Buchanan	0.1	Wooded wetland surrounded by agricultural field and crayfish burrows; 50% canopy cover
765.4–765.5	Missouri, Buchanan	0.1	Grassy wetland next to pond surrounded by agricultural field and crayfish burrows; 5% canopy cover
766.3	Missouri, Buchanan	<0.1	Wetland next to pond surrounded by agricultural field and crayfish burrows; 15% canopy cover
819.4–819.5	Missouri, Carroll	0.1	Wetland surrounded by agricultural field and crayfish burrows; 4% canopy cover
829.8–830.0	Missouri, Carroll	0.2	Wooded wetland, crayfish burrows; 40% canopy cover
834.3–834.4	Missouri, Carroll	0.1	Wetland in a field surrounded by patches of trees and crayfish burrows; 25% canopy cover
840.3–840.4	Missouri, Carroll	0.1	Wooded wetland crossed by two seasonal streams, crayfish burrows; 50% canopy cover
841.0–841.1	Missouri, Chariton	0.1	Emergent wetland next to stream, crayfish burrows; canopy cover 30%
841.1–841.2	Missouri, Chariton	0.1	Emergent wetland next to stream by levee, crayfish burrows; no canopy cover
841.5–841.6	Missouri, Chariton	0.1	Ditch through agricultural field, emergent vegetation, crayfish burrows; no canopy cover
841.5–841.6	Missouri, Chariton	0.1	Ditch through agricultural field, emergent vegetation, crayfish burrows; no canopy cover
842.4–842.8	Missouri, Chariton	0.4	Ditch through agricultural field, emergent vegetation, crayfish burrows; no canopy cover
842.9	Missouri, Chariton	<0.1	Emergent scrub-shrub wetland near stream, surrounded by woodlot, crayfish burrows; 50% canopy cover
846.9–847.0	Missouri, Chariton	0.1	Riparian wetland/woodland surrounded by pasture, crayfish burrows; 30% canopy cover
857.5–857.6	Missouri, Chariton	0.1	Forested wetland, stream levee, agricultural field, and crayfish burrows; 40% canopy cover
858.4	Missouri, Chariton	<0.1	Farm pond in woodlot surrounded by pasture, crayfish burrows, and emergent vegetation; 20% canopy cover
871.8–871.9	Missouri, Chariton	0.1	Pond and wetland next to levee, crayfish burrows, and emergent vegetation; 10% canopy cover

TABLE 3.8.1-10
(Continued)

Milepost	State, County	Total Miles	Description of Habitat
985.3–986.0	Missouri, St. Charles	0.7	Series of ponds and forested wetlands, crayfish burrows, and emergent vegetation; 40% canopy cover
989.0–989.3	Missouri, St. Charles	0.3	Pond, emergent wetland surrounded by forest and agricultural field, crayfish burrows; 40% canopy cover
989.7	Missouri, St. Charles	<0.1	Emergent wetland surrounded by agricultural field, crayfish burrows; 10% canopy cover
1003.3–1003.4	Missouri, St. Charles	0.1	Ditch through agricultural field, crayfish burrows; no canopy cover
1020.9–1021.1	Missouri, St. Charles	0.2	Emergent wetland next to levee, crayfish burrows, emergent vegetation; no canopy cover
1021.5–1022.1	Illinois, Madison	0.4	Habitat surveys in Illinois are scheduled for Spring 2007
1022.1–1022.3	Illinois, Madison	0.2	Habitat surveys in Illinois are scheduled for Spring 2007
1023.8–1024.0	Illinois, Madison	0.2	Habitat surveys in Illinois are scheduled for Spring 2007
1027.0–1027.2	Illinois, Madison	0.2	Habitat surveys in Illinois are scheduled for Spring 2007
1028.4–1028.5	Illinois, Madison	0.1	Habitat surveys in Illinois are scheduled for Spring 2007
1028.8	Illinois, Madison	<0.1	Habitat surveys in Illinois are scheduled for Spring 2007
1029.0	Illinois, Madison	<0.1	Habitat surveys in Illinois are scheduled for Spring 2007
1029.1	Illinois, Madison	<0.1	Habitat surveys in Illinois are scheduled for Spring 2007
1029.8–1029.9	Illinois, Madison	0.1	Habitat surveys in Illinois are scheduled for Spring 2007
1030.2	Illinois, Madison	<0.1	Habitat surveys in Illinois are scheduled for Spring 2007
1036.7–1037.1	Illinois, Madison	0.4	Habitat surveys in Illinois are scheduled for Spring 2007
1037.8–1037.9	Illinois, Madison	0.1	Habitat surveys in Illinois are scheduled for Spring 2007
1040.7–1040.8	Illinois, Madison	0.1	Habitat surveys in Illinois are scheduled for Spring 2007
1040.9–1041.0	Illinois, Madison	0.1	Habitat surveys in Illinois are scheduled for Spring 2007
1042.6–1042.8	Illinois, Madison	0.2	Habitat surveys in Illinois are scheduled for Spring 2007
1046.0–1047.1	Illinois, Madison	1.1	Habitat surveys in Illinois are scheduled for Spring 2007
1053.3–1053.5	Illinois, Bond	0.2	Habitat surveys in Illinois are scheduled for Spring 2007
1053.9–1054.0	Illinois, Bond	0.1	Habitat surveys in Illinois are scheduled for Spring 2007
1055.2–1055.3	Illinois, Bond	0.1	Habitat surveys in Illinois are scheduled for Spring 2007
1055.9–1056.0	Illinois, Bond	0.1	Habitat surveys in Illinois are scheduled for Spring 2007
1056.1	Illinois, Bond	<0.1	Habitat surveys in Illinois are scheduled for Spring 2007
1056.7	Illinois, Bond	<0.1	Habitat surveys in Illinois are scheduled for Spring 2007
1056.6–1056.7	Illinois, Bond	0.1	Habitat surveys in Illinois are scheduled for Spring 2007
1057.0–1057.2	Illinois, Bond	0.2	Habitat surveys in Illinois are scheduled for Spring 2007
1057.9	Illinois, Bond	<0.1	Habitat surveys in Illinois are scheduled for Spring 2007
1058.6–1058.7	Illinois, Bond	0.1	Habitat surveys in Illinois are scheduled for Spring 2007
1058.9–1059.0	Illinois, Bond	0.1	Habitat surveys in Illinois are scheduled for Spring 2007
1059.3–1059.5	Illinois, Bond	0.2	Habitat surveys in Illinois are scheduled for Spring 2007
1061.0–1061.1	Illinois, Bond	0.1	Habitat surveys in Illinois are scheduled for Spring 2007
1061.7–1062.1	Illinois, Bond	0.4	Habitat surveys in Illinois are scheduled for Spring 2007
1068.2–1068.4	Illinois, Fayette	0.2	Habitat surveys in Illinois are scheduled for Spring 2007
1069.5–1070.8	Illinois, Fayette	1.3	Habitat surveys in Illinois are scheduled for Spring 2007

TABLE 3.8.1-10 (Continued)

Milepost	State, County	Total Miles	Description of Habitat
1070.8–1072.1	Illinois, Fayette	1.3	Habitat surveys in Illinois are scheduled for Spring 2007
1072.2–1072.6	Illinois, Fayette	0.4	Habitat surveys in Illinois are scheduled for Spring 2007
1073.6–1073.8	Illinois, Fayette	0.2	Habitat surveys in Illinois are scheduled for Spring 2007

Sources: BHE 2006c, 2007c, Charles Johnson, ENSR, Proposed Survey Schedule for Illinois, January 17, 2007).

TABLE 3.8.1-11
Dakota Skipper Habitats Potentially Affected along the Mainline Project Route

Milepost	State	County	Habitat Quality	Summary
203.6–203.9	North Dakota	Sargent	High	Appears to be high-quality native prairie
204.1–205.0	North Dakota	Sargent	High	Very high-quality native prairie, government owned
265.2–266.2	South Dakota	Day	High	Native prairie adjacent to a hilly, high-quality prairie
296.9–297.9	South Dakota	Clark	Medium	Wetland swale with upland (blue grama) inclusions
390.9–391.7	South Dakota	Hutchinson	High	By Wolf Creek, rolling, native prairie hills
419.6–420.0	South Dakota	Yankton	High	Mosaic of smooth brome pasture with quality blue grama prairie spots
420.6–420.8	South Dakota	Yankton	High	Moderately grazed hills with native grassland
421.8–422.1	South Dakota	Yankton	High	By James River, native prairie ridges between cedar and broadleaf tree-filled ravines

Source: ENSR 2006e.

A total of 4.9 miles (1.2 miles in North Dakota and 3.7 miles in South Dakota) of medium- to 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 will complete Dakota skipper emergence surveys during June to August 1 at the following locations along the Mainline Project route that may contain this species or suitable habitat:

- Barnes County, North Dakota – MP 124.9 to 125.0 and MP 133.3 to 133.8;
- Ransom County, North Dakota – MP 167.8 to 168.6 and MP 172.5 to 172.6;
- Sargent County, North Dakota – MP 203.6 to 203.9 and MP 204.1 to 205.0;
- Clark County, South Dakota – MP 296.9 to 297.9;
- Day County, South Dakota – MP 265.2 to 266.2;

- Hutchinson County, South Dakota – MP 390.9 to 391.7; and
- Yankton County, South Dakota – MP 419.6 to 420.0, MP 420.6 to 420.8, and MP 421.8 to 422.1.

Keystone has committed to implementing the following measures in its Mitigation Plan to protect Dakota skippers and their habitats:

- Keystone will contract a qualified biologist to conduct a survey of sensitive species associated with native tall-grass prairie. Locations of sensitive species found will be documented; if sensitive species are identified in the ROW, Keystone will work with the relevant regulatory authorities to determine whether any additional protection measures are required.
- Disturbance in native prairie will 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 will be implemented to ensure that populations of Dakota skippers are not affected.

To avoid impacts on Dakota skippers and their habitats, **the following measures are recommended:**

- **Impacts on the Dakota skipper and its native prairie habitats should be avoided (John Cochnar, USFWS, March 6, 2007).**
- **Native prairie habitats disturbed within the pipeline ROW should be restored to conditions as good or better than pre-construction conditions to prevent further degradation of likely Dakota skipper habitat (John Cochnar, USFWS, March 6, 2007).**
- **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 3–4 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 adversely affect the Dakota skipper and 4.9 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 3.8.1-12 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. Keystone has committed to using HDD at nine crossings along the Mainline Project route (the Missouri River [two crossings], Platte River, Chariton River, Cuivre River [two crossings], and Kaskaskia River, 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).

Keystone also has committed to implementing the following measures in its Mitigation Plan to protect fish and mollusks:

- Throughout construction, contractors shall maintain adequate flow rates 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.

TABLE 3.8.1-12
Water Body Crossings Containing Protected Fish or Mollusks along the Keystone Project Route

Milepost	County	State	Water Body	Species and Survey Results or Plans
Mainline Project				
298	Clark	South Dakota	Foster Creek	Topeka shiner, suitable habitat – presence survey
299	Clark	South Dakota	Foster Creek	Topeka shiner, unsuitable habitat
304.2	Clark	South Dakota	Tributary of Shue Creek	Topeka shiner, unsuitable habitat
309.4	Beadle	South Dakota	Tributary of Shue Creek	Topeka shiner, unsuitable habitat
313.2	Beadle	South Dakota	Shue Creek	Topeka shiner, unsuitable habitat
317.8	Beadle	South Dakota	Middle Pearl Creek	Topeka shiner, unsuitable habitat
326.2	Kingsbury	South Dakota	South Fork Pearl Creek	Topeka shiner, suitable habitat – presence survey
334.8	Kingsbury	South Dakota	Redstone Creek	Topeka shiner, unsuitable habitat
337.3	Kingsbury	South Dakota	West Redstone Creek	Topeka shiner, unsuitable habitat
343.0	Miner	South Dakota	Redstone Creek	Topeka shiner, suitable habitat – presence survey
362.1	Miner	South Dakota	Rock Creek	Topeka shiner, suitable habitat – presence survey
375.7	Hansen	South Dakota	Wolf Creek	Topeka shiner, unsuitable habitat
384	McCook	South Dakota	Wolf Creek	Topeka shiner, suitable habitat – presence survey
391	Hutchinson	South Dakota	Wolf Creek	Topeka shiner, unsuitable habitat
391.4	Hutchinson	South Dakota	Tributary of Wolf Creek	Topeka shiner, unsuitable habitat
394.8	Hutchinson	South Dakota	Tributary of Wolf Creek	Topeka shiner, unsuitable habitat
417.7	Yankton	South Dakota	Tributary of James River	Topeka shiner, unsuitable habitat
421.8	Yankton	South Dakota	James River	Topeka shiner, winged mapleleaf
423.5	Yankton	South Dakota	Tributary of James River	Topeka shiner, unsuitable habitat
427.9	Yankton	South Dakota	Beaver Creek	Topeka shiner, unsuitable habitat
425.7	Yankton, Cedar	South Dakota, Nebraska	Missouri River (crossing – HDD)	Topeka shiner, pallid sturgeon, lake sturgeon, sturgeon chub, sicklefin chub, blacknose shiner, northern redbelly dace, finescale dace, Higgins' eye pearly mussel, scaleshell mussel
542	Colfax	Nebraska	Platte River (crossing – HDD)	Pallid sturgeon, sturgeon chub, sicklefin chub

TABLE 3.8.1-12
(Continued)

Milepost	County	State	Water Body	Species and Survey Results or Plans
Mainline Project (continued)				
658.9	Marshall	Kansas	Tributary of North Elm Creek	Topeka shiner, no survey
659.5	Marshall	Kansas	Tributary of North Elm Creek	Topeka shiner, marginal habitat survey – no Topeka shiners
662.1	Marshall	Kansas	North Elm Creek	Topeka shiner (FCH)
666.6	Marshall	Kansas	North Elm Creek	Topeka shiner (FCH)
689.6	Nemaha	Kansas	South Fork Big Nemaha River	Western silvery minnow (SCH), flathead chub (SCH)
748.3	Doniphan, Buchanan	Kansas, Missouri	Missouri River (crossing HDD)	Pallid sturgeon, sturgeon chub, sicklefin chub, chestnut lamprey
772.9	Clinton	Missouri	Castile Creek	Topeka shiner, marginal habitat – no Topeka shiners
780.8	Clinton	Missouri	Little Platte River	Topeka shiner, suitable habitat – no Topeka shiners
781.8	Clinton	Missouri	Tributary of Little Platte River	Topeka shiner, poor habitat – no Topeka shiners
785.5	Clinton	Missouri	Shoal Creek	Topeka shiner, suitable habitat – no Topeka shiners
786.2	Clinton	Missouri	Little Shoal Creek	Topeka shiner, surveyed – dry
794.5	Caldwell	Missouri	Log Creek	Topeka shiner, surveyed – dry
795.5	Caldwell	Missouri	Tributary of Log Creek	Topeka shiner, surveyed – no Topeka shiners
796.2	Caldwell	Missouri	Tributary of Log Creek	Topeka shiner, surveyed – no Topeka shiners
801.2	Caldwell	Missouri	Brush Creek	Topeka shiner, poor habitat – no Topeka shiners
801.7	Caldwell	Missouri	Tributary of Brush Creek	Topeka shiner, surveyed – dry
803.5	Caldwell	Missouri	Tributary of Crabapple Creek	Topeka shiner, surveyed – dry
804.5	Caldwell	Missouri	Crabapple Creek	Topeka shiner, poor habitat – no Topeka shiners
871.5	Chariton	Missouri	East Fork Chariton River	Topeka shiner, surveyed – no Topeka shiners
872.2	Chariton	Missouri	Tributary to East Fork Chariton River	Topeka shiner, surveyed – dry
1021.5	St. Charles, Madison	Missouri, Illinois	Mississippi River (crossing HDD)	Pallid sturgeon,
1072.2	Fayette	Illinois	Kaskaskia River (crossing HDD)	Western sand darter
Cushing Extension				
50.3	Clay	Kansas	Republican River (crossing HDD)	Arkansas River shiner, silver chub, speckled chub, habitat survey – occurrence survey
85	Dickinson	Kansas	Tributary of Carry Creek	Topeka shiner (FCH)
86.2	Dickinson	Kansas	Carry Creek	Topeka shiner (FCH), habitat survey – occurrence survey
91.4	Dickinson	Kansas	Tributary of W. Branch Lyon's Creek	Topeka shiner, habitat survey – occurrence survey

TABLE 3.8.1-12 (Continued)

Milepost	County	State	Water Body	Species and Survey Results or Plans
Cushing Extension (continued)				
92.3	Dickinson	Kansas	West Branch Lyon's Creek	Topeka shiner (FCH), habitat survey – occurrence survey
96.2	Dickinson	Kansas	Lyon's Creek	Topeka shiner, habitat survey – occurrence survey
97	Dickinson	Kansas	Tributary of Lyon's Creek	Topeka shiner, habitat survey – occurrence survey
98.7	Dickinson	Kansas	Tributary of Lyon's Creek	Topeka shiner, habitat survey – occurrence survey
114.1	Marion	Kansas	Mud Creek	Topeka shiner (FCH)
117.1	Marion	Kansas	Cottonwood River	Neosha madtom, fawnsfoot, creeper mussel, habitat survey – occurrence survey
205.3	Cowley	Kansas	Tributary to Arkansas River	Arkansas darter, habitat survey – occurrence survey
206.8	Cowley	Kansas	Arkansas River (crossing HDD)	Arkansas River shiner (SCH), silver chub (SCH), Arkansas River speckled chub (SCH), habitat survey – occurrence survey
289.5	Payne	Oklahoma	Cimarron River (crossing HDD)	Arkansas River shiner (SCH), habitat survey – occurrence survey

FCH = Federally designated critical habitat.
HDD = Keystone proposes crossing using horizontal directional drilling.
SCH = State-designated critical habitat.

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

- 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 will 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 will be crossed by HDD will 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 will 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

The pallid sturgeon is 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. 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).

To avoid impacts on pallid sturgeon, **the following measure is recommended:**

- **Keystone should consult with individual states concerning potential water withdrawal from the Platte River drainage and 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 likely would not 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.

To avoid impacts on the Arkansas darter, **the following measures are recommended:**

- **Complete habitat and occurrence surveys at the Cushing Milepost 205.3 crossing of the unnamed tributary of the Arkansas River (Nate Davis, KDWP, February 12, 2007).**
- **If suitable habitat exists within the ROW, no construction should be completed during the Arkansas darter spawning period March 1 to May 31 (Nate Davis, KDWP, February 12, 2007).**
- **Sample and relocation efforts would not be required (Nate Davis, KDWP, February 12, 2007).**

Construction of the Mainline Project would not affect the Arkansas darter. Construction of the Cushing Extension may affect the Arkansas darter at one stream crossing. 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.

To avoid impacts on the Arkansas River shiner and its critical habitats, **the following measures are recommended:**

- **Complete habitat and occurrence surveys at the Cushing Extension MP 206.8 crossing of the Arkansas River (Nate Davis, KDWP, February 12, 2007) and MP 289.5 crossing of the Cimarron River.**
- **If suitable habitat exists within the ROW, no construction should be completed during the Arkansas darter spawning period from March 1 to May 31 (Nate Davis, KDWP, February 12, 2007).**
- **Sampling and relocation efforts would not be required (Nate Davis, KDWP, February 12, 2007).**

Construction of the Mainline Project would not affect the Arkansas River shiner. Construction of the Cushing Extension would not likely affect the Arkansas River shiner or its designated critical habitat in the Arkansas and Cimarron Rivers, if these crossings are completed using HDD as planned. 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 habitat 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. Surveys evaluating Topeka shiner habitats and occurrence for the Cushing Extension will be completed during 2007. The Mainline Project surveys assessed suitability of these habitats based on the current understanding of life history requirements for Topeka shiners (Table 3.8.1-12). 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 3.8.1-12). All crossings were evaluated in Missouri; all contained no suitable habitat or no Topeka shiners.

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

To avoid impacts on the Topeka shiner, **the following measures are recommended:**

- **At a minimum, Keystone should maintain or restore the riparian corridor with native vegetation, ensuring future filtering of surface runoff to the stream (John Cochnar, USFWS, April 28, 2006).**
- **Work that would affect the channel or its banks during the primary spawning season for the shiner should not occur from May 15 to July 31 inclusive (John Cochnar, USFWS, April 28, 2006).**
- **Avoidance and protection measures should be used for all streams harboring Topeka shiners in Kansas, including (John Cochnar, USFWS, May 27, 2007):**

  <u>Mainline Project</u>

  - **Marshall County, MP 658.8 and 659.5 – North Elm Creek and tributaries;**

  <u>Cushing Extension</u>

  - **Dickinson County, MP 86.2 – Carry Creek;**
  - **Dickinson County, MP 91.4 and 92.3 – West Branch Lyons Creek and tributaries; and**
  - **Dickinson County, MP 96.2, 97.0 and 98.7 – Lyons Creek and tributaries.**

At an information meeting in Pierre, South Dakota on February 8, 2006, a Keystone pipeline representative indicated that it is feasible to bore under important habitats, such as Topeka shiner streams. Therefore, **the following measure is recommended:**

- **Topeka shiner streams should be crossed wherever feasible by using the directional boring techniques identified at the February 8, 2006 meeting (John Cochnar, USFWS, April 28, 2006).**

If the Topeka shiner streams cannot be bored, **the following measure is recommended:**

- **To protect the Topeka shiner from significant impacts associated with the Project, all work within the bed or banks of identified Topeka shiner streams is prohibited annually during the species' spawning season of May 15 through July 31. Work outside of the spawning season must include salvage and relocation efforts at all crossings. The following provisions must be implemented by a qualified biologist who has obtained the necessary state and federal collecting permits:**

- **The salvage and relocation efforts must occur within 2 weeks prior to commencing work within the bed and banks of each identified stream. Repeated salvage and relocation efforts may be necessary if high-water events delay construction activities more than 2 weeks following the initial salvage and relocation efforts.**
- **Salvage efforts must occur in all pools of affected streams that contain suitable habitat for the Topeka shiner within the ROW.**
- **Extensive effort must be made to collect all individuals of the species, including multiple seine attempts within pools upstream and downstream and/or electroshocking. Temporary cofferdams should block off the work area in which salvage operations occur.**
- **Activities should occur during ambient weather conditions suitable to ensure survivorship during relocation. Collection and relocation efforts should be performed in the early daytime hours to avoid ambient air temperatures that exceed 80 °F.**
- **Individuals must 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 should 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 must be implemented rapidly to avoid excessive holding time prior to relocation.**
- **The relocation site must 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 should occur between the salvage pools and the relocation pools.**

Based on habitat evaluations in South Dakota, Keystone concluded that 5 of the 21 sites evaluated for habitat be further surveyed to determine the presence or absence of Topeka shiner populations (Table 3.8.1-12). The Mainline Project would cross federally designated critical habitats at North Elm Creek in two locations. 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 3.8.1-12). Habitat evaluations and occurrence surveys will be completed for the Cushing Extension during the 2007 spawning season at six crossings in Kansas (Table 3.8.1-12).

Construction of the Mainline Project likely would not adversely affect the Topeka shiner in Missouri but may affect designated critical habitat in Kansas, and may affect the Topeka shiner in South Dakota. Construction of the Cushing Extension may affect the Topeka shiner and/or designated critical habitats in Kansas. Coordination with federal and state resource agencies should continue concerning 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 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.

To avoid impacts on the Neosho madtom, **the following measures are recommended:**

- **Keystone should complete the habitat survey at the Cushing Extension MP 117.1 crossing of the Cottonwood River (Nate Davis, KDWP, October 13, 2006)**
- **If suitable habitat exists within the ROW, no construction should be completed during the Neosho madtom spawning period from May 21 to July 15 (Nate Davis, KDWP, February 2, 2007).**

Construction of the Mainline Project would not affect the Neosho madtom. Construction of the Cushing Extension may affect the Neosho madtom and its habitat in the Cottonwood River due to the use of a trench crossing for this river. Coordination with state and federal resource agencies should continue concerning the potential to affect the Neosho madtom and its habitat at this crossing, with the goal of habitat impact avoidance, minimization, or mitigation.

Spectaclecase Mussel, 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 425.7 – Missouri River;
- Doniphan, Kansas – MP 748.3 – Missouri River; and
- St. Charles, Missouri – MP 1021.5 – Mississippi River.

Construction of the Keystone pipeline across the Missouri and Mississippi Rivers would use the HDD method; therefore, habitats for these mussels would not be affected by pipeline construction. 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.

Winged Mapleleaf

The winged mapleleaf is reported to occur in the vicinity of the James River crossing at MP 421.8 in Yankton County, South Dakota. A survey for this species was completed at this location in September 2006. No winged mapleleaf were found during sampling for the species at the James River crossing; however, five other species of rare mussels were recovered.

To avoid potential impacts on the winged mapleleaf and other rare native mussels, **the following measure is recommended:**

- **Freshwater mussels in the area of the proposed pipeline crossing (at and downstream from the crossing) on the James River should be moved upstream from the crossing location (Douglas Backlund, South Dakota Department of Game, Fish, and Parks, February 2, 2007)**

Construction of the Mainline Project and Cushing Extension pipelines is not likely to affect the winged mapleleaf. Construction of the Mainline Project at the James River crossing may affect suitable habitat for the winged mapleleaf due to the use of trench crossing for this river. Coordination with state and federal resource agencies should continue concerning the potential to affect winged mapleleaf habitat and five other rare species of mussels at this crossing, with the goal of habitat impact avoidance, minimization, or mitigation.

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 implementing the following measures in its Mitigation Plan 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 will 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, will 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. The decurrent false aster occurs within the Confluence State Park in Missouri (H. Floyd Gilzow, Missouri Department of Natural Resources, April 27, 2007).

Areas that have been determined appropriate to survey for the decurrent false aster during 2007 include:

- St. Charles, Missouri – MP 985.3 to 1021.1;
- Madison, Illinois – MP 1023.8 to 1024.1;
- Madison, Illinois – MP 1025.3 to 1025.6;
- Madison, Illinois – MP 1026.6 to 1027.0;
- Madison, Illinois – MP 1028.0 to 1028.4;
- Madison, Illinois – MP 1028.7 to 1028.8;
- Madison, Illinois – MP 1029.8 to 1030.2;
- Bond, Illinois – MP 1055.3 to 1057.0; and
- Fayette, Illinois – MP 1069.4 to 1073.4 (Carlyle Lake).

Habitats that would be surveyed within these areas include agricultural fields, disturbed areas, roadside ditches, bases of levees near standing water, sloughs, pond margins, wet prairies, and edges of or openings within floodplain forests.

MDC has developed BMPs for projects in areas where the decurrent false aster is likely to occur. 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.

To avoid impacts on the decurrent false aster, **the following measures are recommended:**

- **Conduct a survey for the presence of the decurrent false aster in the Missouri River floodplains in St. Charles County, Missouri from MP 985.3 to 1021.1 during the flowering period from late August through September 2007. Repeat the survey during 2008, even if no plants are found during 2007 (Doyle Brown, MDC, February 6, 2007).**
- **If the decurrent false aster is found in Confluence State Park in St. Charles County, Missouri, additional consultation with the Missouri State Parks Department may be required (Doyle Brown, MDC, February 6, 2007).**

- **If decurrent false aster is found in the Keystone Project ROW and avoidance of its habitat is not possible, Keystone should consult with the landowner, USFWS, and state authorities concerning salvage, relocation, or domestic cultivation prior to habitat restoration and replacement (John Cochnar, USFWS, April 28, 2006).**

Construction of the Mainline Project in the Missouri River floodplain in St. Charles County, Missouri; in the Mississippi River floodplain in Madison County, Illinois; and at Carlyle Lake in Fayette County, Illinois is likely to adversely affect the decurrent false aster. 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.

Eastern Prairie Fringed Orchid

Suitable native wet prairie habitats for the eastern prairie fringed orchid may be crossed by the Mainline Project ROW in Madison, Bond, and Fayette Counties in Illinois. To reduce potential impacts or maximize the listed plant species' survival, IDNR has requested that Keystone complete presence surveys for the eastern prairie fringed orchid in suitable habitats crossed by the pipeline ROW (Rick Pietruszka, IDNR, February 15, 2007). Potential suitable habitats for the eastern prairie fringed orchid that have been identified using aerial photography will be surveyed to evaluate habitats during the flowering period from late-June to mid-July 2007 (Table 3.8.1-13). Pre-construction surveys would be completed in 2008 only in areas where the eastern prairie fringed orchid was observed in 2007.

The BMPs developed by MDC for projects in areas where the western prairie fringed orchid is likely to occur would be applicable to the eastern prairie fringed orchid. These BMPs are voluntary and include:

- Survey high-quality prairies during the flowering period to determine if the orchid is present.
- At known or expected sites: 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.

Construction of the Mainline Project in Madison, Bond and Fayette Counties in Illinois may affect the eastern 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 eastern prairie fringed orchid. Coordination with federal and state resource agencies should continue concerning the potential to affect the eastern prairie fringed orchid or suitable habitats, with the goal of 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. 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.

TABLE 3.8.1-13
Eastern Prairie Fringed Orchid Habitats Potentially Affected along the Keystone Mainline Project Route

Milepost	State	County	Habitat Quality	Summary
1021.5–1023.1	Illinois	Madison	Unknown	Surveys scheduled for summer 2007
1024.2–1024.8	Illinois	Madison	Unknown	Surveys scheduled for summer 2007
1027.0–1027.2	Illinois	Madison	Unknown	Surveys scheduled for summer 2007
1028.5–1029.0	Illinois	Madison	Unknown	Surveys scheduled for summer 2007
1029.8–1030.3	Illinois	Madison	Unknown	Surveys scheduled for summer 2007
1036.6–1037.2	Illinois	Madison	Unknown	Surveys scheduled for summer 2007
1037.9–1038.0	Illinois	Madison	Unknown	Surveys scheduled for summer 2007
1038.7–1039.0	Illinois	Madison	Unknown	Surveys scheduled for summer 2007
1042.7–1042.8	Illinois	Madison	Unknown	Surveys scheduled for summer 2007
1046.0–1047.1	Illinois	Madison	Unknown	Surveys scheduled for summer 2007
1053.2–1054.0	Illinois	Bond	Unknown	Surveys scheduled for summer 2007
1055.9–1056.1	Illinois	Bond	Unknown	Surveys scheduled for summer 2007
1056.6–1057.1	Illinois	Bond	Unknown	Surveys scheduled for summer 2007
1057.9–1058.0	Illinois	Bond	Unknown	Surveys scheduled for summer 2007
1058.6–1059.2	Illinois	Bond	Unknown	Surveys scheduled for summer 2007
1061.0–1062.1	Illinois	Bond	Unknown	Surveys scheduled for summer 2007
1068.0–1068.2	Illinois	Bond	Unknown	Surveys scheduled for summer 2007
1069.4–1073.4	Illinois	Fayette	Unknown	Surveys scheduled for summer 2007

Source: Charles Johnson, ENSR, Biological Survey Program for the Keystone Mainline Pipeline Project in Illinois, January 17, 2007.

The surveys identified suitable habitats for the western prairie fringed orchid that would be affected by the Mainline Project at two sites in North Dakota, five sites in South Dakota, and 10 sites in Nebraska (Table 3.8.1-14).

TABLE 3.8.1-14
Western Prairie Fringed Orchid Habitats Potentially Affected along the Keystone Project Route

Milepost	State	County	Habitat Quality	Summary
207.8–208.3	North Dakota	Dickey	Medium	Wetland meadow with upland inclusions
210.8–211.9	North Dakota	Dickey	High	Grazed wetland meadow with upland inclusions
212.9–214.0	North Dakota	Dickey	None	Large, high-quality wetland with few upland areas
258.6–258.8	South Dakota	Day	Low	Appears to be heavily grazed
277.2–277.9	South Dakota	Clark	Medium	Mosaic of pasture/wetland and grassland
278.4–279.2	South Dakota	Clark	Medium	Mosaic of pasture/wetland and grassland
383.9–384.5	South Dakota	McCook	Medium to high	Smooth brome pasture with wetlands and native grassland on hills
390.9–391.7	South Dakota	Hutchinson	High	By Wolf Creek, rolling, native prairie hills
436.0–436.1	Nebraska	Cedar	Not evaluated	Potential native grassland – orchid habitat
503.4–503.5	Nebraska	Stanton	Not evaluated	Potential native grassland – orchid habitat
540.9–541.2	Nebraska	Colfax	Not evaluated	Potential native grassland – orchid habitat
548.1–548.2	Nebraska	Butler	Not evaluated	Potential native grassland – orchid habitat
564.4–564.7	Nebraska	Butler	Not evaluated	Potential native grassland – orchid habitat
594.8–595.1	Nebraska	Saline	Not evaluated	Potential native grassland – orchid habitat
606.4–606.5	Nebraska	Saline	Not evaluated	Potential native grassland – orchid habitat
622.2–622.4	Nebraska	Jefferson	Not evaluated	Potential native grassland – orchid habitat
635.1–636.8	Nebraska	Jefferson	Not evaluated	Potential native grassland – orchid habitat
637.0–637.4	Nebraska	Jefferson	Not evaluated	Potential native grassland – orchid habitat

Source: ENSR 2006e.

MDC developed 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.

Construction of the Mainline Project in native wet prairie habitats in North Dakota, South Dakota, and Nebraska may affect the eastern 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.

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 that were identified using aerial photography will be surveyed to evaluate suitable habitats during the flowering period from mid-April to May 2007 (Table 3.8.1-15). Pre-construction surveys would be completed in 2008 only in areas where the eastern prairie fringed orchid was observed in 2007.

TABLE 3.8.1-15
Running Buffalo Clover Habitats Potentially Affected by the Keystone Mainline Project Route

Milepost	State	County	Habitat Quality	Summary
748.3	Missouri	Buchanan	Surveys scheduled for summer 2007	Missouri River
841	Missouri	Chariton	Surveys scheduled for summer 2007	Grand River
862.2	Missouri	Chariton	Surveys scheduled for summer 2007	Chariton River
867	Missouri	Chariton	Surveys scheduled for summer 2007	Middle Fork Little Chariton River
871.7	Missouri	Chariton	Surveys scheduled for summer 2007	East Fork Chariton River
957	Missouri	Lincoln	Surveys scheduled for summer 2007	West Fork Cuivre River
971	Missouri	Lincoln	Surveys scheduled for summer 2007	Cuivre River
981.6	Missouri	St. Charles	Surveys scheduled for summer 2007	Cuivre River
985-1021.5	Missouri	St. Charles	Surveys scheduled for summer 2007	Missouri/Mississippi Rivers

Source: Charles Johnson, ENSR, Biological Survey Program for the Keystone Mainline Pipeline Project in Missouri, January 17, 2007.

MDC has developed BMPs for projects in areas where running buffalo clover is likely to occur. 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).

To avoid impacts on running buffalo clover, **the following measures are recommended:**

- **Keystone should conduct surveys of potential running buffalo clover habitat on the floodplain of the Cuivre River. Surveys should be conducted by a botanist familiar with the species to determine the possible occurrence of this plant (John Cochnar, USFWS, April 28, 2006).**
- **Qualification of the surveyor, method of survey, and results of the survey should be submitted to the Columbia, Missouri Field Office of USFWS, for review and a determination whether further Section 7 consultation with USFWS is necessary (John Cochnar, USFWS, April 28, 2006).**

Construction of the Mainline Project in open woodland habitats in Missouri may 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 could aid in minimizing effects on running buffalo clover. 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.

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. Project elements 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 Platte River basin, including the Elkhorn River (MP 498), Shell Creek (MP 527), and the Platte River (MP 537) for hydrostatic testing, which could result in an instream flow depletion to the lower Platte River. Such a 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.

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. This volume of water would be retained for about 7 days to complete tests, after which the water would be returned to the drainage.

Average monthly flow rates for potential water sources including the Elkhorn River, Shell Creek, 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 (36 acre-feet) represents between 2 and 7 percent of the average monthly flow as acre-feet/day for the Elkhorn River (Figure 3.8.1-1), between 16 and 55 percent of the average flow for Shell Creek (Figure 3.8.1-1), and between 1 and 12 percent of the average flow for the Platte River (Figure 3.8.1-1) from February through July.

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

	Elkhorn River at Norfolk, Nebraska (USGS 06799000)			Shell Creek near Columbus, Nebraska (USGS 06795500)			Platte River near Duncan, Nebraska (USGS 06774000)		
	cfs	ac-ft/day	ac-ft/mo	cfs	ac-ft/day	ac-ft/mo	cfs	ac-ft/day	ac-ft/mo
January	295	585	17554	14	28	833	1,040	2,063	61,884
February	**362**	**718**	**21,540**	**33**	**65**	**1,964**	**1,140**	**2,261**	**67,835**
March	**536**	**1,063**	**31,894**	**58**	**115**	**3,451**	**1,310**	**2,598**	**77,950**
April	**986**	**1,954**	**58,612**	**37**	**73**	**2,202**	**1,110**	**2,202**	**66,050**
May	**772**	**1,531**	**45,937**	**116**	**230**	**6,902**	**1,130**	**2,241**	**67,240**
June	**645**	**1,279**	**38,380**	**63**	**125**	**3,749**	**550**	**1,091**	**32,727**
July	**259**	**514**	**15,412**	**38**	**75**	**2,261**	**153**	**303**	**9,104**
August	165	327	9,818	12	24	714	120	238	7,140
September	173	343	10,294	19	38	1,131	205	407	12,198
October	208	413	12,377	11	22	655	387	768	23,028
November	280	555	16,661	17	34	1,012	606	1,202	36,060
December	306	607	18,208	15	30	893	944	1,872	56,172

cfs = Cubic feet per second.
ac-ft/day = Acre-foot (-feet) per day.
ac-ft/mo = Acre-foot (-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).

To avoid impacts on federally protected species in the Lower Platte River basin, **the following measures are recommended:**

- **Keystone should 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 (John Cochnar, USFWS, February 5, 2007).**

  This description should include:

  - **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.**

- **Keystone should maintain adequate flow rates in water bodies used for water withdrawal for hydrostatic testing to protect aquatic life, provide for all water body uses, and provide**

for downstream withdrawals of water by existing users (John Cochnar, USFWS, February 5, 2007).

- **Avoid water withdrawal from February 1 through July 31 in the Lower Platte region (Columbus, Nebraska to the Missouri River) (John Cochnar, USFWS, February 5, 2007).**
- **Keystone should ensure that hydrostatic test water is withdrawn and discharged in the same watershed.**
- **Keystone should ensure that no chemicals are added to the hydrostatic test water.**
- **Keystone should 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.**
- **Keystone should ensure that the pipeline is cleaned prior to the hydrostatic testing.**

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 (pied-billed grebe, king rail, least bittern, and yellow-crowned night heron) raptors (northern harrier and barn owl), snowy plover, 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 – Pied-Billed Grebe, King Rail, Least Bittern, and Yellow-Crowned Night Heron

The pied-billed grebe, king rail, least bittern, and yellow-crowned night heron are state listed as threatened or endangered in Illinois or Missouri. Pied-billed grebes have been recorded within 5 miles of the pipeline ROW in Fayette County, Illinois. 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).

Grebes, 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 and Barn Owl

The northern harrier is state listed as endangered in Missouri and Illinois, and the barn owl is state listed as endangered in Missouri and Illinois. Preliminary raptor surveys along portions of 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.

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.

Snowy Plover

The snowy plover is state listed as threatened in Kansas. Snowy plovers have been recorded in Cowley County, Kansas along the Keystone ROW. Nesting habitats include alkaline flats, mudflats, sandy shorelines, and sandbars along rivers, lakes, ponds, and marshlands. Nesting occurs from May 1 to August 15.

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

Eastern Spotted Skunk

Eastern spotted skunks are state listed as endangered in Missouri, as threatened in Kansas, and as a species of conservation concern in South Dakota. Along the Keystone ROW, Eastern spotted skunks have been recorded in Marshall, Nemaha, Brown, and Doniphan Counties in Kansas.

Spotted skunks prefer forest edge, prairie, brushy areas, and cultivated lands near rock outcrops or shrubs. Spotted skunks den underground in grassy banks, rocky crevices, or along fence rows, as well as aboveground in hay stacks, woodpiles, brush heaps, hollow logs, and abandoned buildings or outbuildings. Young are born in May or June.

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 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, 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).

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 – Pied-Billed Grebe, King Rail, Least Bittern, and Yellow-Crowned Night Heron

Table 3.8.2-1 describes 19 functionally intact or extensive wetland complexes based on wetland survey data along the Mainline Project ROW in Buchanan, Carroll, Chariton, Lincoln, and St. Charles 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.

TABLE 3.8.2-1
King Rail Habitat Potentially Affected by the Keystone Project Route

Milepost	State, County	Wetland Description	Comments
756.7	Missouri, Buchanan	Mostly open water, small area of emergent cattails and sedges	Poor to marginal habitat due to surrounding trees
758.0	Missouri, Buchanan	Pond, attached to wetland at MP 756.7	Poor to marginal habitat
763.0	Missouri, Buchanan	Emergent wetland – sedge, surrounded by flood plain forest, old river channel	Poor to marginal habitat due partly to surrounding trees
763.0	Missouri, Buchanan	Emergent wetland – sedge, surrounded by flood plain forest, old river channel	Poor to marginal habitat due partly to surrounding trees
819.0	Missouri, Carroll	Unknown – no access	Unknown
831.2	Missouri, Carroll	Open water and flood plain forest, some sedges	Poor to marginal habitat, mostly forested
841.1	**Missouri, Chariton**	**Open water and emergent wetland - sedge**	**Floodplain along the Grand River**
841.7	**Missouri, Chariton**	**Forested wetland transitions to emergent wetland - sedge**	**Floodplain along the Grand River**
842.0	**Missouri, Chariton**	**Intermittent stream, emergent wetland - sedge**	**Floodplain along the Grand River**
849.4	Missouri, Chariton	Pond with emergent wetland – cattail and sedge	Marginal habitat, parts of pond forested
850.5	Missouri, Chariton	Emergent wetland – cattail and sedge around pond	Open water and emergent vegetation present
858.4	Missouri, Chariton	Emergent wetland – cattail and sedge in pasture with woodland fringe	Poor to marginal habitat, no open water
859.8	Missouri, Chariton	Narrow emergent wetland – sedge with pond to south	Fringe wetlands, no open water
973.8	Missouri, Lincoln	Emergent wetland – rice cutgrass and bushy seedbox, pond	Good habitat, open water and emergent vegetation
973.8	Missouri, Lincoln	Emergent wetland – bushy seedbox and tall dock	Poor to marginal habitat, no open water
973.9	Missouri, Lincoln	Emergent wetland – tall dock and bushy seedbox	Marginal habitat, next to pond outside ROW
982.8	Missouri, St. Charles	Emergent wetland – sedges, rushes; at base of levee	Poor to marginal habitat, no open water
982.8	Missouri, St. Charles	Emergent wetland – arrowhead, bushy seedbox; at base of levee	Marginal habitat, surrounded by trees
984.9	Missouri, St. Charles	Emergent wetland – bushy seedbox and buttonbrush	Marginal habitat next to Peruche Creek

Note:

Boldface text indicates locations to survey for king rail (Andrew Forbes, Missouri Department of Conservation, February 15, 2007).

Source: ENSR 2007b.

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 avoid impacts to state-protected waterbird species, **the following measures are recommended:**

- **Keystone should conduct surveys at the three 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).**
- **If king rails are identified using the sites described above, no construction should be allowed between April 1 and July 15 to prevent disrupting breeding activities.**
- **Keystone should conduct surveys for least bittern, pied-billed grebe, 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).**
- **Construction in areas with documented nest sites should be avoided 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 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 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.

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

Sources: ENSR 2006a, 2007a.

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 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. Keystone has committed to conducting a pre-construction survey for barn owls in Missouri and Illinois during the nesting season (March to June), if construction would occur during the nesting season for this species (Charles Johnson, ENSR, Proposed Survey Schedule for Missouri, Proposed Survey Schedule for Illinois, January 17, 2007). In addition, pre-construction surveys for northern harriers will 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 (Charles Johnson, ENSR, Keystone Pipeline Project – Proposed Survey Schedule for Missouri, January 17, 2007).

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 on the northern harrier and barn owl, **the following measure is recommended:**

- **Avoid construction that would disturb northern harriers and barn owls during the March to June breeding season.**

Construction of the Mainline Project in Missouri and Illinois may affect nesting, brood-rearing, and foraging northern harriers 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.

Snowy Plover

To avoid impacts on snowy plover, **the following measures are recommended:**

- **Keystone should consult with USFWS and appropriate resource agencies in Kansas to identify nesting areas used by the snowy plover.**
- **If pre-construction nest surveys identify an active snowy plover nest within the construction ROW, Keystone should consult with USFWS and state agency wildlife biologists.**

Construction of the Keystone Project in Illinois may affect nesting, brood-rearing, and foraging snowy plovers if construction takes place during the nesting season. 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. Keystone plans to complete habitat and presence 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, **the following measure is recommended:**

- **Pre-construction nest surveys should be completed in the Carlyle Lake WMA, Fayette County, Illinois. No construction should occur during the breeding season if loggerhead shrikes are observed nesting in the construction ROW (Rick Pietruszka, IDNR, February 6, 2007).**

Construction of the Mainline Project in Illinois may 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.

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.

Eastern Spotted Skunk

The eastern spotted skunk would most likely be affected by construction through shelterbelts and woodlands crossed by the Keystone Project. To avoid impacts on eastern spotted skunks, **the following measures are recommended:**

- **Keystone should contact the appropriate resource agencies in Missouri, Kansas, and South Dakota for current distributions of Eastern spotted skunk; any documented active den sites should be avoided.**
- **If spotted skunks are observed during construction, appropriate state wildlife authorities should be contacted to avoid injury to this species.**

Construction of the Mainline Project and Cushing Extension may affect the eastern spotted skunk and its habitats. If this 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
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.

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 will be surveyed for the presence of river otters during the denning season between March and September 2007. They will 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 listed:

- Colfax County, Nebraska – MP 542, Platte River crossing (HDD);
- Stanton County, Nebraska – MP 502, Elkhorn River crossing (open cut);
- Bond County, Illinois – MP 1050.8, Shoal Creek crossing (open cut); and
- Fayette County, Illinois – MP 1072.2, Kaskaskia River crossing (HDD).

To avoid impacts on river otters, **the following measure is recommended:**

- **Occupied den sites should be identified and avoided by construction (Rick Schneider, NGPC, June 16, 2006).**

Construction of the Mainline Project in Nebraska and Illinois may 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.

Western Fox Snake

Based on photo-interpretation of potential habitat, approximately 4.4 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 3.8.1-10).

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.

To avoid impacts on the western fox snake, **the following measure is recommended:**

- **Survey suitable habitats for emerging snakes in early April (Doyle Brown, MDC, February 28, 2007).**

Construction of the Mainline Project in Missouri may affect the western fox snake and its habitats. If western fox snakes are observed during hibernation emergence surveys at the habitats identified in Table 3.8.1-10, 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 8.1 miles of potentially suitable habitat for the Kirtland's snake in Madison, Bond, and Fayette Counties in Illinois (Table 3.8.1-10). Habitat evaluations at 35 sites potentially containing suitable habitats (based on review of aerial photography, habitat mapping, and consultation with state resource agencies) will be completed during spring 2007. Kirtland's snake is known to occur in the Carlyle Lake WMA.

To avoid construction-related impacts to the Kirtland's snake, **the following measure is recommended:**

- **Develop a conservation plan for Kirtland's snake in Illinois, with guidance from IDNR and the Illinois Natural History Survey (Rick Pietruszka, IDNR, February 6, 1007).**

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 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. Therefore, construction would not 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.

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 open-cut method would degrade the designated critical habitat and negatively affect the flathead chub. Other designated critical habitats for this species in Kansas and the Missouri River crossing in Missouri would be crossed using HDD and would not affect this species.

To avoid impacts on flathead chubs, **the following measures are recommended:**

- **Complete habitat and presence surveys for the flathead chub at the South Fork Big Nemaha River crossing in Kansas (Nate Davis, KDWP, February 12, 2007).**
- **No construction should occur during the flathead chub spawning period from July 1 to August 15 within the South Fork Big Nemaha River channel (Nate Davis, KDWP, February 12, 2007).**
- **If flathead chubs are present at the crossing site, they should be collected and relocated to suitable habitats upstream from the construction area (Nate Davis, KDWP, February 12, 2007).**

Construction of the Cushing Extension in Kansas may affect the flathead chub and designated critical habitat in the South Fork Big Nemaha River. Coordination with state resource agencies should continue, with the goal of impact avoidance, minimization, or mitigation.

Silver Chub

The Cushing Extension would cross silver chub habitats in the Republican River and Arkansas River in Kansas (Nate Davis, KDWP, October 13, 2006). These rivers would be crossed using HDD, and no river channel habitat impacts are expected. Habitat and sampling surveys for this species will be conducted during June 1 to August 15, 2007 at the following location:

- Cowley County, Kansas – Cushing Extension MP 206.8, Arkansas River crossing (HDD).

To avoid impacts on silver chubs, if the Arkansas River crossing would be trench cut instead of the proposed HDD method, **the following measures are recommended:**

- **Complete habitat and presence surveys for the silver chub at the Arkansas River crossings in Kansas (Nate Davis, KDWP, February 4, 2007).**
- **No instream construction should occur during the silver chub spawning period from July 1 to August 15 within the South Fork Big Nemaha River channel (Nate Davis, KDWP, February 4, 2007).**
- **If silver chubs are present at the crossing site, they should be collected and relocated to suitable habitats upstream from the construction area (Nate Davis, KDWP, February 4, 2007).**

Construction of the Cushing Extension in Kansas may affect the silver chub and designated critical habitat in the Arkansas River. Coordination with state resource agencies should continue, with the goal of impact avoidance, minimization, or mitigation, if this river crossing would be constructed using the trench cut method rather than the HDD method, as currently proposed.

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 hydrostatic testing may alter habitats in the Platte River used by sturgeon chub. To avoid impacts on sturgeon chub, **the following measure is recommended:**

- **Keystone should 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 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. To avoid impacts on sicklefin chub, Keystone should implement the measured identified above for the sturgeon chub.

Construction of the Mainline Project 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. To avoid impacts on silver chubs, if the Arkansas River crossing would be trench cut instead of the proposed HDD method, **the following measure is recommended:**

- **No instream construction should occur during the silver chub spawning period from May 15 to August 31 within the Arkansas River channel.**

Construction of the Cushing Extension in Kansas is not likely to affect the Arkansas River speckled chub or its designated critical habitat in the Arkansas River. Coordination with state resource agencies should continue, if this river crossing would be constructed using the trench cut method rather than the HDD method as currently proposed, 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 (Nate Davis, KDWP, February 12, 2007). The proposed open-

cut crossing method would degrade this designated critical habitat and would negatively affect the western silvery minnow.

To avoid impacts on the western silvery minnow, **the following measures are recommended:**

- **Complete habitat and presence surveys for the western silvery minnow at the South Fork Big Nemaha River crossing in Kansas (Nate Davis, KDWP, February 12, 2007).**
- **No construction should occur during the western silvery minnow spawning period from June 1 to August 15 within the South Fork Big Nemaha River channel (Nate Davis, KDWP, February 12, 2007).**
- **If western silvery minnows are present at the crossing site, they should be collected and relocated to suitable habitats upstream from the construction area (Nate Davis, KDWP, February 12, 2007).**

Construction of the Cushing Extension in Kansas may affect the western silvery minnow and designated critical habitat in the South Fork Big Nemaha River. 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. Therefore, construction would not 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.

Small White Lady's Slipper

The locations of potential habitats that could be affected by the Keystone Project are shown in Table 3.8.2-4. Surveys scheduled for May 15 to June 7, 2007 would verify the occurrence of small white lady's slippers in these potentially suitable habitats along the ROW.

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. Coordination with state resource agencies should continue, with the goal of impact avoidance, minimization, or mitigation.

Royal Catchfly, Prairie Spiderwort, and Spring Ladies' Tresses

IDNR requested that Keystone conduct surveys for these state-listed plants within suitable habitats crossed by the Mainline Project to reduce impacts and maximize the species survival.

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.

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 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. No additional pre-construction surveys would occur during 2008, if these plants are not found during the 2007 surveys. If any of these plants are found during the 2007 surveys, 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. Coordination with state resource agencies should continue, with the goal of impact avoidance, minimization, or mitigation.

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).

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					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					Charlton 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 Mainline Project and Cushing Extension Routes

Species	Status [a]	Residence [b] ND	SD	NE	KS	MO	IL	OK	Habitat
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] ND	SD	NE	KS	MO	IL	OK	Habitat
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] ND	SD	NE	KS	MO	IL	OK	Habitat
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.

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.

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.

To minimize potential construction- and operations-related effects, Keystone would implement procedures outlined in its Mitigation Plan. Pipeline construction would be conducted in accordance with any required permits.

Keystone has committed to implementing the following measures in its Mitigation Plan to protect wildlife species of conservation concern:

- Bevel shavings produced during pipe bevel operation will be removed immediately to ensure that livestock and wildlife do not ingest this material.
- Litter and garbage that could attract wildlife will 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 will not be permitted to have firearms or pets on the construction ROW.
- All food and wastes will be stored and secured in vehicles and/or appropriate facilities.
- Areas of disturbance in native range will be seeded with a native seed mix after topsoil replacement.

- Keystone will 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 will be documented; if species of conservation concern are identified in the ROW, Keystone will work with the relevant regulatory authorities to determine whether any additional protection measures would be required.
- Disturbance in native prairie will 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 will be implemented to ensure that populations of species of conservation concern are not affected.
- Keystone will 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 will 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 will 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 will work with USFWS and state agency wildlife biologists to develop mitigation measures. These measures will 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, **the following measures are recommended:**

- **Keystone should work with USFWS to identify measures to comply with the MBTA and the Bald and Golden Eagle Protection Act.**
- **Keystone should work with USFWS and state agency wildlife biologists to determine whether additional mitigation is needed for wildlife species of conservation concern.**

3.8.3.2 Connected Action

In modifying or constructing transmission line substations to support the Keystone Project, Western would implement the following mitigation measures for Threatened and Endangered Species:

- Western would ensure that all personnel on site are briefed on the laws protecting threatened and endangered species, and proper procedures for removal from project right-of-way.
- If required, a qualified biologist would accompany construction crews into the field when construction activities occur in habitat of federally-listed threatened or endangered species.

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3.9 LAND USE, RECREATION AND SPECIAL INTEREST AREAS, AND VISUAL RESOURCES

Construction, operation, and maintenance of the pipeline facilities and access routes for the Keystone Project would cause temporary and permanent impacts on various types of land uses, such as agriculture, rangeland, wetlands, waterbodies, industrial/commercial land, residential land, and recreational and other special interest areas (e.g., public lands). The potential impacts and recommended mitigation in the following sections apply to both the Mainline Project and the Cushing Extension routes, except as noted.

As shown in Tables 3.9.3-3 and 3.9.4-3 (in the respective sections), the largest amount of acreage that would be affected by the Keystone Project would be agricultural land (65 percent and 51 percent for the Mainline Project and the Cushing Extension, respectively), followed by rangeland (15 and 32 percent, respectively). Impacts to these and other various land uses, as well as visual resources, are discussed below and are separated for the Mainline Project and the Cushing Extension routes. Wetlands and forested areas are discussed in greater detail in Sections 3.4 and 3.5, respectively.

3.9.1 Right-of-Way Acquisition Process

Pipeline facilities would predominantly affect privately owned land. Private land comprises approximately 99 percent of lands that would be crossed by the Mainline Project and 98 percent that would be crossed by Cushing Extension. Of the affected privately owned areas, land use is primarily agricultural.

Keystone requires a negotiated easement from all ROW landowners. Easements would consist of two types: permanent easements that would allow Keystone to construct, operate, and maintain the pipeline in the permanent ROW; and temporary easements to allow for additional construction workspace and storage areas In return, the company compensates the landowner for use of the land. The easement agreement between the company and landowner typically specifies compensation for loss of use during construction, loss of non-renewable or other resources, damage to property during construction, and allowable uses of the permanent ROW after construction. Because the easement acquisition process is conducted with the landowner, it is possible that tenants or lessees could be adversely affected, although it is not known whether any instances of such impacts would occur in conjunction with the components of the Keystone Project.

The potential effect of a pipeline easement on private property values or property income is an issue that would be negotiated between the parties during the easement acquisition process, a process designed to compensate a landowner for the right to use the property for pipeline construction and operation. The impact a pipeline may have on the value of a tract of land depends on many factors, including the size of the tract, the values of adjacent properties, the presence of other utilities, the current value of the land, and the current land use. Construction of the proposed Keystone Project would not change the general use of the land (except for permanent aboveground facilities and forest land) but would preclude construction of aboveground structures on the permanent ROW, restrict excavation or alteration of ground elevation, and restrict impoundment of water above the permanent ROW. The easement would allow Keystone the right to cut and clear trees, brush, and shrubbery and to remove structures and other obstacles from the permanent ROW. Construction and operation of the pipeline might interfere with other current uses on a short-term or long-term basis, or contribute to the loss of non-renewable resources or destruction of site improvements such as fences.

Keystone would monetarily compensate landowners in return for granting easements. Compensation would be for loss of use during construction, crop loss, loss of non-renewable or other resources, and

restoration of any unavoidable damage to personal property during construction. In the event that an easement cannot be negotiated with a landowner, Keystone would utilize state eminent domain laws to obtain easements needed for pipeline construction, maintenance, and operation. State laws dictate under what circumstances eminent domain may be used and define the eminent domain process for each state, as applicable. Keystone would still be required to compensate the landowner for the ROW and damages incurred during construction. However, the level of compensation would be determined by a court according to applicable state or federal law. In either case, Keystone would compensate landowners for use of the land. Eminent domain does not apply to lands under federal ownership.

Compensation for crop loss would be determined on a case-by-case basis. Keystone would obtain from the USDA current information regarding commodity prices and yields; these data would be supplemented by property-specific yield and price data supplied by the landowner. Landowners would be compensated at 100 percent for the year of construction, with diminishing percentages over the next 2 years.

Keystone also would acquire a number of sites for the construction, operation, and maintenance of pump stations and other permanent aboveground facilities. These would be negotiated with and purchased from landowners.

3.9.2 Data and Methodology

The Keystone Pipeline Project Environmental Report (ENSR 2006a) was the primary source of data for this analysis of land use, recreation and special interest areas, and visual resources. The Environmental Report originally was submitted in April 2006 and was updated in November. Land use classifications provided in the Environmental Report were established by developing Project-specific land cover categories based on analysis of high-resolution aerial photography (TransCanada 2007c). Keystone subsequently has updated its land use data four times: the December 2006 realignment of the Cushing Extension route; the January 24, 2007 supplemental filing to DOS (TransCanada 2007a); the January 29, 2007 Data Request #1 filing (TransCanada 2007b), and the April 4, 2007 Data Request #2 filing (TransCanada 2007c). Future filings and responses to data requests are expected. Keystone's Mitigation Plan (Appendix B) was instrumental in determining the adequacy of mitigations and impact significance. In addition, aerial strip maps were analyzed to verify land use categories and identify structures on or close to the construction ROW.

On January 26, 2007, a meeting was held between DOS and FSA; on February 1, 2007, a similar meeting between DOS and NRCS was held to discuss potentially affected conservation easements, compensatory mitigation for impacts to agricultural wetlands, and appropriate mitigation and revegetation measures for agricultural lands. Subsequent meetings to discuss agricultural issues were held with FSA on March 15, 2007, and with Keystone on April 9, 2007. Review of the Keystone Project shapefiles indicates that the route as originally proposed in the application would cross three NRCS easements: one each in South Dakota, Missouri, and Oklahoma. Keystone has agreed to try to avoid all but the Missouri easement. For this easement, Keystone determined that potential impacts would be greater to re-route the Project than to cross the easement. NRCS has agreed to this finding with caveats, described fully in the agricultural land use subsection.

3.9.3 MAINLINE PROJECT

3.9.3.1 General Land Use

As proposed, the 1,078-mile Mainline Project would disturb a total of 17,205 acres of land while traversing the states of North Dakota, South Dakota, Nebraska, Kansas, Missouri, and Illinois. Of this total, approximately 6,673 acres would be retained as the permanent ROW. Approximately 134 acres are

to be set aside for permanent aboveground facilities, including pump stations, MLVs, delivery facilities, and densitometer sites, and 6 acres would be permanent lateral ROW. All other disturbed acreage (including pipe and contractor yards, additional temporary facilities, and the construction ROW) would revert to previous uses following the construction process.

Approximately 344 miles (32 percent) of the Mainline Project pipeline would be within existing pipeline, utility, or road ROWs. The remaining 734 miles would require a new ROW; however, approximately 79 of those miles are adjacent to existing facility ROWs (TransCanada 2007c). Table 3.9.3-1 shows the number of acres that would be affected during construction and operation of the Mainline Project.

At the time of this EIS, Keystone does not plan to construct any permanent roads to access the construction ROW (TransCanada 2007c). Existing roads would be used on a temporary basis during construction; and some of these roads may require improvements. A total of 104 new temporary roads or expanded existing roads are planned for the Mainline Project. The majority of these roads would be less than 0.5 mile long and would cross agricultural land. However, one access road at MP 1072.5 would be 13.5 miles long and would cross a wetland. Access roads also are discussed in Section 2.1.1.3, Ancillary Facilities.

TABLE 3.9.3-1
Land Requirements for the Keystone Mainline Project

State	Land Affected during Construction (acres)	Permanent Right-of-Way (acres)
North Dakota	3,386	1,342
South Dakota	3,253	1,349
Nebraska	3,327	1,323
Kansas	1,827	610
Missouri	4,498	1,689
Illinois	914	360
Mainline Project total	**17,205**	**6,673**

Sources: ENSR 2006a, TransCanada 2007c.

Additional Aboveground Facilities

The Mainline Project would include 23 new pump stations (and a possible 24th at Bond County, Illinois to support expansion) and 52 MLVs, two delivery sites (Wood River and Patoka Terminals), three densitometer sites, (one in Jefferson County, Nebraska; one in St Charles County, Missouri; and one in Bond County, Illinois), and six pig launching and receiving facilities that would be located within pump stations. Table 3.9.3-2 catalogues the number of acres required to accommodate aboveground facilities during construction and operation, as well as affected acreage for the pipeline and lateral ROWs, additional workspaces, and contractor and pipe yards. Some facilities, including densitometer stations, MLVs, and pig launching and receiving sites, are located within the affected acreage of other facilities (e.g., pig launchers and receivers would be located within pump stations) or would be located entirely within the 50-foot-wide permanent ROW (densitometer stations and MLVs). The state, county, and milepost location of each aboveground facility is provided in Table 2.1-6, in Section 2.1.1.3.

TABLE 3.9.3-2
Acres Affected during Construction and Operation of Pipeline Facilities for the Keystone Mainline Project

Pipeline Facility	Construction	Operation
North Dakota		
Pipeline right-of-way (ROW)	2,891	1,314
Lateral ROWs	0	0
Additional temporary workspaces	141	0
Pipe and contractor yards	326	0
Pump stations and delivery facilities	28	28
North Dakota subtotal	*3,386*	*1,342*
South Dakota		
Pipeline ROW	2,919	1,327
Lateral ROWs	0	0
Additional temporary workspaces	171	0
Pipe and contractor yards	141	0
Pump stations and delivery facilities	22	22
South Dakota subtotal	*3,253*	*1,349*
Nebraska		
Pipeline ROW	2,850	1,295
Lateral ROWs	0	0
Additional temporary workspaces	166	0
Pipe and contractor yards	283	0
Pump stations and delivery facilities	28	28
Nebraska subtotal	*3,327*	*1,323*
Kansas		
Pipeline ROW	1,317	599
Lateral ROWs	0	0
Additional temporary workspaces	81	0
Pipe and contractor yards	418	0
Pump stations and delivery facilities	11	11
Kansas subtotal	*1,827*	*610*
Missouri		
Pipeline ROW	3,641	1,655
Lateral ROWs	0	0
Additional temporary workspaces	282	0
Pipe and contractor yards	541	0
Pump stations and delivery facilities	34	34
Missouri subtotal	*4,498*	*1,689*

TABLE 3.9.3-2 (Continued)		
Pipeline Facility	**Construction**	**Operation**
Illinois		
Pipeline ROW	653	343
Lateral ROWs	11	6
Additional temporary workspaces	64	0
Pipe and contractor yards	175	0
Pump stations and delivery facilities (includes the Bond County pump station (PS-38) potentially needed for expansion)	11	11
Illinois subtotal	*914*	*360*
Mainline Project		
Total pipeline ROW	14,271	6,533
Total lateral ROW	11	6
Total additional temporary workspaces	905	0
Total pipe and contractor yards	1,884	0
Total pump stations and delivery facilities	134	134
Mainline Project total	**17,205**	**6,673**

Notes:

Discrepancies between acreages for individual features and totals and subtotals are attributable to rounding.

Affected acreage for densitometer sites and mainline valves is effectively included within the 50-foot-wide permanent ROW of the pipeline and therefore is not listed separately here.

All pig launching and receiving facilities would be located within pump stations and would not require any additional acreage.

Sources: ENSR 2006a, TransCanada 2007c.

Turnouts and access roads from public roads would be installed to each aboveground facility. Drainage would be maintained by installing ditches or culverts, and the short access roads would be surfaced with crushed rock. The delivery facility sites would be enclosed with a chain-link security fence (TransCanada 2007c).

Land Use by State

The Mainline Project would primarily affect agriculture and grassland/rangeland land uses. Of lands that would be crossed by the Mainline Project, agriculture and rangeland account for 65 and 15 percent, respectively, of the total acres affected by the Mainline Project. Table 3.9.3-3 shows affected land use acreages by state for the Mainline Project.

On a state-by-state basis, agriculture is the predominant land use affected, generally followed by grassland/rangeland. Illinois is an exception to this rule, where more miles of developed, wetland, and forestland would be affected than grassland. Missouri differs in that a much larger percentage of land crossed by the pipeline is comprised of rangeland and forestland than for other states. In Missouri, 25 percent of affected land is rangeland and 13 percent is forestland. Missouri contains more affected forestland acreage than all other stretches of the pipeline combined. The Mainline Project in Kansas also has a relatively higher percentage of forestland (8 percent) than for North Dakota, South Dakota, and Nebraska.

TABLE 3.9.3-3
Acres Affected during Construction by Land Use Type for the Keystone Mainline Project

Land Use Type	ND	SD	NE	KS	MO	IL	Total	Percent of Total (%)
Agriculture/cropland	2,322	1,974	2,601	1,314	2,386	613	11,210	65
Grassland/rangeland	379	550	355	270	1,035	20	2,609	15
Forestland	45	4	34	113	538	63	797	5
Wetlands	258	268	39	13	79	31	688	4
Developed	373	447	280	97	398	173	1,768	10
Water	9	10	18	20	62	14	133	1
Total	**3,386**	**3,253**	**3,327**	**1,827**	**4,498**	**914**	**17,205**	

Notes:

Agriculture includes cultivated crops, flood or pivot irrigation crops, and fallow cropland.

Rangeland includes herbaceous and mixed rangeland that is characterized by short-grass prairie or mixed-grass prairie, and lands that appear to be used for cattle or other livestock grazing—with or without a shrub component.

Forestland includes upland and wetland forested areas.

Wetlands include palustrine forested wetlands and palustrine emergent/scrub-shrub wetlands.

Developed land includes both industrial/commercial and residential uses. Industrial/commercial includes electric power or gas utility stations, manufacturing or industrial plants, livestock feedlots, landfills, mines, quarries, commercial or retail facilities, and roads.

Residential includes residential yards, subdivisions, and planned new residential developments.

Sources: ENSR 2006a, TransCanada 2007c.

The Mainline Project alignment was rerouted to avoid affecting wetlands in several North Dakota and South Dakota sections. These included North Dakota reroutes in Nelson and Steele Counties, and in the Hecla Sandhills (Sargent County, North Dakota, and Marshall County, South Dakota). Nevertheless, substantial amounts of wetlands would be affected along the Mainline Project for North Dakota and South Dakota (approximately 8 percent of the affected acres for each state). Wetland impacts are discussed in further detail in Section 3.4.3.

Developed land comprises between approximately 5 (Kansas) and 19 percent (Illinois) of affected acres along the Mainline Project. For the Mainline Project pipeline as a whole, developed land represents about 10 percent of the affected acres.

Ownership

Land along the Mainline Project is principally privately owned. In all states except Illinois, private ownership comprises more than 98 percent of lands that would be crossed by the Mainline Project (see Table 3.9.3-4). For Illinois, private ownership accounts for approximately 94 percent of land that would be crossed, with federal and municipal lands making up the remaining 6 percent. For the Mainline Project as a whole, private ownership accounts for approximately 99 percent of land crossed by the Project. This translates to approximately 37 acres of affected federal land in Illinois, approximately 15 acres of affected federal land in Missouri (TransCanada 2007c) and 49 acres of affected state land in North Dakota, South Dakota, and Missouri (see Table 3.9.3-5).

TABLE 3.9.3-4
Ownership of Land Crossed by the Keystone Mainline Project

Land Owner	Miles Crossed	Percent of Total (%)
North Dakota		
Federal	0	0.0
State	0.8	0.4
County or municipality	0.2	0.1
Private	216.1	99.6
North Dakota subtotal	*216.9*	
South Dakota		
Federal	0	0.0
State	<0.1	0.0
County or municipality	0.4	0.1
Private	218.4	99.9
South Dakota subtotal	*218.9*	
Nebraska		
Federal	0	0.0
State	0.1	0.05
County or municipality	0.1	0.05
Private	213.5	99.9
Nebraska subtotal	*213.7*	
Kansas		
Federal	0	0.0
State	0	0.0
County or municipality	0	0.0
Private	98.8	100.0
Kansas subtotal	*98.8*	
Missouri		
Federal	1.1	0.4
State	1.6	0.6
County or municipality	0.8	0.3
Private (includes Nature Conservancy lands)	269.5	98.7
Missouri subtotal	*273.1*	
Illinois		
Federal	2.9	5.1
State	0	0.0
County or municipality	0.5	0.9
Private	53.1	94.0
Illinois subtotal	*56.5*	

TABLE 3.9.3-4 (Continued)		
Land Owner	Miles Crossed	Percent of Total (%)
Mainline Project		
Federal	4.0	0.4
State	2.6	0.2
County or municipality	2.0	0.2
Private	1,069.4	99.2
Mainline Project total	**1,077.9**	

Note: Discrepancies between mileage for individual land owner type, totals, and subtotals are attributable to rounding.

Sources: ENSR 2006a, TransCanada 2007c.

TABLE 3.9.3-5
Ownership of Acres Crossed by the Keystone Mainline Project

Location	Federal	State	Private	Total
North Dakota	0	13	3,373	3,386
South Dakota	0	8	3,245	3,253
Nebraska	0	0	3,327	3,327
Kansas	0	0	1,827	1,827
Missouri	15	28	4,470	4,498
Illinois	37	0	877	914
Mainline Project total	**37**	**49**	**17,119**	**17,205**

Sources: ENSR 2006a, TransCanada 2007c.

As noted earlier, temporary and permanent ROWs would be acquired via negotiation with private landowners on a case-by-case basis. Where the pipeline would traverse state land, all applicable state statutes would apply. The Mainline Project would cross approximately 2.5 miles of state-owned lands comprising 0.8 mile in North Dakota, less than 0.02 mile in South Dakota, 0.1 mile in Nebraska, and approximately 1.6 miles in Missouri; no state-owned lands would be crossed in Illinois (TransCanada 2007c).

Where the pipeline would traverse federal land, all applicable federal statutes would apply. In July 2007, Keystone will apply for Right-of-Way Grants pursuant to the Mineral Leasing Act, which would authorize temporary construction use and long-term use of federal land for pipeline purposes. A Right-of-Way Grant is issued for a 30-year term and contains a right of renewal if the project continues to be used for its initial purpose. Each federal agency has its own easement procedure. The Mainline Project would cross about 1 mile of federally owned land in Missouri and almost 3 miles in Illinois (TransCanada 2007c). The Mainline Project would not cross any other federal lands.

3.9.3.2 Agricultural Land

The Mainline Project primarily would cross cropland in private ownership. Construction and operation of the Mainline Project facilities would affect about 11,210 acres of agricultural land along approximately 1,078 miles of construction route. Of this amount, approximately 583 miles is considered prime farmland by the NRCS (including land considered potential prime farmland, if adequate protection from flooding and drainage was provided). Of the total acres affected by state, Nebraska has the highest percentage that is considered prime farmland (over 78 percent), and Missouri has the lowest (53 percent) (see Table 3.9.3-3).

To determine the amount of agricultural land that potentially would be affected, Keystone reviewed aerial photographs and made general observations during reconnaissance activities. Further refinements to the assessment of various types of cover were completed during an August 2006 grassland survey. Based on the aerial photography evaluations and ground surveys, Keystone has indicated that no known orchards would be crossed by the Keystone Project. Ground survey verification of the orchard category will conclude in June 2007.

Crops vary significantly along the pipeline route due to its length (ranging from the 49th Parallel N at the U.S./Canadian border to the 43rd Parallel N at Patoka, Illinois, and the 36th Parallel N at Cushing, Oklahoma). Typical crops along the pipeline route include corn, soybeans, wheat, barley, rye, sorghum, sunflower, dry edible beans, flaxseed, canola, popcorn, alfalfa, hay, sugar beets, and oats. Certain crops are more common in the southern states of the pipeline route, including cotton, fruits and nuts, rice, vegetables, flowers, and tomatoes.

Numerous tracts of land are enrolled in USDA programs managed through NRCS and FSA. The NRCS negotiates easements with landowners for a variety of land and habitat conservation priorities. Some NRCS programs include the Wetland Reserve Program (WRP), the Farm and Ranchland Protection Program (FRRP), and the Wildlife Habitat Incentives Program (WHIP). FSA does not negotiate easements but enters into a contract with landowners for certain conservation practices. Some FSA programs include the Conservation Reserve Program (CRP), the Conservation Reserve Enhancement Program (CREP), the Farmable Wetlands Program (FWP), and the Emergency Conservation Program (ECP). The Grassland Reserve Program is implemented by both the FSA and NRCS and provides rental and easement options. Both easements and rental contracts for these programs are available for a variety of durations, and some easements can be made in perpetuity.

The CRP is the largest of these programs. Landowners with CRP contracts can receive annual rental payments and cost-share assistance to establish long-term resource-conserving covers on eligible farmland. CRP protects millions of acres of topsoil from erosion and is designed to safeguard natural resources. The program encourages farmers to convert highly erodable cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filter strips[1], or riparian buffers. Participants enroll in CRP contracts for 10 to 15 years (FSA 2007a).

Potential Impacts and Mitigation

Construction-related activities such as grading, trenching, stringing, welding, backfilling, and restoration could impact agricultural lands by leading to soil erosion, interference with and damage to agricultural surface and subsurface drainage and irrigation systems, mixing or loss of fertile topsoil and subsoil, and

[1] Filter strips are vegetated areas planted adjacent to crops that are designed to filter runoff and improve water quality. They are frequently used near streams, ponds, lakes, sinkholes, and agricultural drainage wells. Filter strips are typically planted with very close-growing vegetation, to better trap sediments, nutrients, and chemicals.

soil compaction. All of these impacts could result in reduced productivity of agricultural lands or direct crop loss.

During the scoping period for the Keystone Project, several members of the public expressed concerns regarding impacts on agricultural activities that could result in crop losses, including:

- Soil compaction due to heavy construction equipment;
- Construction schedule and duration during which agricultural activities could not be conducted;
- Impact to center pivot irrigation systems;
- Surface and subsurface drainage, ponds, waterlines, and drainage ditches;
- Access to farmland, particularly in areas where large amounts of wetland surround the farmland;
- Effect of wetland impacts on farmers eligible for payments associated with protection of wetlands on farmland (FSA programs);
- Impacts on landowners with CRP lands; and
- Compensation for affected crop production.

To address impacts on agricultural lands, Keystone has proposed a number of mitigation measures that are detailed in the Mitigation Plan (Appendix B). Keystone proposes to restore all disturbed areas associated with construction of the Keystone Project, in accordance with its Mitigation Plan and all other applicable federal, state, and local permit requirements. Keystone intends to repair or restore drain tiles, fences, and land productivity as these may be damaged during the construction process. Following construction, agricultural land can revert to its previous use, except for 140 acres of land that would be set aside for permanent aboveground facilities and that Keystone would directly purchase from landowners. Approximately 118 of these 140 acres currently are devoted to crops (TransCanada 2007c). When construction and cleanup have been completed, affected land along the temporary and permanent ROWs could be returned to agricultural production.

Keystone's Mitigation Plan includes typical measures such as avoiding or minimizing topsoil/subsoil mixing and ensuring that compaction and other construction-related effects are rectified. See Section 3.2.2.1 for a detailed discussion of topsoil segregation. In addition, several of Keystone's proposed mitigations directly address the comments raised by landowners and other stakeholders affected by the Keystone Project. Keystone would:

- Only use machinery with low ground pressure;
- Avoid or restrict construction activities in excessively wet soil conditions to minimize soil compaction and rutting;
- Restore all temporary and permanent ROWs and additional workspaces to pre-construction levels of soil compaction through ripping and discing subsoil prior to salvaged topsoil replacement;
- Provide a minimum of 24 hours notice to a landowner before accessing his/her property for construction purposes;
- Supply Keystone contact information to affected landowners prior to construction;
- Reach a mutually acceptable agreement between Keystone and a landowner on the access route for entering and exiting the pipeline construction ROW, should access not be possible from adjacent pipeline construction ROW segments or from a public access road;

- Establish with a landowner an acceptable amount of time that an irrigation system (pivot, spray, or flow) may be out of service due to pipeline construction and reasonably compensate a landowner for any losses incurred due to irrigation disruption, both on and off the temporary and permanent ROWs;
- Implement measures to allow for irrigation to continue during pipeline construction when feasible and mutually agreeable to Keystone and the landowner;
- Not disrupt irrigation ditch water flows, except for the amount of time required to install the pipeline (typically 1 day or less), unless otherwise directed;
- Reestablish all original contours and drainage patterns following construction;
- Limit disruption to the surface drain network near the ROW;
- Leave gaps in trenches and strung pipeline to facilitate drainage;
- Discharge trench water in a manner that avoids damage to adjacent agricultural land, crops, and pasture;
- Install trench breakers on slopes where required to minimize potential water movement down the ditch and subsequent erosion;
- Minimize the duration of construction-related disturbance within wetlands to the extent possible; and
- Repair and restore land productivity to pre-construction levels.

Keystone would compensate agricultural landowners for actual crop losses resulting from removal of standing crops, disruption of planned seeding activity, disruption of general farming activities, or other losses resulting from construction of the pipeline—as negotiated in individual easements with the landowners. This includes compensation for direct yield payments from FSA. Standard damage remedies included in Keystone's Mitigation Plan stipulate that Keystone would agree to pay the landowner for any physical damages that arise from Keystone's use of the easement. In addition, any crop reductions related to the pipeline construction, whether on or off the construction and permanent ROWs, would be compensated to the landowner. Keystone would conduct post-construction monitoring to examine the revegetation in affected agricultural areas. Restoration is considered successful in agricultural areas if crop yields are similar to adjacent undisturbed portions of the same field. Affected areas would be restored, and Keystone would compensate landowners for any losses or damages both on and off the ROW that may result from pipeline construction. As noted in Section 3.9.1, crop loss compensation would be determined on a case-by-case basis. Keystone would obtain from the USDA current information regarding commodity prices and yields; these data would be supplemented by property-specific yield and price data supplied by the landowner. Landowners would be compensated at 100 percent for the year of construction, with diminishing percentages over the next 2 years.

Construction impacts on general agricultural activities are expected to be temporary and minor. Operations impacts on general agricultural activities are expected to be permanent but minor, consisting of the conversion of a small amount of agricultural acreage to industrial use for permanent aboveground facilities.

Soil Compaction

Construction of the Mainline Project could affect agricultural lands through soil compaction and decreased soil productivity. As outlined in its Mitigation Plan, Keystone proposes to avoid some initial soil compaction impacts by only using vehicles with low ground weight or wide tracks. Keystone would

set restrictions upon construction during excessively wet periods to prevent compaction and rutting. Top soil would be stripped and segregated from sub soil. All affected land would be returned to original levels of compaction through ripping and discing prior to replacement of top soil. The restored ROW would be tested at regular intervals along the construction ROW. In the event that a landowner disagrees with Keystone's restoration methods, Keystone would consult the appropriate county Soil and Water Conservation District. Construction-related soil compaction impacts are expected to be short term and minor. Operation of the pipeline would not affect soil compaction.

Construction Schedule

Public comments questioned how the construction schedule might affect agricultural activities. Keystone proposes to begin construction of the pipeline in 2008, with the construction period continuing for approximately 18 months, and operation beginning by November 30, 2009. Construction of the Cushing Extension section would proceed after this initial period, in late 2009 or early 2010, beginning service by 2010. The pipeline would be constructed in five spreads, four for the Mainline Project and one for the Cushing Extension, proceeding north to south. The Mainline Project spreads would be constructed concurrently, and the Cushing extension spread would commence construction thereafter.

As described in Section 2.2, the typical pipeline construction period would include surveying and staking; clearing and grading; trenching; pipe stringing, bending, and welding; lowering-in and backfilling; hydrostatic testing; pipe geometry inspection; final tie-in welding; commissioning; and cleanup and restoration. In some areas, special construction techniques may be used for rugged or steep terrain, waterbodies, wetlands, paved roads, and railroads. Typical construction at one point would last for only a few days.

Keystone has made several schedule commitments in its Mitigation Plan. Landowners would be provided a minimum of 24 hours notice that Keystone intends to access their land for construction purposes. Notice would be made via personal or telephone contact, or by mail or hand delivery if a landowner cannot be reached. During construction, Keystone would provide access across the ROW to landowners at locations requested by the landowners, if practicable. Any restricted activity would continue for the duration of construction activities on any particular parcel of land and is not expected to last for more than a few days. Construction activities are expected to cause temporary and minor impacts to landowners.

Center Pivot Irrigation

Pivot irrigation systems typically involve an overhead irrigation mechanism consisting of several segments of pipe mounted on wheeled towers, with a row of sprinklers attached. The system moves in a circular pattern and is fed with water from the pivot point at the center, with crops planted in a circle to conform to the system geometry. Center pivot equipment also can be configured to move in a straight line, where the water is pulled from a central ditch.

The proposed pipeline crosses primarily agricultural lands, some of which use pivot irrigation systems. During scoping, public comments indicated concerns regarding the potential for pipeline installation to disrupt ongoing pivot irrigation.

While disruption of irrigation may occur during construction due to the location of trenching activity in relation to the pivot/tower system, these impacts would be temporary, and operations would return to normal following final restoration of the ROW. Keystone proposes to work with landowners to allow pivot irrigation to continue, as feasible and mutually acceptable, across land on which a pipeline is being constructed. If use of the irrigation system must be disrupted for pipeline construction, Keystone would establish with a landowner the acceptable amount of time that the system can remain out of operation. If

interrupted irrigation due to pipeline construction would adversely affect agricultural production, Keystone would reasonably compensate the landowner for damages both on and off the ROW. Construction impacts on irrigation systems are anticipated to be temporary and minor. Pipeline operation is not expected to affect irrigation systems of any type.

Surface and Subsurface Drainage, Ponds, Waterlines, and Drainage Ditches

During scoping, commentors sought clarification concerning impacts to subsurface drainage, ponds, waterlines, and drainage ditches. In its Mitigation Plan, Keystone proposes to avoid initial disruption of surface drainage and to reestablish all original contours and drainage patterns following construction. For subsurface drainage, a major concern is migration of water within the pipeline trench. This would be prevented by installation of trench breakers on slopes at regular intervals to prevent water movement and subsequent erosion.

During land acquisition and permitting, Keystone would identify the locations of potentially affected public and private waterlines. No water lines would be cut without the permission of the landowner or public agency. Waterlines would merit the same treatment as irrigation systems—Keystone would attempt to allow continued operation of waterlines during construction and would establish with the landowner an acceptable amount of time that the waterline could be out of service, in the event that operation must be temporarily interrupted. If interruption of waterline service were to lead to damages to agricultural resources, Keystone would provide reasonable compensation to the landowner for lost productivity. The pipeline would be installed beneath the waterline in most cases, leaving a minimum of 12 inches of clearance between the waterline and the Keystone pipeline. If there is sufficient depth of cover available, in some areas, the Keystone pipeline could cross above the waterline with 12 inches of clearance and the additional 4 feet of cover on the oil pipeline (TransCanada 2007c).

During construction, a small backhoe or hand excavation would be used to expose the waterline, which then would be left exposed and flagged. The pipeline section to be installed beneath the waterline would be welded and left adjacent to the exposed waterline for installation by the tie-in crew. During connection, the waterline would be supported across the trench to prevent it from breaking. During backfilling of the trench, native material would be used and care would be taken to prevent damage to the waterline (TransCanada 2007c).

Underground drainage tiles would be repaired by Keystone if damaged during construction, either through settlement with the landowner or the county (in the case that a drainage tile system is publicly owned), or by directly repairing the system. In the Mitigation Plan, Keystone has adopted a set of guidelines and procedures for managing impacts to drainage tile systems. Keystone intends to avoid interrupting irrigation ditch flows, except for the time required for trenching, lowering-in pipe, and backfilling (typically 1 day or less).

Keystone proposes to avoid agricultural ponds by adjusting the pipeline route as necessary. If it is not possible to avoid a pond, Keystone would work with the landowner to remove or lower the water level in the agricultural pond prior to construction, to allow dry terrain installation (TransCanada 2007c). Where dry installation is not practical or acceptable to the landowner, the open-cut wet crossing method would be used to cross the pond. This method entails trenching through the water body, depositing trench spoils at least 10 feet from the edge of the water, installing pipeline that was previously assembled next to the pond, and backfilling with native material. The pipe would be weighted with concrete to provide negative buoyancy, and the banks would be restored. For a full description of this construction method, see Section 2.2. Cleanup of the adjacent banks and restoration, which would include installing temporary erosion controls and re-seeding the banks, would be completed following construction (TransCanada 2007c).

Construction impacts related to drainage systems, ponds, ditches, and waterlines would be temporary and minor, and Keystone would fully compensate or remediate any resulting damages. Operation of the underground pipeline is not expected to affect surface or subsurface drainage, water delivery, or water storage systems. (See Section 3.3.1.2 for a discussion of impacts on surface waters in the project area.)

Conservation Reserve Program Lands

Several scoping comments requested information about impacts on lands in the CRP. In reviewing the proposed alignment, FSA determined that there are landownership tracts along the proposed corridor that total 16,648 acres that have some portion of the tract enrolled in the CRP program. They are unable to determine based on existing information how many acres of actual CRP lands within these tracts are impacted by the proposed corridor. However, the actual potentially affected acreage of CRP land is likely to be a small percentage of the total acreage within these landownership tracts.[2] Those CRP acres that are directly crossed by the corridor could be required to exit the program, and in this case the landowner would be required to pay 25 percent of the annual rental payment, in addition to the federal cost-shares received, all annual rental payments, and interest. Keystone and FSA would determine the actual amount of enrolled acres that would be affected by the ROW through site visits. These visits would document whether the ROW crosses CRP acreage and the site-specific impact based on the type of affected habitat.

Certain CRP lands, such as grasslands (approximately 80 percent of the potentially affected acreage reported by FSA), that would be affected by the construction period would require up to 5 years to fully regenerate to pre-construction conditions. Nevertheless, these areas could be managed in the same manner and for the same priorities following restoration. Enrolled CRP land containing woody vegetation and trees would be more intensively affected, because the permanent ROW would need to be cleared and maintained in an open condition for the life of the pipeline. The construction ROW also, would be affected over the long-term in woodlands, due to the long regeneration times for these cleared areas. Tree conservation acres represented less than 1 percent of the potentially affected acres reported by FSA. Impacts on CRP would be long term but minimal and localized.

To mitigate the impacts of land disturbance in CRP and other FSA conservation program areas, in addition to the mitigation already included within the Keystone mitigation plan, **the following measure is recommended:**

- **For all verified enrolled acreage intersected by the ROW, Keystone should provide the following to the appropriate FSA county office:**
  - **The program participant's name, location of impacted program land, and FSA program(s) the affected land is currently enrolled in, obtained from the landowner.**
  - **A description of construction techniques to be used, including a sediment/erosion control plan, a time schedule of proposed activities, and a contact person.**
  - **The length of time the FSA program land would be affected.**

[2] FSA is unable release the precise location of acreage enrolled in its programs. The analysis that generated the amount of 16,648 acres affected during construction and 6,595 acres affected during operation was created by calculating the acreage of tracts *on which enrolled CRP acreage exists* that would be intersected by the proposed ROW. The ROW could intersect tracts of land with enrolled acreage and still avoid intersecting the enrolled acreage.

- **Proposed site remediation to return the land to its condition before impacts. Remediation of the site should be consistent with the appropriate NRCS Field Office Technical Guide Standard (Appendix M). The contractor should meet with the appropriate NRCS State Agronomist/Resource Conservationist to review the proposed sediment erosion control plan, time schedule of activities, remediation activities, and management requirements prior to the start of the project.**
- **The proposed maintenance plan for the permanent ROW, including weed control.**

In comments on the preliminary draft EIS, the FSA outlined that the FSA county office would in turn ensure that:

- The proposed construction, remediation, and maintenance meet the minimum requirements of the FSA program(s) land affected and all requirements defined under their approved conservation plan for the affected FSA program land.
- If crops are to be affected, that the proposed impact would not adversely affect their base acreage, or affect their current eligibility to maintain program participation or future eligibility to participate in FSA programs.
- The receipt of income would not affect the participant's ability to fulfill any FSA farm loan financial requirements or affect the participant's outstanding indebtedness (a Farm Loan Officer should be consulted).
- Any proposed construction activities on CRP program land would not occur during the primary nesting season specified for that state.
- All FSA program participant files would be updated to reflect any changes associated with the pipeline project.

In the event that a landowner with current CRP contracts would need to remove land from the program because of pipeline construction and operation, Keystone would be responsible for covering all agricultural losses incurred because of pipeline construction and operation, as described in its Mitigation Plan (Appendix B). Keystone would restore the ROW to its original condition following construction.

Farmable Wetland Program Lands and Other FSA Programs

Some scoping comments asked about potential impacts on farmers who are currently eligible for federal payments from FSA associated with protection of wetlands on their farmland. The FWP is a voluntary program to restore up to 1,000,000 acres of farmable wetlands and associated buffers by improving the land's hydrology and vegetation. Eligible producers in all states can enroll eligible land in the FWP through the CRP. Eligible acreage includes farmed and prior converted wetlands that have been affected by farming activities. The maximum acreage for enrollment of wetlands and buffers is 40 acres per tract (FSA 2007b). Pipeline construction in these areas would follow Keystone's guidelines for wetlands construction (see Section 2.2.2.4 for more information).

As with CRP lands, impacts on enrolled FWP lands and all FSA programs would be determined by site-specific visits. The CRP mitigation listed above also would apply to these lands. Keystone would be responsible for any agricultural impact resulting from pipeline construction and would restore the ROW to its original condition following construction.

NRCS Programs

NRCS determined that the Mainline Project would affect one WRP easement in Missouri. The WRP is a voluntary program offering landowners the opportunity to protect, restore, and enhance wetlands on their property. NRCS provides technical and financial support to help landowners with their wetland restoration efforts. The goal is to achieve the greatest wetland functions and values, along with optimum wildlife habitat, establishing long-term conservation and wildlife practices and protection.

Keystone agreed to re-route the ROW to avoid an easement in South Dakota but determined that relocating the alignment at the Missouri site would result in greater potential impacts than crossing the easement. NRCS agreed with this rationale for crossing the easement. To minimize the potential impacts of crossing this WRP easement, **the following measure is recommended:**

- **Keystone should utilize the state-specific NRCS Field Office Technical Guide (Appendix M) for mitigation and revegetation of areas damaged by construction. Keystone should consult with the local NRCS representatives to determine the adequacy of Keystone's Mitigation Plan and supplement the plan as needed.**

Implementation of this measure would reduce potential impacts to agriculture on the one NRCS easement that would be crossed by the Mainline Project. The effect of the crossing would be considered long term but minor, with revegetation requiring up to 5 years to reestablish itself to pre-construction conditions. Maintenance of vegetation would not be conducted over the full width of the permanent ROW in non-forested areas, and no permanent impacts would result in this instance. Keystone would compensate the affected landowner construction or operations impacts that affect the easement's continued enrollment in the WRP.

Access to Farmland

During construction of the pipeline, landowners may be temporarily unable to access farmland for agricultural activities. Keystone proposes to inform landowners a minimum of 1 day in advance of accessing their lands for construction purposes. In addition, Keystone would provide access during construction across the ROW, at locations requested by the landowners, if practicable. Construction impacts on farmland access would be temporary and minor, and Keystone would compensate landowners for any damage due to construction-related restriction of access. Operation of the pipeline would not affect access, as full access to the ROW would be restored to landowners following the construction period.

During construction, Keystone anticipates that farmers would be able to access farmlands that are surrounded by wetlands because Keystone would coordinate with the landowner to maintain access using the existing access roads. Access would be maintained by leaving hard plugs or soft plugs, or by creating temporary bridges using mats or other bridging materials where needed (TransCanada 2007c).

Windbreaks, Shelterbelts, and Living Snow Fences

Windbreaks, shelterbelts, and living snow fences are important resources in the Plains states for preventing soil erosion, reducing evaporation from soils, increasing crop yields, and providing habitat and wind protection for livestock (Haugen et al. 2002). The Mainline Project would intersect many windbreaks planted on private lands. At these intersection points, Keystone would need to remove trees and brush to provide access for construction equipment. During the operational life of the Keystone Project, the ROW would be maintained in an open condition, and trees and brush would not be allowed to

revegetate the permanent ROW. Keystone has pledged that the construction ROW would be reduced to the minimum necessary width to construct the pipeline when crossing a shelterbelt.

To ensure that impacts on windbreaks, shelterbelts, and living snow fences are minimized, **the following measures are recommended:**

- **Keystone should implement all Mitigation Plan measures pertaining to impacts, mitigation, and reclamation in forested areas for impacts on windbreaks, shelterbelts, and living snow fences.**
- **Keystone should provide non-vegetative remediation for affected windbreaks, shelterbelts, and living snow fences within the permanent and construction ROWs in the form of windbreak nets, mesh, or fencing and snow fencing.**

Revegetation with trees or woody vegetation would not be possible within the permanent ROW for the life of the Keystone Project, and revegetation within the construction ROW would take many decades to mature. Construction and operation of the pipeline, even with implementation of preventive and remedial measures, would result in permanent, significant impacts to vegetative windbreaks, shelterbelts, and living snow fences.

3.9.3.3 Rangeland

Construction of Mainline Project facilities would affect about 2,609 acres of rangeland/grassland, representing approximately 15 percent of the total acres affected by the Mainline Project. Missouri has the highest percentage of affected rangeland/grassland acres of all states (23 percent), and Illinois has the lowest (about 2 percent). Affected rangeland acreage in other states along the Mainline Project alignment ranges between 11 and 17 percent (TransCanada 2007c).

Potential Impacts and Mitigation

Construction activities would displace or halt grazing activities and would disturb the surface of livestock foraging areas. In addition, construction activities such as trenching could put livestock at risk of falling or being trapped in open trenches.

During the scoping period, the public asked how cattle would be protected during construction. To reduce overall risks to livestock grazing in rangelands, Keystone has proposed to work with the individual landowners to reach mutually agreeable terms regarding exclusion of livestock from construction work areas. These measures may include installation of fencing or use of hard (short lengths of unexcavated trench) or soft trench plugs (areas where the trench is excavated and replaced with minimal compaction) at agreed-upon livestock crossing intervals. Soft plugs would be constructed with a ramp on each side to allow a means of exit for animals that fell into the trench. In addition, Keystone has agreed to install temporary gates for livestock fences that must be breached. The following rangeland-specific mitigation measures are outlined in Keystone's Mitigation Plan:

- Access across the ROW during construction shall be provided at locations requested by landowners, if practicable;
- Bevel shavings during pipe bevel operations are to be removed immediately to ensure that livestock and wildlife do not ingest this material;
- Litter and garbage shall be collected and removed from the construction site at the end of the day's activities;

- Temporary gates shall be installed at fence lines for access to the construction ROW; gates shall remain closed at all times and shall be removed and replaced with permanent fencing upon completion of construction;
- Feeding or harassment of livestock or wildlife is prohibited;
- Construction personnel shall not be permitted to have firearms or pets on the construction ROW;
- All food and wastes shall be stored and secured in vehicles and/or appropriate facilities;
- Areas of disturbance in native rangelands shall be seeded with a native seed mix after top soil replacement; and
- Improved pasture shall be seeded with a seed mix approved by individual landowners after top soil replacement.

Keystone has proposed to avoid impacts to livestock and to restore disturbed areas according to its Mitigation Plan, which requires grading and revegetation in rangelands to be conducted in consultation with landowners and land managing agencies. Following restoration, affected rangelands would be restored and reseeded, and rangeland activities may resume. Implementation of the proposed rangeland-specific mitigation measures discussed above would reduce potential impacts to minimal levels. Although restoration activities would begin soon after the end of construction in rangeland areas, herbaceous grasslands may take up to 5 years to recover to the point where visual scarring is no longer evident. Therefore, construction impacts to rangelands are expected to be long term, but minor.

For the Mainline Project, approximately 140 acres located on agricultural/cropland or rangeland/grassland would be set aside for permanent aboveground facilities (such as for pump stations and MLVs). Approximately 22 of these 140 acres consist of rangeland (TransCanada 2007c). Construction and operation of aboveground facilities on rangeland/grassland would result in permanent conversion of rangeland to industrial/commercial use. Rangeland affected by operation of the aboveground facilities would be purchased or leased from the current landowners. Keystone would attempt to locate facilities to be as unobtrusive as possible to ongoing agricultural activities, and to cause the least disturbance to adjacent agricultural operations. In addition, Keystone would attempt to locate aboveground facilities near public roads to allow year-round access and would construct short permanent access roads to these facilities within the permanent ROW only when necessary. Operations impacts from aboveground facilities are considered permanent but minor, as the amount of land to be converted from rangeland to industrial land uses is small in comparison to the amount of productive rangeland in the region. Other pipeline operational activities are not expected to affect rangeland.

3.9.3.4 Forestland

Construction and operation of the Mainline Project facilities would affect about 797 acres of forestland of both upland and wetland types. This represents about 5 percent of the total acres affected by the Mainline Project. The majority of affected forestland is located in Missouri (538 acres) and Kansas (113 acres). Forest vegetative types are discussed in Section 3.5. None of the forested land that would be crossed by the pipeline is used for timber or Christmas tree production (TransCanada 2007c).

Mainline construction would affect forested wetlands in Missouri. Forested wetlands were once a dominant component of Missouri's landscape but are now considered at risk (Missouri Department of Conservation 2007d). Table 3.4.3-1 shows that 44.6 acres of this community would be affected, with 19.7 acres affected permanently.

Potential Impacts and Mitigation

Construction activities would remove trees and brush from forested areas. During operation, the permanent ROW would be maintained, and revegetation of these types of woody materials would be prevented. This would result in a permanent loss of tree growth within the permanent ROW.

Keystone has proposed to minimize impacts to affected forested areas in several ways, as outlined in its Mitigation Plan. Trees would be felled such that they fall toward the center of the ROW, to minimize disturbance and limb breakage outside of the ROW. Tree stumps would not be grubbed beyond 5 feet on either side of the trench line and only where necessary for grading a level surface for construction equipment to operate safely. All debris would be recovered and landowners would be given the option of salvaging any materials removed; all unsalvaged materials would be properly disposed of. Disposal may not take place in wooded areas along the ROW; however, chipped material may be spread and incorporated with mineral soil over the forest floor at a density that would not prevent grass revegetation. See Section 2.2.2.8 for a more thorough discussion of forest construction methods and mitigation measures.

These measures would reduce impacts on forested lands. However, areas within the permanent ROW would not be allowed to regenerate over the life of the Keystone Project, and cleared areas in the construction ROW would not regenerate for many decades. Therefore, pipeline construction in forested areas would cause a long-term, significant impact on forestland. Pipeline operations in forested areas would constitute a permanent, significant impact on forestland. Section 3.5 describes potential impacts on forests and applicable mitigation measures.

3.9.3.5 Residences and Planned Development

The Mainline Project would cross and affect residential land. Based on 2006 aerial photography, Keystone identified 985 potential residential structures within 500 feet of the proposed Mainline Project ROW. Keystone is currently conducting field surveys that will determine the location of residential structures and other buildings within 50 feet of the proposed ROW. These surveys are scheduled for completion in June 2007, and survey results are scheduled to be filed with DOS in July 2007. The majority of potential residential structures are in Missouri (579) and Nebraska (112). Most structures in Missouri are situated where the Mainline Project route would collocate with the existing Platte pipeline. Additional non-residential structures (e.g., grain bins, silos, and outbuildings) should be identified in the June surveys. When Keystone has concluded field surveys, it will provide site-specific construction plans for each of the residential structures within 25 feet of the construction workspace.

Keystone is not aware of any residential or commercial developments planned within 0.25 mile of the ROW. This assertion will be verified by the ground surveys concluding in June 2007.

Potential Impacts and Mitigation

The principal measures proposed by Keystone to mitigate impacts in existing residential areas include ensuring that construction proceeds quickly through such areas and limiting the hours during which activities with high-decibel noise levels could be conducted. Landowners would be notified at least 24 hours prior to construction. As specified in its Mitigation Plan, Keystone has proposed several mitigation measures for construction in all residential areas. Keystone would:

- Develop site-specific construction plans to mitigate the impacts of construction on residential and commercial structures;
- Notify landowners prior to construction;

- Post warning signs as appropriate;
- Reduce the construction ROW width, if practicable, by eliminating the construction equipment passing lane, reducing the size of work crews, or utilizing "stove pipe" or "drag section" construction techniques (stove pipe construction consists of welding pipe sections together away from residences, with trenching, pipeline lower in, and backfilling proceeding quickly to minimize construction duration; drag section construction techniques consist of layout and pre-assembly of the pipeline, followed by pull back of the assembled pipe to its proper position);
- Remove fences, sheds, and other improvements as necessary for protection from construction activities;
- Preserve mature trees and landscaping to the extent possible, while ensuring safe operation of the construction equipment;
- Fence the edge of the construction work area adjacent to a residence for a distance of 100 feet on either side of the residence to ensure that construction equipment and materials, including the spoil pile, remain within the construction work area;
- Limit the hours during which construction activities with high-decibel noise levels can be conducted;
- Limit dust impacts through prearranged work hours and by implementing dust minimization techniques;
- Ensure that construction proceeds quickly through residential and developed areas;
- Maintain access and traffic flow during construction activities, particularly for emergency vehicles;
- Clean up construction trash and debris daily;
- Fence or plate open ditches during non-construction activities;
- Restore all lawn areas, shrubs, specialized landscaping, fences, and other structures consistent with its pre-construction appearance or the requirements of the landowner immediately after backfilling; and
- Ensure that the pipe is ready for installation if the pipeline centerline is within 25 feet of a residence prior to excavating the trench; backfill immediately following pipe installation.

Construction of the pipeline and aboveground facilities may cause minor interference with the use of residential properties and other uses near the ROW, mainly from increased noise, heavy vehicle traffic, and dust. The adverse effects would be short term, lasting 2 to 3 months on any particular property, depending on weather and terrain. Equipment would be required to have effective mufflers installed to minimize construction noise. Access, including emergency access, to residences would be maintained at all times during construction. Keystone has not yet developed site-specific plans for residential structures in proximity to the pipeline. The potential impacts in residential areas are accentuated on weekends, when individuals and families are more likely to be at the residence throughout the day. To ensure that impacts in residential areas are minimized, **the following measure is recommended:**

- **Keystone should prohibit all construction work during weekends and major holidays in the vicinity of residences.**

Based on measures in Keystone's Mitigation Plan and the recommended measure, construction-related effects on residences would be temporary and minor.

Operation of the pipeline has the potential to cause interference with the long-term use of residential property and may result in ongoing noise impacts. Refer to Section 3.12.2 for a discussion of potential noise impacts and mitigation. Dwellings and ancillary structures would not be permitted to be placed over the permanent ROW for the operational life of the proposed Project. Prohibiting placement of structures above the permanent ROW would be a substantial constraint on landowners' property usage in the vicinity of the 50-foot-wide permanent ROW. Therefore, operations impacts on residential land uses would be permanent and are considered significant.

Keystone contacted planning and development departments in each of the counties that would be crossed by the proposed Mainline Project facilities to determine whether any residential or commercial development is planned within 0.25 mile of the proposed construction ROW. Planned development projects would include those that are permitted and not yet constructed and those with permit applications that have been filed but have not yet been approved. Keystone's initial consultations indicate that no known planned residential or commercial developments are within 0.25 mile of the proposed Mainline Project facilities; consequently, construction and operation of the Mainline Project would not affect planned development. Keystone would meet with landowners as part of the easement negotiations. Discussions would include whether residential and commercial developments are planned in close proximity to the ROW. Keystone then would determine whether minor property-specific adjustments to the route are feasible (TransCanada 2007c).

3.9.3.6 Commercial and Industrial Land

Construction of the Mainline Project facilities would affect about 1,701 acres of developed land. Table 3.9.3-6 provides a breakdown of developed land categories by state for the Keystone Mainline Project.

TABLE 3.9.3-6
Developed Land Categories by State for the Keystone Mainline Project (acres)

State	Residential	Commercial/Industrial	Pre-Existing ROW	Total Developed
North Dakota	315	25	33	373
South Dakota	15	402	30	447
Nebraska	6	236	38	280
Kansas	2	95	0	97
Missouri	32	286	76	398
Illinois	4	140	29	173
Mainline Project total	**378**	**1,184**	**206**	**1,768**

Source: TransCanada 2007c.

Affected developed acreage is distributed rather evenly among the states along the Mainline Project. For the Mainline Project route as a whole, developed land represents approximately 10 percent of the affected acres.

Potential Impacts and Mitigation

Construction of the Mainline Project could affect commercial and industrial land through restricted access and the presence of construction activity. Impacts on a specific commercial or industrial area are anticipated to last only for several days. Keystone has adopted mitigation measures for commercial and industrial land in its Mitigation Plan. Keystone would mitigate impacts on commercial and industrial landowners by:

- Notifying business owners prior to construction;
- Reducing the construction corridor width to 85 feet, if feasible;
- Removing fences and other improvements as necessary for construction activity;
- Fencing the construction work area adjacent to businesses for approximately 100 feet on either side of a building to keep construction equipment and materials in the work area;
- Preserving mature trees and landscaping to the extent possible, while ensuring safe operation of construction equipment;
- Limiting hours during which construction activities with high-decibel noise levels can be conducted;
- Limiting dust impacts through prearranged work hours and implementing dust minimizing techniques;
- Proceeding quickly with construction through commercial and industrial areas;
- Maintaining access and traffic flow during construction, particularly for emergency vehicles;
- Cleaning up daily after construction;
- Fencing or plating open ditches during non-construction periods;
- Restoring landscaping, fences, and other structures immediately after backfilling;
- Employing site restoration personnel familiar with local horticultural and turf establishment practices; and
- Prefabricating the pipe so it is ready for immediate lowering-in where the pipeline centerline is within 25 feet of a commercial or industrial building.

Given the mitigation procedures described above, construction of the Mainline Project would cause temporary minor impacts on any commercial and industrial land.

Buildings of any type, including commercial and industrial structures, would not be permitted within the permanent ROW for the life of the proposed Keystone Project. This would place a substantial constraint on the use of commercial and industrial property in the vicinity of the 50-foot-wide permanent ROW. Therefore, operations impacts on commercial and industrial land use are considered permanent and significant. Keystone would compensate landowners for these impacts on a case-by-case basis (TransCanada 2007c).

3.9.3.7 Recreation and Special Interest Areas

The proposed Mainline Project facilities would cross various recreation and special interest areas and other recreation areas, resulting in temporary construction impacts and potential permanent impacts. Table 3.9.3-7 details the recreation and special interests lands that would be intersected by the Mainline

Project. No other national, state, or local parks or forests are located with 500 feet of the proposed Mainline Project centerline.

As shown in Table 3.9.3-7, the proposed Mainline Project would cross multiple conservation and wildlife reserve easements, the majority of which are privately owned. Several of the areas listed in the table are discussed in further detail below.

Tetrault Woods State Forest and Pembina River, North Dakota

Tetrault Woods is a 432-acre area located along the banks of the Pembina River, in Cavalier and Pembina Counties. It preserves some of the riparian forest typical of the Pembina River Valley, including specimens of oak, ash, birch, elm, and aspen. The forest contains hiking trails and a scenic overlook of the valley (NDFS 2007). Tetrault Woods is one of very few public forest areas in North Dakota. The Mainline Project would cross Tetrault Woods between MP 6.9 and 7.7, traversing 0.8 mile of forestland and the Pembina River. The Pembina River has been classified by the National Rivers Inventory as having outstanding resource values for scenery and geology, although it is not classified as a National Wild and Scenic River (http://www.rivers.gov/agencies.html) or a National Recreation River (NPS 2007b). The Pembina River is a popular paddling and canoeing destination (NDPRD 2007). Keystone proposes to cross the Pembina River using the open-cut wet crossing method (see Section 2.2.2.3), crossing a public hiking trail south of the river. The Mainline Project also would intersect another section of forestland, managed by the North Dakota Forest Service, at MP 25.

Game Production Area, South Dakota

The SDGFP manages game production areas around the state to create habitat for game species and provide hunting opportunities (SDGFP 2007). The Mainline Project would intersect a game production area at MP 228.4, traversing a distance of 0.5 mile.

Missouri National Recreational River

The section of the Missouri River south of Yankton, South Dakota is designated a National Recreational River by the NPS. Rivers selected for this designation are to be preserved for having remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values (NPS 2007a). The Mainline Project would intersect the Missouri River and surrounding recreation lands at MP 433.5, and would traverse approximately 3 miles in South Dakota and Nebraska.

Keystone proposes using HDD (see Section 2.2.2.3) to cross the Missouri River. This method is not expected to affect the bed, banks, or water quality of the Missouri River. Additionally, this method would not interrupt recreational activity on the river or on its banks.

Keystone's preliminary HDD plan would avoid direct land disturbance within the NPS National Recreational River administrative boundary. The HDD entry point would be on City of Yankton land on the north shore, and the exit would be on privately owned land on the south shore. NPS administers land at the crossing location, but it does not own this land. Keystone conducted preliminary discussions with NPS and the City of Yankton in February 2006, and provided the proposed HDD procedure at a May 19, 2006 meeting in Yankton.

TABLE 3.9.3-7
Special Interest Areas Crossed by the Keystone Mainline Project

Site Name	Milepost	Miles Crossed	Ownership
North Dakota			
Tetrault Woods State Forest	6.9–7.7	0.8	North Dakota Forest Service
Pembina River	8	NA	NA
Conservation Reserve	10–10.5	0.5	Privately owned North Dakota Game and Fish Easement
Forest	25–28.5	3.5	State Forest Service
Conservation Reserve	77–78	1	Privately owned North Dakota Game and Fish Easement
Conservation Reserve	79.5–80	0.5	Privately owned North Dakota Game and Fish Easement
Conservation Reserve	80.2–82.3	2.1	Privately owned North Dakota Game and Fish Easement
Conservation Reserve	83.3–84.3	1	Privately owned North Dakota Game and Fish Easement
Conservation Reserve	110.1–111.1	1	Privately owned North Dakota Game and Fish Easement
Wildlife Preserve	187.2–187.7	0.5	Privately owned North Dakota Game and Fish Easement
South Dakota			
Game Production Area	228.4–228.9	0.5	South Dakota Game, Fish and Parks Department
Missouri National Recreational River	433.5–435.8	2.3	Privately owned Designated Wild and Scenic (National Park Service)
Nebraska			
Missouri National Recreational River	435.8–436.2	0.4	National Park Service
Kansas			
None identified	NA	NA	NA
Missouri			
Pigeon Hill Conservation Area	746.5–746.6	0.1	Missouri Department of Conservation
Western Missouri River Alluvial Plain Conservation Opportunity Area (COA)	758.4–759.1	0.6	Private and Missouri Department of Conservation
Pigeon Hill Conservation Area	758.4–759.1	0.6	Missouri Department of Conservation
Platte River Loess Prairie/Woodland Hills COA	767.4–769	1.4	Private
Little Platte River Woodland COA	771–772.25	1.25	Private
Cameron River Upland Prairie Plain COA	779.3–781.5	2.2	Private
Shoal Creek Prairie	823–823.8	0.5	Private
Shoal Creek Prairie/Woodland Scarped Plain COA	825.9–826.5	0.6	Private

TABLE 3.9.3-7
(Continued)

Site Name	Milepost	Miles Crossed	Ownership
Missouri (continued)			
Lower Grand River Lowland Plains/Missouri Grand River Lowland Plains COA	838.8–841.6	2.8	Private
Lower Chariton Woodland/Forest Hills COA	867.7–869	1.3	Private
Lower Chariton Woodland/Forest Hills COA	871.4–872.2	0.5	Private
West Fork Cuivre River	923.4	NA	NA
Cuivre River Woodland/Forest Hills COA	961.1–963	1.9	Private
Cuivre River Woodland/Forest Hills COA	970.5–972.8	2.3	Private
Cuivre River Woodland/Forest Hills COA	983–983.2	0.2	Private
Cuivre River Woodland/Forest Hills COA	983.7–984.3	0.6	Private
St. Charles County Prairie/Woodland Low Hills, St. Charles/Lincoln Alluvial Plain, Mairas Temp Clair Alluvial Plain, West Allan Alluvial Plain, St. Louis County Prairie/Savannah Dissected Karst Plain COA	984.9–1019.9	35	Private
Riverlands Environmental Demonstration Area	1015–1017.8	1.1	U.S. Army Corps of Engineers
Jones-Confluence Point State Park	1019.9–1021.1	1.2	Missouri Department of Natural Resources
Illinois			
Carlyle Lake Wildlife Management Area	1069.6–1072.7	3.1	U.S. Army Corps of Engineers
Mainline Project total		**70.25**	

NA = Not available.

Source: ENSR 2006a.

Pigeon Hill Conservation Area, Missouri

The Pigeon Hill Conservation Area is owned and managed by the MDC. Pigeon Hill is a 424-acre conservation area with a shooting range and hunting and fishing opportunities. Most of the acreage is forested (MDC 2007c), consisting of 250 acres of upland forest that includes areas of improved and high-value forest stands. The Mainline Project would intersect this area twice, first in a 0.1-mile segment at MP 748.5 and again in a 0.6-mile segment from MP 758.4 to 759.1.

Conservation Opportunity Areas, Missouri

The Mainline Project would cross numerous privately owned Conservation Opportunity Areas (COAs), including approximately 51 miles in 13 separate COAs located throughout Missouri. The MDC partners with stakeholders and landowners to identify places where partners can best apply technology, expertise, and resources for conservation efforts (MDC 2007a). See Table 3.9.3-7 for the specific locations and names of COAs in Missouri.

West Fork Cuivre River, Missouri

The National Rivers Inventory has classified the West Fork of the Cuivre River as having outstanding resource values for scenery, geology, and fish; however, it is not classified as a National Wild and Scenic River (http://www.rivers.gov/agencies.html). The West Fork can be navigated by canoe or small johnboat during normal flows (MDC 2007b). The Mainline Project would cross the West Fork of the Cuivre River at MP 923.4, using the HDD drilling method.

Riverlands Environmental Demonstration Area, Missouri

This educational and wildlife viewing area is located on the Mississippi River, just west of the Missouri-Mississippi River confluence. The COE owns and manages the area, consisting of a 2,500-acre prairie marsh restoration site named the Riverlands Migratory Bird Sanctuary. The Audubon Society has designated this area as an Important Bird Area. The flow-through wetland supports an abundant array of waterfowl, shorebirds, and raptors. The National Great Rivers Museum is part of the area, located on the Illinois side of the Mississippi River. More than 2 million visitors recreate within the Riverlands Migratory Bird Sanctuary annually, enjoying wildlife viewing, boating, hiking, biking, fishing, and other activities. The Mainline Project would cross approximately 1.25 miles of the Riverlands area over three stretches between MP 1015 and 1017.

Jones-Confluence Point State Park, Missouri

This state park is situated at the confluence of the Missouri and Mississippi Rivers; work is ongoing to restore the natural floodplain of the area. The restored 1,118-acre park would include native vegetation, natural wetlands, forests, prairies, and marshes. Visitors can engage in high-quality bird watching and native plant species viewing (MSPHS 2007). Keystone's Mainline Project would intersect Jones-Confluence State Park at MP 1,019.9 and traverse approximately 1 mile of the park. In addition, the pipeline ROW would traverse 35 miles of private COA land prior to entering state park lands.

Carlyle Lake Wildlife Management Area, Illinois

Carlyle Lake, managed by COE, is the largest reservoir in Illinois, with 26,000 surface acres of water and 11,000 acres of adjacent public land. It is a major recreation destination for residents in the St. Louis metropolitan area. Recreation activities include fishing, hunting, wildlife viewing, boating, swimming, camping, and golfing. The Carlyle Lake Wildlife Management Area (WMA) is located at the north end

of the reservoir and is managed by the IDNR under a 25-year lease from COE. The WMA includes 2,000 acres of woodland, 5,800 acres of open water and wetlands, 200 acres of grassland, and 1,500 acres of cropland planted for wildlife food and cover (IDNR 2007). The Mainline Project would cross approximately 3 miles of the WMA between MP 1,069.6 and 1,072.7.

U.S. Fish and Wildlife Service Wetland Easements

The proposed Mainline Project route also would cross multiple USFWS easements in North Dakota and South Dakota. Table 3.9.3-8 shows the location of USFWS wetland easements. USFWS easements and wetlands of special concern or value are discussed in depth in Section 3.4.2. Wetland easements are signed agreements with private landowners to permanently protect valuable wetlands. The landowner receives a one-time payment. Protected wetland basins cannot be drained, burned, filled, or leveled.

When these wetlands naturally dry up, they can be farmed, grazed, or hayed. The land remains in private ownership, remains on the tax rolls, and the landowner controls access (USFWS 2007b). USFWS wetland easements are important habitat areas for a variety of flora and fauna, and they serve as private hunting areas. The Mainline Project would cross approximately 37.7 miles of USFWS wetland easements (see Table 3.9.3-8).

Wildlife Management Areas and Hunting

Hunting occurs on publicly and privately owned lands along the proposed Mainline Project route. Most affected cover for game species would be located on private land that would require landowner permission for access; however, two public wildlife areas (Pigeon Hill Conservation Area, Missouri at MP 748.5 and Carlyle Lake WMA, Illinois at MP 1,069.6) would be crossed by the pipeline route. The Mainline Project also would cross a South Dakota game production area at MP 228.4 that is owned and managed by the SDGFP. Hunting also is permitted in Tetrault Woods State Forest (North Dakota).

Wilderness Areas

The proposed Mainline Project route would not cross any designated Wilderness Areas or Wilderness Study Areas.

Potential Impacts and Mitigation

Public scoping comments questioned the effect of the Keystone Project on bicycle trails in Madison County, South Dakota and on special use areas (including walnut tree groves and a tree nursery in Sargent County, North Dakota).

General Recreation Activities

For recreation areas and special management areas, the Keystone Project is expected to cause temporary impacts to recreational traffic and use patterns during construction. Sightseers, hikers, wildlife viewers, and other recreationists would be displaced from the immediate area during construction. Keystone would continue to coordinate with agency managers to minimize conflicts between construction activities and recreational uses for which these special areas were established. Following construction, all affected recreational lands would return to previous uses; Keystone would restore any affected trails or bicycle routes that cross the construction and permanent ROWs, and pipeline operation would not be expected to impact recreational activities. Construction impacts on general recreation activities are considered temporary and minor. Pipeline operation is not expected to affect general recreation.

TABLE 3.9.3-8
U.S. Fish and Wildlife Service Wetland Easements Crossed by the Keystone Mainline Project

North Dakota		South Dakota	
Milepost	Miles Crossed	Milepost	Miles Crossed
79–77	1.0	216.9–218.8	1.9
79.1–79.6	0.5	219.3–219.8	0.5
80.1–82.3	2.2	222.3–222.8	0.5
85.8–86.5	0.7	261.3–261.6	0.3
87–88.1	1.1	210.5–211	0.5
89.6–89.9	0.3	316.4–316.9	0.5
91.7–92.7	1.0	318.8–319.3	0.5
97.7–98.3	0.6	321.9–322.4	0.5
100.9–101.2	0.3	324.4–324.6	0.2
109.6–110.1	0.5	325.5–326.5	1.0
110.6–111.1	0.5	329.2–329.6	0.4
117.3–117.7	0.4	332.2–332.7	0.5
118.9–119.2	0.3	333.7–334.7	1.0
121.8–122.3	0.5	334.9–335.2	0.3
127.6–127.9	0.3	338.9–340	1.1
128.3–128.6	0.3	349.2–349.8	0.6
137.3–138.2	0.9	355.5–356.0	0.5
138.9–140	1.1	360.5–361.7	1.2
169.3–170.3	1.0	363.4–364.7	1.3
172.5–173.0	0.5		
170.5–170.8	0.3		
174–174.5	0.5		
175.5–176	0.5		
176.5–177	0.5		
177.6–179.1	1.5		
180.6–183.2	2.5		
183.2–183.4	0.3		
186.7–187.2	0.5		
187.7–189.2	1.5		
198.8–199.1	0.3		
214.9–216.9	2.0		
Mainline Project total			**37.7**

Source: ENSR 2006a.

Missouri National Recreational River

The Mainline Project would cross the Missouri National Recreational River at Yankton, South Dakota. Approximately 3 miles of protected land would be affected by this crossing. Keystone has developed a site-specific crossing plan for the Missouri River, which details the HDD methods to be used (Drawing K-31-P-6001-A-1.06, ENSR 2006a). The site plan shows that the HDD entry and exit points would be set well back from the river banks (more than 500 feet, in each case), and that views from the river of the entry and exit points would be shielded by vegetation. In addition, the site plan specifies that the water quality of the Missouri would not be affected by hydrostatic test water or excess drilling mud, which may not be disposed of in the water body or in existing wetlands but must be deposited in upland erosion control structures or as directed under conditions of the permit to conduct the HDD. The HDD drilling process would have the potential to create frac-outs, or a rupture of drilling mud to the surface or riverbed, where it could affect water quality and recreation on the Missouri River. Keystone proposes to contain and collect any inadvertently released drilling mud to the extent possible, and to dispose of it in compliance with the drilling permit.

NPS would require Keystone to apply for a Special Use Permit to conduct geotechnical drilling near the banks of the Missouri River. On August 17, 2006, Keystone filed an application for an NPS Special Use Permit, including the Missouri River HDD site plan. Approval of this permit is pending. Keystone submitted copies of the NPS consultation documents to DOS in its September 15, 2006 filing.

Construction activities are anticipated to cause only temporary impacts, such as noise and dust from drilling at the entry and exit points for the HDD. Pipeline operation is not expected affect recreation on the Missouri River or its banks.

Wetland Easements

As mentioned above, the Mainline Project would intersect multiple USFWS wetland easements in North Dakota and South Dakota. Construction in wetland easements would proceed in the same manner as outlined for general wetland areas. All mitigation for pipeline construction in wetlands of all types would apply to wetlands easements. Keystone would use trench construction in wetland areas. Soil stability at the time of construction largely would determine which wetland crossing method would be used. Refer to Section 2.2.2.4 for more information on construction methods in wetlands.

USFWS wetland easements also have a financial component that is paid to the landowner in return for maintaining the wetland (although the land may be grazed, farmed, or hayed if the wetland dries up due to natural causes). USFWS wetlands easements are perpetual, and payment is made to a consenting landowner at one time as a lump sum. Given proposed mitigation measures, construction impacts on wetland easements are expected to be short term and minor. These temporary impacts would be associated with vegetation removal, grading, grubbing, trenching, and soil stockpiling; they would be minimized by following the mitigation measures described in Appendix B (TransCanada 2007c).

Pipeline operation is not anticipated to affect wetland easements. Maintenance of vegetation would not be conducted over the full width of the permanent ROW in these wetland areas. Therefore, no permanent impacts are anticipated from crossing wetlands on USFWS easements (TransCanada 2007c).

Groves and Tree Nurseries

Keystone's proposed mitigation measures would minimize impacts on groves and tree nurseries. For these special interest areas, trees in the path of the construction and permanent ROWs would be removed, and no trees would be allowed to regenerate above the permanent ROW for the life of the Keystone

Project. Any construction ROW areas cleared of trees during the construction process would take many decades to regenerate, which is considered a long-term significant impact. Operations impacts on groves and nurseries, given the need to maintain the permanent ROW in an open condition, are considered permanent and significant. The same construction and operation impacts would apply to any Sargent County, North Dakota walnut tree groves or tree nurseries identified in the scoping comments. Review of aerial strip maps of the proposed Keystone Project route indicates that the proposed route may affect small, isolated tree groves and windbreaks, some of which may be walnut trees or nurseries. Based on a review of aerial photography, helicopter reconnaissance, and limited ground surveys, Keystone has determined that no vineyards, orchards, or hops plantations would be crossed by the proposed Keystone Project (TransCanada 2007c). Additional verification will be accomplished through ground surveys (concluding in June 2007) and discussions with landowners.

Forests and Woodlands

Some state forestland (Tetrault Woods State Forest, North Dakota), state park land (Jones-Confluence Point State Park, Missouri), state conservation land (game production area, South Dakota; Pigeon Hill Conservation Area, Missouri; Carlyle Lake WMA, Illinois), and private woodlands (COAs in Missouri) would be crossed by the Mainline Project. Recreation activities such as hiking, fishing, and hunting in these areas would be temporarily interrupted during the pipeline construction period, and these activities could resume following construction. The quality of the recreational experience following construction likely would be diminished due to the permanent clearance of most vegetation in the permanent ROW, long-term clearance of vegetation in the construction ROW, and permanent maintenance activities required to maintain the permanent ROW in an open condition. These activities would result in long-term impacts on vegetation and would induce habitat fragmentation, which would decrease enjoyment of private and public recreational resources. Specific impacts and mitigation for forests can be found in Section 3.5. Impacts and mitigation for woodland habitat are discussed in Section 3.6. Permanent clearance of forestland and woodlands would result in permanent significant impacts on recreation resources.

Keystone has adopted construction, mitigation, and restoration measures for forested land in its Mitigation Plan (see Section 2.2.2.8 for more details on construction procedures in forestland areas). To further decrease the impact of forest clearance on recreation, **the following measures are recommended:**

- **Keystone should consult with state wildlife management and natural resource officials to schedule construction activities in order to avoid important recreational periods (such as hunting seasons) and to create a maintenance plan for the permanent ROW that avoids important recreational periods and results in minimal disturbance to the area.**

- **Where the pipeline follows an existing ROW in forested areas, Keystone should attempt to route the pipeline as close as possible to the existing ROW in order to minimize the overall Project footprint.**

Implementation of these measures would substantially reduce the potential impacts on recreation activities in forested areas; nevertheless, clearance of woodlands would cause a permanent and significant impact in forested areas that would remain throughout the operational life of the pipeline.

Privately Owned Conservation Areas

The Mainline Project would intersect multiple private conservation areas in North Dakota and Missouri. These privately owned conservation areas consist of woodlands, grasslands, and wetlands. The ROW crosses the Missouri-Mississippi confluence area in Missouri, where numerous COAs have been

designated. Many of these COAs are managed as hunting grounds for private duck clubs and as conservation land for wildlife habitat and flood control. For all of these areas, recreational activities would be temporarily interrupted during the pipeline construction process and could resume following restoration. As described for recreational resources in forests and woodlands, privately owned conservation areas could be adversely affected by a decline in the recreation experience and enjoyment of recreational resources due to habitat fragmentation, tree removal, and visible scarring from the construction and mechanical maintenance processes.

Impacts to private conservation areas would differ depending on the land use type. For grasslands and wetlands, proposed construction mitigation and restoration measures would reduce effects to minimal levels. Mitigation would include relieving compaction, rock removal, reseeding, erosion control, stream bank stabilization, and repair or replacement fencing (as outlined in Section 4.11 of the Mitigation Plan, see Appendix B). Even with mitigation, however, grasslands may take up to 5 years to mature to levels where the visible construction scars are no longer evident. Construction impacts on grassland and wetland conservation areas are expected to be long term but minor, while pipeline operation would not affect grassland and wetland conservation areas following restoration, because regular maintenance would not occur above the permanent ROW in these areas.

For wooded conservation areas, impacts associated with pipeline construction and operation would be the same as for forested areas. Construction and operation impacts on wooded conservation areas would be long term or permanent, respectively, and significant.

To mitigate potential impacts on recreational resources in privately owned conservation areas, **the following measures are recommended:**

- **Keystone should consult with owners of private conservation areas and local advocacy groups to schedule construction activities in order to avoid important recreational periods (such as hunting seasons), and to create a maintenance plan for the permanent ROW that avoids important recreational periods and results in minimal disturbance to the area.**

- **Where the pipeline follows an existing ROW, Keystone should attempt to route the pipeline as close as possible to the existing ROW in order to minimize the overall footprint of these features in privately owned conservation areas.**

Implementation of these measures would reduce potential impacts on recreation resources at privately owned conservation areas; nevertheless, permanent impacts would remain, particularly for forested areas.

Riverlands Environmental Demonstration Area

Riverlands is a prairie marsh restoration, designed as a flow-through wetland. It is a designated bird sanctuary and has been identified by the Audubon Society as an Important Bird Area. Construction in Riverlands would proceed in the same manner as outlined for general wetland areas. All mitigation for pipeline construction in wetlands (as identified in the Construction Mitigation and Reclamation Plan) apply to Riverlands. Keystone would use open cut trench construction in wetlands. Soil stability at the time of construction largely would determine which wetland crossing method would be used. Refer to Section 2.2.2.4 for more information on construction methods in wetlands.

Given proposed mitigation measures, construction impacts on wetlands are expected to be long term but minor. These temporary impacts would be associated with vegetation removal, grading, grubbing, trenching, and soil stockpiling; they would be minimized by following the mitigation measures described in Appendix B (TransCanada 2007c). The visible impact of the construction zone would be apparent for

as many as 5 years, during which time the wetland vegetation would be allowed to return. Any disruption to trails, wildlife viewing areas, public access roads, parking, or boat access areas would be restored by Keystone; construction impacts would be long term but minor.

Pipeline operation is not anticipated to affect Riverlands or recreation within the area. Maintenance of vegetation would not be conducted over the full width of the permanent ROW in wetland areas. Therefore, no permanent impacts are anticipated from crossing wetlands (TransCanada 2007c). The COE would be free to manage the area using its present practices, including seasonal flooding and prescribed burning.

To further mitigate possible impacts on the Riverlands area, **the following measures are recommended:**

- **Keystone should attempt to route the pipeline as close as possible to the existing ROW (Platte pipeline) in order to minimize the overall footprint of these features in Riverlands.**

- **Keystone should pay special attention to the soils in the Mississippi-Missouri confluence region and their uniqueness, taking care to avoid alteration of the hydrology of the area due to disruption of the ridge/swale topography.**

- **Keystone should minimize construction impacts by scheduling construction activities in Riverlands during early summer and ending construction prior to autumn.**

Wildlife Management Areas and Hunting

The Mainline Project would intersect one public WMA (Carlyle Lake WMA, Illinois), a public conservation area (Pigeon Hill Conservation Area, Missouri), a public game production area (South Dakota), and a public state forest where hunting is allowed (Tetrault Woods State Forest, North Dakota). Public access to these areas for hunting and wildlife viewing could be impeded during construction. In addition, the Mainline Project would intersect many private areas regularly used for hunting. The impacts of pipeline construction in any one of these areas would be of limited duration; however, construction during the fall hunting and migratory season, in particular, could create conflicts with hunters and wildlife viewers.

To decrease possible conflicts with hunting and other recreational activities in wildlife management and public conservation areas, **the following measures are recommended:**

- **Keystone should consult with public land managers to schedule construction activities in wildlife management and public conservation areas to avoid important recreational periods, and to create a maintenance plan for the permanent ROW that avoids important recreational periods and results in minimal disturbance to these areas.**

- **Where the pipeline follows an existing ROW in a wildlife management or public conservation area, Keystone should attempt to route the pipeline as close as possible to the existing ROW in order to minimize the overall footprint of these features in wildlife management and public conservation areas.**

Implementation of these measures would substantially reduce the potential for conflicts with hunting and other recreation activities; nevertheless, some degree of recreational impact would persist throughout the life of the pipeline due to habitat fragmentation and routine maintenance activities.

Pipeline construction and operation activities have the potential to substantially affect forested portions of WMAs, public conservation areas, public game production areas, and public forest lands. Trees would be removed from both the construction and permanent ROWs. Woody vegetation along the permanent ROW would be periodically cleared by mechanical mowing or cutting. Trees would not be allowed to regrow within the permanent ROW for the life of the Keystone Project, and revegetation within the construction ROW would require many decades. For these forested special interest areas, impacts related to construction activities are considered significant and long term. Pipeline operation would result in a permanent significant impact on forested parts of these public areas.

Carlyle Lake WMA (a COE property managed by the IDNR) and Riverlands Environmental Demonstration Area (a COE property) are subject to the Land and Water Conservation Fund (LWCF) Act. These areas may be funding recipients of the LWCF, which was established to assist states and federal agencies in meeting present and future outdoor recreation demands. Section 6.f.3 of the LWCF Act states that: "No property acquired or developed with assistance under this section shall, without the approval of the Secretary [of the Interior], be converted to other than public outdoor recreation uses" (16 USC §4601-8[f.3]). Land may be converted, however, if it is deemed that the change is in accordance with existing statewide outdoor recreation plans, and given that the land is substituted for other recreation properties of "at least equal fair market value and or reasonably equivalent usefulness and location." Construction and operation of Keystone Project facilities would affect the recreational use of Carlyle Lake WMA and Riverlands Environmental Demonstration Area by temporarily disturbing access and recreational activities during construction, and by affecting the overall recreational experience and enjoyment of individuals through habitat fragmentation and visible scarification of the landscape following construction and during operation. Woodlands, grasslands, and wetlands would be affected as described above, and the same mitigation measures would apply.

Off-Road Vehicles and Trespassing

Pipeline projects have the potential to create trespassing problems, particularly when off-road vehicles (ORVs) and snow mobiles use the restored ROW after construction. The construction process creates a cleared, graded route and opens up a potential pathway for ORV use. No designated ORV areas were noted in the vicinity of the proposed route; however, many states allow ORV riders to use rural roadways and road shoulders, which would provide access to points where the pipeline ROW would cross these routes. Snow mobiles also may be permitted to operate on road shoulders, and trespassers could access the pipeline ROW by foot, bicycle, cross-country skis, and snow shoes.

While ROWs would be restored relatively quickly in agricultural areas such as cropland, revegetation would require longer periods in some land use types. In forests, revegetation of trees would not be allowed above the permanent ROW. Grasslands may take up to 5 years for the visible scar from pipeline construction activities to disappear. In forested areas, Keystone has committed to using gates, boulders, or other barriers to minimize unauthorized access, if requested by landowners. Keystone would install and maintain these control measures, as detailed in Section 2.15 of its Mitigation Plan. The Mitigation Plan does not, however, specifically mention trespass as a potential problem beyond ORV users and does not mention land use types other than forests that may be affected by trespass. Therefore, **the following measures are recommended:**

- **Keystone should use fencing and gates to prevent unauthorized access to the ROW immediately following the start of construction activities. Keystone should maintain and monitor fences and gates until permanent mitigation measures can be put in place.**

- **Keystone should commit to prevention of trespass in all of its potential forms on the construction and permanent ROW, using the stated mitigation measures, to be implemented at the time of restoration and mitigation,**

Implementation of these mitigation measures would reduce potential trespassing and ORV impacts to minimal levels, and prevent them entirely in most cases. With mitigation, pipeline construction and operation would not create ORV or trespassing problems.

3.9.3.8 Visual Resources

General visual impacts associated with the construction ROW, additional temporary workspaces, and operation of the Cushing Extension pipeline include clearing and removal of existing vegetation; exposure of bare soils; earthwork and grading scars associated with heavy equipment tracks; trenching; rock formation alteration or removal; machinery and pipe storage; landform changes that introduce contrasts in visual scale, spatial characteristics, form, line, color, or texture; and new aboveground structures.

Potential Impacts and Mitigation

Agricultural Lands and Rangeland

Some of the proposed Mainline Project route would be located within or adjacent to existing ROWS for pipelines, utilities, or roads ROWs—or in previously disturbed agricultural lands and herbaceous rangeland. The majority (approximately 61 percent) of the route, however, would consist of new ROW. Visual impacts associated with pipeline construction in rangeland and agricultural areas along the route would be temporary and would result from the presence of construction equipment and post-construction visual scarring. In cultivated croplands, visual scarring would persist until the ROW is replanted with new crops. Once crops are replanted, only a minor visual impact from pipeline construction would be evident in cultivated croplands. However, visual scarring in herbaceous rangeland and previously disturbed areas may last for 5 or more years in the Keystone Project region.

Temporary minor impacts could result from the presence of construction equipment along the ROW, but the remote location and short duration of the construction sequence in a given area would minimize these potential visual impacts, and they would cease immediately following construction. As scarring in rangeland areas may continue for up to 5 years, visual impacts resulting from construction are expected to be long term but minor in these areas. Construction-based visual impacts on agricultural lands are anticipated to be short term and minor, with the visual ROW impacts fading with subsequent replanting of crops. Visual impacts from pipeline operation in agricultural and rangeland areas would be limited to the introduction of aboveground facilities, discussed below.

In many agricultural and rangeland areas, landowners plant trees or shrubs to act as windbreaks, shelterbelts, or living snow fences; these features reduce wind erosion, reduce evaporation from soils, increase crop yields, provide wildlife habitat and wind protection for livestock, and serve as visual screens. Keystone has proposed mitigation to minimize impacts to these features; however, any access of the pipeline ROW through a windbreak would result in a permanent segmentation of the visual feature (see Section 3.9.3.2 for a detailed discussion of windbreaks). Pipeline construction and operation are expected to result in permanent but minor visual impacts on windbreaks.

The proposed aboveground facilities that are not adjacent to existing crude oil or other industrial facilities could affect visual resources because they would be new permanent industrial facilities located in relatively flat open areas. However, these facilities would primarily be situated in rural herbaceous

rangeland and agricultural areas that have not been designated as primary viewsheds or scenic corridors, with only nominal viewer traffic. Keystone proposes to provide a landscaped visual screen for aboveground facilities where appropriate. Construction-based visual impacts on rangeland and agricultural areas from these facilities would be temporary and minor, consisting of the presence of construction equipment and staging areas along the ROW. Aboveground facilities would be permanent landscape fixtures in agricultural and rangeland areas. To further reduce visual impacts from these facilities, **the following measures are recommended:**

- **Aboveground facilities should be painted with a non-reflective coating similar in color to the surrounding terrain and several shades darker, using colors that account for seasonal change in landscape colors.**
- **Keystone should use a vegetative barrier to shield a facility from sight when it is within viewing distance of a residence, or when otherwise appropriate.**

With implementation of these measures, the operational visual impact of these facilities is expected to be permanent but minor, based on the generally remote location.

Forestland

The Mainline Project would affect almost 800 acres of forestland (see Table 3.9.3-3); most of these acres are in Missouri and Kansas. Keystone construction standards for forested areas dictate that trees above the permanent ROW would be removed prior to trenching. Removal of additional trees and grubbing of tree stumps would occur along the construction ROW for the safe operation of construction vehicles. Keystone has proposed construction mitigation and restoration measures to reduce potential impacts to forested land to minimal levels; however, trees would not be allowed to regenerate within the permanent ROW for the life of the Keystone Project. In addition, trees likely would not regenerate within the construction ROW for many decades. Removal of trees along both the permanent and construction ROWs would leave a highly visible deforestation line that would persist for the duration of pipeline operation. The visual impact related to the construction ROW is considered long term and significant, while the visual impact related to the permanent ROW is considered permanent and significant.

Connected Action – Wood River Refinery Upgrade

The Wood River Refinery would undergo numerous upgrades to achieve the capacity to refine the additional crude oil resources from the Project. These upgrades would become permanent visible fixtures within the landscape. Among these, vertical structures would be most visible, including a new water tower and coking flare. The flare also would constitute a visible source of light when it is in use. The upgrades also are likely to include additional facility lighting, which would constitute a permanent addition to the existing amount of light produced by the refinery.

The visual impact of new structures would be permanent but minor, as these new structures would be located near numerous existing industrial features. The visual impact of new lighting also would be permanent but minor, as it would contribute incrementally to an already substantial light source in an industrial setting.

3.9.4 CUSHING EXTENSION

3.9.4.1 General Land Use

As proposed, the approximately 294-mile Cushing Extension would disturb a total of 4,595 acres of land while traversing the states of Nebraska (approximately 2 miles), Kansas (approximately 210 miles), and

Oklahoma (81 miles); 1,807 acres of this total would be retained as the permanent ROW. All disturbed acreage would revert to previous uses following construction, except for 17 acres to be retained as space for aboveground facilities, including pump stations, MLVs, delivery facilities, densitometer sites, and pigging facilities.

At the time of this EIS, Keystone does not plan to construct any permanent roads to access the construction ROW for the Cushing Extension (TransCanada 2007c). Existing roads would be used on a temporary basis during construction; and some of these roads may require improvements. A total of 24 new temporary roads or expanded existing roads are planned for construction of the Cushing Extension. The length of these roads ranges from 0.02 to 1.10 miles, and they all would cross agricultural land or grasslands. (See Section 2.1.1.3 for further discussion of access roads.) None of the Cushing Extension pipeline would be located within existing pipeline, utility, or road ROWs (TransCanada 2007c). Consequently, the entire 294-mile Cushing Extension would require a new ROW. However, about 26 miles of the pipeline would be adjacent to existing facility ROWs. Table 3.9.4-1 shows the number of acres that would be affected during construction and operation of the Cushing Extension.

TABLE 3.9.4-1
Land Requirements for the Keystone Cushing Extension

State	Land Affected during Construction (acres)	Permanent Right-of-Way (acres)
Nebraska	51	15
Kansas	3,266	1,284
Oklahoma	1,278	508
Cushing Extension total	**4,595**	**1,807**

Note:

Discrepancies between acreages for individual features and totals are attributable to rounding.

Sources: ENSR 2006a, TransCanada 2007c.

Additional Aboveground Facilities

The Cushing Extension would include three new pump stations, 12 MLVs, two delivery facilities, two densitometer sites, and two pigging facilities (one each at the Ponca City and Cushing Terminals). Table 3.9.4-2 catalogues the number of acres required to accommodate aboveground facilities during construction and operation, as well as affected acreage for the pipeline and lateral ROWs, additional workspaces, and contractor and pipe yards. Some facilities would be located within the affected acreage of other facilities (e.g., all pig launchers and receivers would be located within delivery facilities) or would be located entirely within the 50-foot-wide permanent ROW (the location for all densitometer stations and MLVs).

TABLE 3.9.4-2
Acres Affected by Construction and Operation of Pipeline Facilities for the Keystone Cushing Extension

Pipeline Facility	Construction	Operation
Nebraska		
Pipeline right-of-way (ROW)	32	15
Lateral ROWs	0	0
Additional temporary workspaces	4	0
Pipe and contractor yards	39	0
Pump stations and delivery facilities	0	0
Nebraska subtotal	*75*	*15*
Kansas		
Pipeline ROW	2,802	1,273
Lateral ROWs	0	0
Additional temporary workspaces	158	0
Pipe and contractor yards	351	0
Pump stations and delivery facilities	11	11
Kansas subtotal	*3,322*	*1,284*
Oklahoma		
Pipeline ROW	1,079	496
Lateral ROWs	11	6
Additional temporary workspaces	77	0
Pipe and contractor yards	123	0
Pump stations and delivery facilities	6	6
Oklahoma subtotal	*1,296*	*508*
Cushing Extension		
Total pipeline ROW	3,913	1,784
Total lateral ROW	11	6
Total additional temporary workspaces	239	0
Total pipe and contractor yards	513	0
Total pump stations and delivery facilities	17	17
Cushing Extension total	**4,693**	**1,807**

Notes:

Discrepancies between acreages for individual features and totals and subtotals are attributable to rounding.

Affected acreage for densitometer sites and mainline valves is effectively included within the 50-foot-wide permanent ROW of the pipeline and therefore is not listed separately here.

All pig launching and receiving facilities would be located within pump stations and would not require any additional acreage.

Sources: ENSR 2006a, TransCanada 2007c.

Turnouts and access roads from public roads would be installed for each aboveground facility. Drainage would be maintained by installing ditches or culverts, and the short access roads would be surfaced with crushed rock. The delivery facility sites would be enclosed with a chain-link security fence. (TransCanada 2007c.)

Land Use

The Cushing Extension primarily would affect agriculture and grassland/rangeland land uses. Of lands crossed by the Cushing Extension, agriculture and rangeland account for 51 and 32 percent, respectively, of the acres affected by the Cushing Extension pipeline. Table 3.9.4-3 shows affected land use acreage by state for the Cushing Extension.

TABLE 3.9.4-3
Acres Affected during Construction by Land Use Type for the Keystone Cushing Extension

Land Use Type	Nebraska	Kansas	Oklahoma	Total	Percent of Total (%)
Agriculture/cropland	36	1,893	455	2,384	51
Grassland/rangeland	18	887	598	1,503	32
Forestland	6	104	28	138	3
Wetlands	0	90	63	153	3
Developed	15	339	147	501	11
Water	<1	9	5	14	0
Cushing Extension total	**75**	**3,322**	**1,296**	**4,693**	

Notes:

Agriculture includes cultivated crops, flood or pivot irrigation crops, and fallow cropland.

Rangeland includes herbaceous and mixed rangeland characterized by short-grass prairie, mixed-grass prairie, and lands that appear to be used for cattle or other livestock grazing—with or without a shrub component.

Forestland includes upland and wetland forested areas.

Wetlands include palustrine forested wetlands and palustrine emergent/scrub-shrub wetlands.

Developed land includes both industrial/commercial and residential uses. Industrial/commercial includes electric power or gas utility stations, manufacturing or industrial plants, livestock feedlots, landfills, mines, quarries, commercial or retail facilities, and roads. Residential includes residential yards, subdivisions, and planned new residential developments.

Sources: ENSR 2006a, TransCanada 2007c.

Rangeland/grassland is the predominant land use that would be affected in Oklahoma (35 percent of the acres affected in that state), while agriculture is the predominant land use that would be affected in Nebraska and Kansas (48 and 57 percent of the acres affected in those states, respectively). A total of 339 acres (10 percent of the total affected acreage) in Kansas and 147 acres (11 percent of the total affected acreage) in Oklahoma are developed land. For the Cushing Extension route as a whole, developed land accounts for about 11 percent of the total affected acreage.

Ownership

Nearly 99 percent of lands that would be crossed by the pipeline along the Cushing Extension route are privately owned (see Tables 3.9.4-4 and 3.9.4-5). In Nebraska, land along the entire route is privately owned. In Kansas, about 1 percent of the affected land is federally owned, and the remainder is privately owned. In Oklahoma, approximately 3 percent of the land that would be crossed is owned by the state, less than 0.5 percent is municipal land, and the remainder is privately held.

TABLE 3.9.4-4
Ownership of Land Crossed by the Keystone Cushing Extension

Land Owner	Miles Crossed	Percent of Total (%)
Nebraska		
Federal	0	0.0
State	0	0.0
Private	2.4	100.0
Nebraska subtotal	*2.4*	
Kansas		
Federal	1.9	0.9
State	0.0	0.0
Private	208.2	99.1
Kansas subtotal	*210.1*	
Oklahoma		
Federal	0.0	0.0
State	2.4	2.9
Municipality	0.3	0.3
Private	78.4	96.8
Oklahoma subtotal	*81.0*	
Cushing Extension		
Federal	1.9	0.6
State	2.4	0.8
Municipality	0.3	
Private	289	98.5
Cushing Extension total	**293.5**	

Note:

Discrepancies between acreages for individual features and totals and subtotals are attributable to rounding.

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

TABLE 3.9.4-5 Ownership of Acres Crossed by the Keystone Cushing Extension				
Location	Federal	State	Private	Total
Nebraska	0	0	75	75
Kansas	52	0	3,270	3,322
Oklahoma	0	53	1,243	1,296
Cushing Extension total	**52**	**53**	**4,588**	**4,693**

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

As noted, temporary and permanent ROWs would be acquired through negotiations with private landowners on a case-by-case basis. The Cushing Extension route would cross approximately 2 miles of state-owned land in Oklahoma; all applicable state statutes would apply.

Where the pipeline would traverse federal land (approximately 2 miles in Kansas), all applicable federal statutes would apply. For the Cushing Extension ROW, Keystone will apply in July 2008 for Right-of-Way Grants pursuant to the Mineral Leasing Act, which provides for authorizations for temporary construction use and long-term use of federal land for pipeline purposes. A Right-of-Way Grant is issued for a 30-year term and contains a right of renewal if the project continues to be used for its initial purpose.

3.9.4.2 Agricultural Land

The principal land use that would be affected by the proposed pipeline would be agricultural. The Cushing Extension would cross a substantial amount of agricultural cropland that is presently in private ownership. Construction and operation of the Cushing facilities would affect about 2,384 acres of agricultural land, along approximately 294 miles of the pipeline route. Of this, approximately 212 miles is considered prime farmland by NRCS (this includes land considered potential prime farmland, if adequate protection from flooding and drainage are provided). Prime farmland accounts for 66 percent of the proposed Cushing Extension route mileage in Oklahoma and 75 percent of the route in Kansas. No prime farmland would be crossed in Nebraska.

To determine the amount of agricultural land that potentially would be affected, Keystone reviewed aerial photographs and made general observations during reconnaissance activities. Further refinements to the assessment of various types of cover were completed during an August 2006 grassland survey. Based on the aerial photography evaluations and ground surveys, Keystone has indicated that no known orchards would be crossed by the Keystone Project. One landowner indicated in scoping comments that pecan trees would be removed along the Cushing Extension. Ground survey verification of the orchard category lands will conclude in June 2007.

Potential Impacts and Mitigation

Construction-related activities such as grading, trenching, stringing, welding, backfilling, and restoration could impact agricultural lands by leading to soil erosion, interference with and damage to agricultural surface and subsurface drainage and irrigation systems, mixing or loss of fertile topsoil and subsoil, and soil compaction. All of these impacts could result in reduced productivity of agricultural lands or direct crop loss.

During the scoping period for the Keystone Project, concerns were expressed over a number of agricultural issues, as discussed in Section 3.9.3.2. To address impacts on agricultural lands, Keystone

has proposed mitigation measures that are discussed in detail in the Mitigation Plan (Appendix B). Keystone proposes to restore all areas disturbed during construction of the Keystone Project in accordance with the Mitigation Plan and all other applicable federal, state, and local permit requirements. In particular, Keystone intends to repair or restore drain tiles, fences, and land productivity as these may be affected during the construction process.

Following construction, all agricultural land affected by the Cushing Extension can revert to its previous use, except for 23 acres that would be set aside for permanent aboveground facilities; Keystone would purchase this acreage from landowners. These 23 acres would be permanently converted from agricultural to industrial land use. When construction and cleanup have been completed, all other affected land along the temporary and permanent ROWs could be returned to agricultural production.

Potential agricultural land use impacts and all proposed and recommended mitigation measures for the Cushing Extension are the same as those for the Mainline Project (see Section 3.9.3.2). Specific agricultural topics discussed in Section 3.9.3.2 include soil compaction; construction schedule; center pivot irrigation; surface and subsurface drainage, ponds, waterlines, and drainage ditches; CRP lands; FWP lands and other FSA programs; NRCS programs; access to farmland; and windbreaks, shelterbelts, and living snow fences. The recommended additional mitigation for CRP lands; FWP lands; NRCS programs; and windbreaks, shelterbelts, and living snow fences would minimize impacts on these features associated with the Cushing Extension.

3.9.4.3 Rangeland

The Cushing Extension would cross substantial amounts of grassland and rangeland. Construction and operation of the Cushing Extension facilities would affect about 1,503 acres of rangeland/grassland along the approximately 294-mile route. Approximately 23 acres would be set aside for permanent aboveground facilities (such as pump stations and MLVs); approximately 1 acre of this amount would be located on grassland/rangeland. This acreage would be converted permanently from grassland to industrial land uses.

Affected rangeland acres represent about 32 percent of the total acres affected by the Cushing Extension. Of states that would be crossed by the Cushing Extension, Oklahoma has the highest percentage of affected rangeland/grassland acres (46 percent, representing 598 acres), while Kansas has the lowest (27 percent, representing 887 acres). Approximately 24 percent (18 acres) of the Cushing Extension ROW that would cross Nebraska is comprised of rangeland acres.

Potential Impacts and Mitigation

Construction activities would displace or halt grazing activities and would disturb the surface of livestock foraging areas. In addition, construction activities such as trenching could put livestock at risk of falling or being trapped in open trenches. Land that would be set aside for operation of aboveground facilities would be permanently converted from rangeland to industrial uses.

During the scoping period, commentors questioned how cattle would be protected during construction. To reduce overall risks to livestock grazing in rangelands, Keystone has proposed a number of construction guidelines and mitigation measures that are outlined in its Mitigation Plan (Appendix B). Potential impacts and proposed and recommended mitigation measures related to rangeland for the Cushing Extension are the same as those for the Mainline Project (see Section 3.9.3.3).

3.9.4.4 Forestland

Construction and operation of the Cushing Extension facilities would affect about 138 acres of forestland along approximately 9 miles of the Cushing Extension route. This represents about 3 percent of the total acres that would be affected by the Cushing Extension. The majority of affected forestland is located in Kansas (94 acres). Section 3.5 includes a detailed discussion of forest vegetative types. None of the forested land along the Cushing Extension route is used for timber or Christmas tree production (TransCanada 2007c).

Potential Impacts and Mitigation

Construction activities would remove trees and brush from forested areas. For the life of pipeline operation, the ROW would be maintained in an open condition, and woody revegetation would be periodically removed. This would result in a permanent loss of tree growth in the permanent ROW. In addition, Keystone anticipates that 0.2 acres of forestland may be part of the 13 acres reserved for permanent aboveground facilities. This acreage would be converted permanently from forestland to industrial land uses.

To reduce impacts on forestlands, Keystone has proposed a number of construction guidelines and mitigation measures that are outlined in its Mitigation Plan. Construction and operation impacts and mitigation measures related to forestland are the same for the Cushing Extension as discussed for the Mainline Project (see Section 3.9.3.4).

3.9.4.5 Residences and Planned Development

The Cushing Extension would cross and affect residential land. Based on 2006 aerial photography, Keystone identified 211 potential residential structures within 500 feet of the proposed Cushing Extension ROW. Keystone is currently conducting field surveys that will determine the location of residential structures and other buildings within 50 feet of the proposed ROW. These surveys are scheduled for completion in June 2007 with survey results scheduled to be filed with DOS in July 2007.

Keystone is not aware of any residential or commercial developments planned within 0.25 mile of the Cushing Extension ROW. This assertion will be verified by the ground surveys concluding in June 2007. The majority of potential residential structures are in Kansas (124) and Oklahoma (86), with only one structure near the ROW in Nebraska. Once Keystone has concluded field surveys, it will provide site-specific construction plans for each of the residential structures within 25 feet of the construction workspace.

Potential Impacts and Mitigation

The principal measure proposed by Keystone to mitigate impacts in existing residential areas is to ensure that construction proceeds quickly through such areas and that the hours during which activities with high-decibel noise levels would be conducted are limited. Landowners would be notified at least 24 hours prior to construction. As specified in the Mitigation Plan, Keystone has proposed mitigation measures for potential impacts on all residential land. These measures, along with potential impacts and recommended mitigation, are the same as those discussed in Section 3.9.3.5 for the Mainline Project.

3.9.4.6 Commercial and Industrial Land

Construction and operation of the Cushing Extension facilities would affect about 501 acres of developed land (Table 3.9.4-6). Most of the developed acreage on the Cushing Extension route is located in Kansas

(339 acres), with 147 acres in Oklahoma, and 15 acres in Nebraska. For the Cushing Extension route as a whole, developed land represents approximately 11 percent of total acres affected by the Cushing Extension.

Potential Impacts and Mitigation

Construction of the Cushing Extension could affect commercial and industrial land through restricted access and the presence of construction activity. Impacts to a specific commercial or industrial area are anticipated to last for only several days. Keystone has adopted mitigation measures for commercial and industrial land in its Mitigation Plan. Construction and operation impacts and mitigation related to commercial and industrial land is the same for the Cushing Extension as described for the Mainline Project (see Section 3.9.3.6).

TABLE 3.9.4-6
Developed Land Categories by State for the Keystone Cushing Extension (acres)

State	Residential	Commercial/Industrial	Pre-Existing ROW	Total Developed
Nebraska	0	15	>1	15
Kansas	5	295	39	339
Oklahoma	6	116	25	147
Cushing Extension total	**11**	**426**	**64**	**501**

Source: TransCanada 2007c.

3.9.4.7 Recreation and Special Interest Areas

The proposed Cushing Extension facilities would cross only one special interest area, resulting in temporary construction impacts and possible permanent impacts. Table 3.9.4-7 details the recreational and special interests lands intersected by the Cushing Extension route; no other national, state, or local parks or forests are located within 500 feet of the proposed Cushing Extension centerline.

The proposed Cushing Extension would cross the Milford Wildlife Area in Kansas at four points (MPs 50, 50.2, 52.8, and 53.7), affecting a total of approximately 3 miles along the route (representing 52 affected acres). The Cushing Extension would not intersect any recreational or special interest areas in Nebraska or Oklahoma.

Milford Wildlife Area, Kansas

The Milford Wildlife Area consists of approximately 19,000 acres of public land surrounding the western and northern sides of Milford Reservoir. The Kansas Forestry, Fishing & Game Commission manages the wildlife area, which is owned by COE along with the adjacent Milford Reservoir. The area includes a public hunting area, a wildlife area, and a number of recently created wetlands along the Republican River between the reservoir and Clay Center, Kansas (KDWP 2007).

TABLE 3.9.4-7
Special Interest Areas Crossed by the Keystone Cushing Extension

Site Name	Milepost	Miles Crossed	Ownership
Nebraska			
None identified	NA	NA	NA
Kansas			
Milford Wildlife Area	50–51.8	1.8	U.S. Army Corps of Engineers (COE)
Milford Wildlife Area	52.2–52.7	0.5	COE
Milford Wildlife Area	52.8–53.3	0.5	COE
Milford Wildlife Area	53.7–54.3	0.6	COE
Oklahoma			
None identified	NA	NA	NA
Cushing Extension total		**3.4**	

NA = Not applicable.

Source: ENSR 2006a.

Wilderness Areas

The Cushing Extension would not cross any designated Wilderness Areas or Wilderness Study Areas.

Potential Impacts and Mitigation

Construction activities would cause temporary impacts to recreational traffic and use patterns during construction. Sightseers, hikers, wildlife viewers, hunters, and other recreationists would be displaced from the immediate area during construction. Public hunting access to this area could be impeded during construction. Although impacts of pipeline construction would be of limited duration, construction during the fall hunting and migration season, in particular, could create conflicts with hunters and wildlife viewers. Keystone would continue to coordinate with agency managers to minimize conflicts between construction activities and recreational uses for which these special areas were established. Following construction, all affected recreational and special interest would return to their previous uses.

Operation of the pipeline would not affect hunting in the Milford Wildlife Area. Milford is primarily a wetland restoration area. Given proposed wetland mitigation measures, construction impacts are expected to be long term but minor. These temporary impacts would be associated with vegetation removal, grading, grubbing, trenching, and soil stockpiling; they would be minimized by following the measures described in Keystone's Mitigation Plan (TransCanada 2007c). The ROW may be visible for up to 5 years as wetland and grassland vegetation reestablishes, resulting in a long term, minor impact. Other temporary and minor construction impacts may occur, including decreased access and closure of trails, parking, and wildlife viewing areas. Keystone would restore all of these areas following construction.

Maintenance of vegetation would not be conducted over the full width of the permanent ROW in wetland areas. Therefore, no permanent impacts are anticipated from crossing wetlands of the Milford Wildlife Area (TransCanada 2007c).

For the Milford Wildlife Area, the primary concerns would be limited access and conflicts with hunters during construction. Therefore, **the following measures are recommended:**

- **Keystone should develop a site-specific crossing plan for the Milford Wildlife Area.**
- **Keystone should work with Milford Wildlife Area managers to schedule construction activities in order to avoid seasonal hunting conflicts with the public hunting area.**

As described in Section 3.3.7 for the Carlyle Lake WMA and Riverlands Environmental Demonstration Area, Milford Wildlife Area may be a funding recipient of the LWCF and could be subject to the requirements of Section 6.f.3 of the LWCF Act. Construction and operation of Keystone facilities would not change the recreational use of Milford Wildlife Area, although temporary and minor recreational impacts would be expected.

Other general impacts related to recreation and special interest areas and associated recommended mitigation measures are the same for the Cushing Extension as discussed for the Mainline Project (see Section 3.9.3.7).

3.9.4.8 Visual Resources

General visual impacts associated with the construction ROW, additional temporary workspaces, and operation of the Cushing Extension pipeline include clearing and removal of existing vegetation; exposure of bare soils; earthwork and grading scars associated with heavy equipment tracks; trenching; rock formation alteration or removal; machinery and pipe storage; landform changes that introduce contrasts in visual scale, spatial characteristics, form, line, color, or texture; and new aboveground structures.

Potential Impacts and Mitigation

Impacts on visual resources and associated recommended mitigation measures are the same for the Cushing Extension as described for the Mainline Project (see Section 3.9.3.8).

3.9.4.9 Connected Action

In modifying or constructing transmission line substations to support the Keystone Project, Western would implement the following mitigation measures for Land Use, Recreation and Special Interest Areas, and Visual Resources:

- Removal of vegetation would be minimized to avoid creating a swath along the ROW.

3.9.5 References

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3.9 LAND USE, RECREATION AND SPECIAL INTEREST AREAS, AND VISUAL RESOURCES

Construction, operation, and maintenance of the pipeline facilities and access routes for the Keystone Project would cause temporary and permanent impacts on various types of land uses, such as agriculture, rangeland, wetlands, waterbodies, industrial/commercial land, residential land, and recreational and other special interest areas (e.g., public lands). The potential impacts and recommended mitigation in the following sections apply to both the Mainline Project and the Cushing Extension routes, except as noted.

As shown in Tables 3.9.3-3 and 3.9.4-3 (in the respective sections), the largest amount of acreage that would be affected by the Keystone Project would be agricultural land (65 percent and 51 percent for the Mainline Project and the Cushing Extension, respectively), followed by rangeland (15 and 32 percent, respectively). Impacts to these and other various land uses, as well as visual resources, are discussed below and are separated for the Mainline Project and the Cushing Extension routes. Wetlands and forested areas are discussed in greater detail in Sections 3.4 and 3.5, respectively.

3.9.1 Right-of-Way Acquisition Process

Pipeline facilities would predominantly affect privately owned land. Private land comprises approximately 99 percent of lands that would be crossed by the Mainline Project and 98 percent that would be crossed by Cushing Extension. Of the affected privately owned areas, land use is primarily agricultural.

Keystone requires a negotiated easement from all ROW landowners. Easements would consist of two types: permanent easements that would allow Keystone to construct, operate, and maintain the pipeline in the permanent ROW; and temporary easements to allow for additional construction workspace and storage areas In return, the company compensates the landowner for use of the land. The easement agreement between the company and landowner typically specifies compensation for loss of use during construction, loss of non-renewable or other resources, damage to property during construction, and allowable uses of the permanent ROW after construction. Because the easement acquisition process is conducted with the landowner, it is possible that tenants or lessees could be adversely affected, although it is not known whether any instances of such impacts would occur in conjunction with the components of the Keystone Project.

The potential effect of a pipeline easement on private property values or property income is an issue that would be negotiated between the parties during the easement acquisition process, a process designed to compensate a landowner for the right to use the property for pipeline construction and operation. The impact a pipeline may have on the value of a tract of land depends on many factors, including the size of the tract, the values of adjacent properties, the presence of other utilities, the current value of the land, and the current land use. Construction of the proposed Keystone Project would not change the general use of the land (except for permanent aboveground facilities and forest land) but would preclude construction of aboveground structures on the permanent ROW, restrict excavation or alteration of ground elevation, and restrict impoundment of water above the permanent ROW. The easement would allow Keystone the right to cut and clear trees, brush, and shrubbery and to remove structures and other obstacles from the permanent ROW. Construction and operation of the pipeline might interfere with other current uses on a short-term or long-term basis, or contribute to the loss of non-renewable resources or destruction of site improvements such as fences.

Keystone would monetarily compensate landowners in return for granting easements. Compensation would be for loss of use during construction, crop loss, loss of non-renewable or other resources, and

restoration of any unavoidable damage to personal property during construction. In the event that an easement cannot be negotiated with a landowner, Keystone would utilize state eminent domain laws to obtain easements needed for pipeline construction, maintenance, and operation. State laws dictate under what circumstances eminent domain may be used and define the eminent domain process for each state, as applicable. Keystone would still be required to compensate the landowner for the ROW and damages incurred during construction. However, the level of compensation would be determined by a court according to applicable state or federal law. In either case, Keystone would compensate landowners for use of the land. Eminent domain does not apply to lands under federal ownership.

Compensation for crop loss would be determined on a case-by-case basis. Keystone would obtain from the USDA current information regarding commodity prices and yields; these data would be supplemented by property-specific yield and price data supplied by the landowner. Landowners would be compensated at 100 percent for the year of construction, with diminishing percentages over the next 2 years.

Keystone also would acquire a number of sites for the construction, operation, and maintenance of pump stations and other permanent aboveground facilities. These would be negotiated with and purchased from landowners.

3.9.2 Data and Methodology

The Keystone Pipeline Project Environmental Report (ENSR 2006a) was the primary source of data for this analysis of land use, recreation and special interest areas, and visual resources. The Environmental Report originally was submitted in April 2006 and was updated in November. Land use classifications provided in the Environmental Report were established by developing Project-specific land cover categories based on analysis of high-resolution aerial photography (TransCanada 2007c). Keystone subsequently has updated its land use data four times: the December 2006 realignment of the Cushing Extension route; the January 24, 2007 supplemental filing to DOS (TransCanada 2007a); the January 29, 2007 Data Request #1 filing (TransCanada 2007b), and the April 4, 2007 Data Request #2 filing (TransCanada 2007c). Future filings and responses to data requests are expected. Keystone's Mitigation Plan (Appendix B) was instrumental in determining the adequacy of mitigations and impact significance. In addition, aerial strip maps were analyzed to verify land use categories and identify structures on or close to the construction ROW.

On January 26, 2007, a meeting was held between DOS and FSA; on February 1, 2007, a similar meeting between DOS and NRCS was held to discuss potentially affected conservation easements, compensatory mitigation for impacts to agricultural wetlands, and appropriate mitigation and revegetation measures for agricultural lands. Subsequent meetings to discuss agricultural issues were held with FSA on March 15, 2007, and with Keystone on April 9, 2007. Review of the Keystone Project shapefiles indicates that the route as originally proposed in the application would cross three NRCS easements: one each in South Dakota, Missouri, and Oklahoma. Keystone has agreed to try to avoid all but the Missouri easement. For this easement, Keystone determined that potential impacts would be greater to re-route the Project than to cross the easement. NRCS has agreed to this finding with caveats, described fully in the agricultural land use subsection.

3.9.3 MAINLINE PROJECT

3.9.3.1 General Land Use

As proposed, the 1,078-mile Mainline Project would disturb a total of 17,205 acres of land while traversing the states of North Dakota, South Dakota, Nebraska, Kansas, Missouri, and Illinois. Of this total, approximately 6,673 acres would be retained as the permanent ROW. Approximately 134 acres are

to be set aside for permanent aboveground facilities, including pump stations, MLVs, delivery facilities, and densitometer sites, and 6 acres would be permanent lateral ROW. All other disturbed acreage (including pipe and contractor yards, additional temporary facilities, and the construction ROW) would revert to previous uses following the construction process.

Approximately 344 miles (32 percent) of the Mainline Project pipeline would be within existing pipeline, utility, or road ROWs. The remaining 734 miles would require a new ROW; however, approximately 79 of those miles are adjacent to existing facility ROWs (TransCanada 2007c). Table 3.9.3-1 shows the number of acres that would be affected during construction and operation of the Mainline Project.

At the time of this EIS, Keystone does not plan to construct any permanent roads to access the construction ROW (TransCanada 2007c). Existing roads would be used on a temporary basis during construction; and some of these roads may require improvements. A total of 104 new temporary roads or expanded existing roads are planned for the Mainline Project. The majority of these roads would be less than 0.5 mile long and would cross agricultural land. However, one access road at MP 1072.5 would be 13.5 miles long and would cross a wetland. Access roads also are discussed in Section 2.1.1.3, Ancillary Facilities.

TABLE 3.9.3-1
Land Requirements for the Keystone Mainline Project

State	Land Affected during Construction (acres)	Permanent Right-of-Way (acres)
North Dakota	3,386	1,342
South Dakota	3,253	1,349
Nebraska	3,327	1,323
Kansas	1,827	610
Missouri	4,498	1,689
Illinois	914	360
Mainline Project total	**17,205**	**6,673**

Sources: ENSR 2006a, TransCanada 2007c.

Additional Aboveground Facilities

The Mainline Project would include 23 new pump stations (and a possible 24th at Bond County, Illinois to support expansion) and 52 MLVs, two delivery sites (Wood River and Patoka Terminals), three densitometer sites, (one in Jefferson County, Nebraska; one in St Charles County, Missouri; and one in Bond County, Illinois), and six pig launching and receiving facilities that would be located within pump stations. Table 3.9.3-2 catalogues the number of acres required to accommodate aboveground facilities during construction and operation, as well as affected acreage for the pipeline and lateral ROWs, additional workspaces, and contractor and pipe yards. Some facilities, including densitometer stations, MLVs, and pig launching and receiving sites, are located within the affected acreage of other facilities (e.g., pig launchers and receivers would be located within pump stations) or would be located entirely within the 50-foot-wide permanent ROW (densitometer stations and MLVs). The state, county, and milepost location of each aboveground facility is provided in Table 2.1-6, in Section 2.1.1.3.

TABLE 3.9.3-2
Acres Affected during Construction and Operation of Pipeline Facilities for the Keystone Mainline Project

Pipeline Facility	Construction	Operation
North Dakota		
Pipeline right-of-way (ROW)	2,891	1,314
Lateral ROWs	0	0
Additional temporary workspaces	141	0
Pipe and contractor yards	326	0
Pump stations and delivery facilities	28	28
North Dakota subtotal	*3,386*	*1,342*
South Dakota		
Pipeline ROW	2,919	1,327
Lateral ROWs	0	0
Additional temporary workspaces	171	0
Pipe and contractor yards	141	0
Pump stations and delivery facilities	22	22
South Dakota subtotal	*3,253*	*1,349*
Nebraska		
Pipeline ROW	2,850	1,295
Lateral ROWs	0	0
Additional temporary workspaces	166	0
Pipe and contractor yards	283	0
Pump stations and delivery facilities	28	28
Nebraska subtotal	*3,327*	*1,323*
Kansas		
Pipeline ROW	1,317	599
Lateral ROWs	0	0
Additional temporary workspaces	81	0
Pipe and contractor yards	418	0
Pump stations and delivery facilities	11	11
Kansas subtotal	*1,827*	*610*
Missouri		
Pipeline ROW	3,641	1,655
Lateral ROWs	0	0
Additional temporary workspaces	282	0
Pipe and contractor yards	541	0
Pump stations and delivery facilities	34	34
Missouri subtotal	*4,498*	*1,689*

TABLE 3.9.3-2 (Continued)		
Pipeline Facility	**Construction**	**Operation**
Illinois		
Pipeline ROW	653	343
Lateral ROWs	11	6
Additional temporary workspaces	64	0
Pipe and contractor yards	175	0
Pump stations and delivery facilities (includes the Bond County pump station (PS-38) potentially needed for expansion)	11	11
Illinois subtotal	*914*	*360*
Mainline Project		
Total pipeline ROW	14,271	6,533
Total lateral ROW	11	6
Total additional temporary workspaces	905	0
Total pipe and contractor yards	1,884	0
Total pump stations and delivery facilities	134	134
Mainline Project total	**17,205**	**6,673**

Notes:

Discrepancies between acreages for individual features and totals and subtotals are attributable to rounding.

Affected acreage for densitometer sites and mainline valves is effectively included within the 50-foot-wide permanent ROW of the pipeline and therefore is not listed separately here.

All pig launching and receiving facilities would be located within pump stations and would not require any additional acreage.

Sources: ENSR 2006a, TransCanada 2007c.

Turnouts and access roads from public roads would be installed to each aboveground facility. Drainage would be maintained by installing ditches or culverts, and the short access roads would be surfaced with crushed rock. The delivery facility sites would be enclosed with a chain-link security fence (TransCanada 2007c).

Land Use by State

The Mainline Project would primarily affect agriculture and grassland/rangeland land uses. Of lands that would be crossed by the Mainline Project, agriculture and rangeland account for 65 and 15 percent, respectively, of the total acres affected by the Mainline Project. Table 3.9.3-3 shows affected land use acreages by state for the Mainline Project.

On a state-by-state basis, agriculture is the predominant land use affected, generally followed by grassland/rangeland. Illinois is an exception to this rule, where more miles of developed, wetland, and forestland would be affected than grassland. Missouri differs in that a much larger percentage of land crossed by the pipeline is comprised of rangeland and forestland than for other states. In Missouri, 25 percent of affected land is rangeland and 13 percent is forestland. Missouri contains more affected forestland acreage than all other stretches of the pipeline combined. The Mainline Project in Kansas also has a relatively higher percentage of forestland (8 percent) than for North Dakota, South Dakota, and Nebraska.

TABLE 3.9.3-3
Acres Affected during Construction by Land Use Type for the Keystone Mainline Project

Land Use Type	ND	SD	NE	KS	MO	IL	Total	Percent of Total (%)
Agriculture/cropland	2,322	1,974	2,601	1,314	2,386	613	11,210	65
Grassland/rangeland	379	550	355	270	1,035	20	2,609	15
Forestland	45	4	34	113	536	63	797	5
Wetlands	258	268	39	13	79	31	688	4
Developed	373	447	280	97	398	173	1,768	10
Water	9	10	18	20	62	14	133	1
Total	**3,386**	**3,253**	**3,327**	**1,827**	**4,498**	**914**	**17,205**	

Notes:

Agriculture includes cultivated crops, flood or pivot irrigation crops, and fallow cropland.

Rangeland includes herbaceous and mixed rangeland that is characterized by short-grass prairie or mixed-grass prairie, and lands that appear to be used for cattle or other livestock grazing—with or without a shrub component.

Forestland includes upland and wetland forested areas.

Wetlands include palustrine forested wetlands and palustrine emergent/scrub-shrub wetlands.

Developed land includes both industrial/commercial and residential uses. Industrial/commercial includes electric power or gas utility stations, manufacturing or industrial plants, livestock feedlots, landfills, mines, quarries, commercial or retail facilities, and roads.

Residential includes residential yards, subdivisions, and planned new residential developments.

Sources: ENSR 2006a, TransCanada 2007c.

The Mainline Project alignment was rerouted to avoid affecting wetlands in several North Dakota and South Dakota sections. These included North Dakota reroutes in Nelson and Steele Counties, and in the Hecla Sandhills (Sargent County, North Dakota, and Marshall County, South Dakota). Nevertheless, substantial amounts of wetlands would be affected along the Mainline Project for North Dakota and South Dakota (approximately 8 percent of the affected acres for each state). Wetland impacts are discussed in further detail in Section 3.4.3.

Developed land comprises between approximately 5 (Kansas) and 19 percent (Illinois) of affected acres along the Mainline Project. For the Mainline Project pipeline as a whole, developed land represents about 10 percent of the affected acres.

Ownership

Land along the Mainline Project is principally privately owned. In all states except Illinois, private ownership comprises more than 98 percent of lands that would be crossed by the Mainline Project (see Table 3.9.3-4). For Illinois, private ownership accounts for approximately 94 percent of land that would be crossed, with federal and municipal lands making up the remaining 6 percent. For the Mainline Project as a whole, private ownership accounts for approximately 99 percent of land crossed by the Project. This translates to approximately 37 acres of affected federal land in Illinois, approximately 15 acres of affected federal land in Missouri (TransCanada 2007c) and 49 acres of affected state land in North Dakota, South Dakota, and Missouri (see Table 3.9.3-5).

TABLE 3.9.3-4
Ownership of Land Crossed by the Keystone Mainline Project

Land Owner	Miles Crossed	Percent of Total (%)
North Dakota		
Federal	0	0.0
State	0.8	0.4
County or municipality	0.2	0.1
Private	216.1	99.6
North Dakota subtotal	*216.9*	
South Dakota		
Federal	0	0.0
State	<0.1	0.0
County or municipality	0.4	0.1
Private	218.4	99.9
South Dakota subtotal	*218.9*	
Nebraska		
Federal	0	0.0
State	0.1	0.05
County or municipality	0.1	0.05
Private	213.5	99.9
Nebraska subtotal	*213.7*	
Kansas		
Federal	0	0.0
State	0	0.0
County or municipality	0	0.0
Private	98.8	100.0
Kansas subtotal	*98.8*	
Missouri		
Federal	1.1	0.4
State	1.6	0.6
County or municipality	0.8	0.3
Private (includes Nature Conservancy lands)	269.5	98.7
Missouri subtotal	*273.1*	
Illinois		
Federal	2.9	5.1
State	0	0.0
County or municipality	0.5	0.9
Private	53.1	94.0
Illinois subtotal	*56.5*	

TABLE 3.9.3-4 (Continued)		
Land Owner	Miles Crossed	Percent of Total (%)
Mainline Project		
Federal	4.0	0.4
State	2.6	0.2
County or municipality	2.0	0.2
Private	1,069.4	99.2
Mainline Project total	**1,077.9**	

Note: Discrepancies between mileage for individual land owner type, totals, and subtotals are attributable to rounding.

Sources: ENSR 2006a, TransCanada 2007c.

TABLE 3.9.3-5
Ownership of Acres Crossed by the Keystone Mainline Project

Location	Federal	State	Private	Total
North Dakota	0	13	3,373	3,386
South Dakota	0	8	3,245	3,253
Nebraska	0	0	3,327	3,327
Kansas	0	0	1,827	1,827
Missouri	15	28	4,470	4,498
Illinois	37	0	877	914
Mainline Project total	**37**	**49**	**17,119**	**17,205**

Sources: ENSR 2006a, TransCanada 2007c.

As noted earlier, temporary and permanent ROWs would be acquired via negotiation with private landowners on a case-by-case basis. Where the pipeline would traverse state land, all applicable state statutes would apply. The Mainline Project would cross approximately 2.5 miles of state-owned lands comprising 0.8 mile in North Dakota, less than 0.02 mile in South Dakota, 0.1 mile in Nebraska, and approximately 1.6 miles in Missouri; no state-owned lands would be crossed in Illinois (TransCanada 2007c).

Where the pipeline would traverse federal land, all applicable federal statutes would apply. In July 2007, Keystone will apply for Right-of-Way Grants pursuant to the Mineral Leasing Act, which would authorize temporary construction use and long-term use of federal land for pipeline purposes. A Right-of-Way Grant is issued for a 30-year term and contains a right of renewal if the project continues to be used for its initial purpose. Each federal agency has its own easement procedure. The Mainline Project would cross about 1 mile of federally owned land in Missouri and almost 3 miles in Illinois (TransCanada 2007c). The Mainline Project would not cross any other federal lands.

3.9.3.2 Agricultural Land

The Mainline Project primarily would cross cropland in private ownership. Construction and operation of the Mainline Project facilities would affect about 11,210 acres of agricultural land along approximately 1,078 miles of construction route. Of this amount, approximately 583 miles is considered prime farmland by the NRCS (including land considered potential prime farmland, if adequate protection from flooding and drainage was provided). Of the total acres affected by state, Nebraska has the highest percentage that is considered prime farmland (over 78 percent), and Missouri has the lowest (53 percent) (see Table 3.9.3-3).

To determine the amount of agricultural land that potentially would be affected, Keystone reviewed aerial photographs and made general observations during reconnaissance activities. Further refinements to the assessment of various types of cover were completed during an August 2006 grassland survey. Based on the aerial photography evaluations and ground surveys, Keystone has indicated that no known orchards would be crossed by the Keystone Project. Ground survey verification of the orchard category will conclude in June 2007.

Crops vary significantly along the pipeline route due to its length (ranging from the 49th Parallel N at the U.S./Canadian border to the 43rd Parallel N at Patoka, Illinois, and the 36th Parallel N at Cushing, Oklahoma). Typical crops along the pipeline route include corn, soybeans, wheat, barley, rye, sorghum, sunflower, dry edible beans, flaxseed, canola, popcorn, alfalfa, hay, sugar beets, and oats. Certain crops are more common in the southern states of the pipeline route, including cotton, fruits and nuts, rice, vegetables, flowers, and tomatoes.

Numerous tracts of land are enrolled in USDA programs managed through NRCS and FSA. The NRCS negotiates easements with landowners for a variety of land and habitat conservation priorities. Some NRCS programs include the Wetland Reserve Program (WRP), the Farm and Ranchland Protection Program (FRRP), and the Wildlife Habitat Incentives Program (WHIP). FSA does not negotiate easements but enters into a contract with landowners for certain conservation practices. Some FSA programs include the Conservation Reserve Program (CRP), the Conservation Reserve Enhancement Program (CREP), the Farmable Wetlands Program (FWP), and the Emergency Conservation Program (ECP). The Grassland Reserve Program is implemented by both the FSA and NRCS and provides rental and easement options. Both easements and rental contracts for these programs are available for a variety of durations, and some easements can be made in perpetuity.

The CRP is the largest of these programs. Landowners with CRP contracts can receive annual rental payments and cost-share assistance to establish long-term resource-conserving covers on eligible farmland. CRP protects millions of acres of topsoil from erosion and is designed to safeguard natural resources. The program encourages farmers to convert highly erodable cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filter strips[1], or riparian buffers. Participants enroll in CRP contracts for 10 to 15 years (FSA 2007a).

Potential Impacts and Mitigation

Construction-related activities such as grading, trenching, stringing, welding, backfilling, and restoration could impact agricultural lands by leading to soil erosion, interference with and damage to agricultural surface and subsurface drainage and irrigation systems, mixing or loss of fertile topsoil and subsoil, and

[1] Filter strips are vegetated areas planted adjacent to crops that are designed to filter runoff and improve water quality. They are frequently used near streams, ponds, lakes, sinkholes, and agricultural drainage wells. Filter strips are typically planted with very close-growing vegetation, to better trap sediments, nutrients, and chemicals.

soil compaction. All of these impacts could result in reduced productivity of agricultural lands or direct crop loss.

During the scoping period for the Keystone Project, several members of the public expressed concerns regarding impacts on agricultural activities that could result in crop losses, including:

- Soil compaction due to heavy construction equipment;
- Construction schedule and duration during which agricultural activities could not be conducted;
- Impact to center pivot irrigation systems;
- Surface and subsurface drainage, ponds, waterlines, and drainage ditches;
- Access to farmland, particularly in areas where large amounts of wetland surround the farmland;
- Effect of wetland impacts on farmers eligible for payments associated with protection of wetlands on farmland (FSA programs);
- Impacts on landowners with CRP lands; and
- Compensation for affected crop production.

To address impacts on agricultural lands, Keystone has proposed a number of mitigation measures that are detailed in the Mitigation Plan (Appendix B). Keystone proposes to restore all disturbed areas associated with construction of the Keystone Project, in accordance with its Mitigation Plan and all other applicable federal, state, and local permit requirements. Keystone intends to repair or restore drain tiles, fences, and land productivity as these may be damaged during the construction process. Following construction, agricultural land can revert to its previous use, except for 140 acres of land that would be set aside for permanent aboveground facilities and that Keystone would directly purchase from landowners. Approximately 118 of these 140 acres currently are devoted to crops (TransCanada 2007c). When construction and cleanup have been completed, affected land along the temporary and permanent ROWs could be returned to agricultural production.

Keystone's Mitigation Plan includes typical measures such as avoiding or minimizing topsoil/subsoil mixing and ensuring that compaction and other construction-related effects are rectified. See Section 3.2.2.1 for a detailed discussion of topsoil segregation. In addition, several of Keystone's proposed mitigations directly address the comments raised by landowners and other stakeholders affected by the Keystone Project. Keystone would:

- Only use machinery with low ground pressure;
- Avoid or restrict construction activities in excessively wet soil conditions to minimize soil compaction and rutting;
- Restore all temporary and permanent ROWs and additional workspaces to pre-construction levels of soil compaction through ripping and discing subsoil prior to salvaged topsoil replacement;
- Provide a minimum of 24 hours notice to a landowner before accessing his/her property for construction purposes;
- Supply Keystone contact information to affected landowners prior to construction;
- Reach a mutually acceptable agreement between Keystone and a landowner on the access route for entering and exiting the pipeline construction ROW, should access not be possible from adjacent pipeline construction ROW segments or from a public access road;

- Establish with a landowner an acceptable amount of time that an irrigation system (pivot, spray, or flow) may be out of service due to pipeline construction and reasonably compensate a landowner for any losses incurred due to irrigation disruption, both on and off the temporary and permanent ROWs;
- Implement measures to allow for irrigation to continue during pipeline construction when feasible and mutually agreeable to Keystone and the landowner;
- Not disrupt irrigation ditch water flows, except for the amount of time required to install the pipeline (typically 1 day or less), unless otherwise directed;
- Reestablish all original contours and drainage patterns following construction;
- Limit disruption to the surface drain network near the ROW;
- Leave gaps in trenches and strung pipeline to facilitate drainage;
- Discharge trench water in a manner that avoids damage to adjacent agricultural land, crops, and pasture;
- Install trench breakers on slopes where required to minimize potential water movement down the ditch and subsequent erosion;
- Minimize the duration of construction-related disturbance within wetlands to the extent possible; and
- Repair and restore land productivity to pre-construction levels.

Keystone would compensate agricultural landowners for actual crop losses resulting from removal of standing crops, disruption of planned seeding activity, disruption of general farming activities, or other losses resulting from construction of the pipeline—as negotiated in individual easements with the landowners. This includes compensation for direct yield payments from FSA. Standard damage remedies included in Keystone's Mitigation Plan stipulate that Keystone would agree to pay the landowner for any physical damages that arise from Keystone's use of the easement. In addition, any crop reductions related to the pipeline construction, whether on or off the construction and permanent ROWs, would be compensated to the landowner. Keystone would conduct post-construction monitoring to examine the revegetation in affected agricultural areas. Restoration is considered successful in agricultural areas if crop yields are similar to adjacent undisturbed portions of the same field. Affected areas would be restored, and Keystone would compensate landowners for any losses or damages both on and off the ROW that may result from pipeline construction. As noted in Section 3.9.1, crop loss compensation would be determined on a case-by-case basis. Keystone would obtain from the USDA current information regarding commodity prices and yields; these data would be supplemented by property-specific yield and price data supplied by the landowner. Landowners would be compensated at 100 percent for the year of construction, with diminishing percentages over the next 2 years.

Construction impacts on general agricultural activities are expected to be temporary and minor. Operations impacts on general agricultural activities are expected to be permanent but minor, consisting of the conversion of a small amount of agricultural acreage to industrial use for permanent aboveground facilities.

Soil Compaction

Construction of the Mainline Project could affect agricultural lands through soil compaction and decreased soil productivity. As outlined in its Mitigation Plan, Keystone proposes to avoid some initial soil compaction impacts by only using vehicles with low ground weight or wide tracks. Keystone would

set restrictions upon construction during excessively wet periods to prevent compaction and rutting. Top soil would be stripped and segregated from sub soil. All affected land would be returned to original levels of compaction through ripping and discing prior to replacement of top soil. The restored ROW would be tested at regular intervals along the construction ROW. In the event that a landowner disagrees with Keystone's restoration methods, Keystone would consult the appropriate county Soil and Water Conservation District. Construction-related soil compaction impacts are expected to be short term and minor. Operation of the pipeline would not affect soil compaction.

Construction Schedule

Public comments questioned how the construction schedule might affect agricultural activities. Keystone proposes to begin construction of the pipeline in 2008, with the construction period continuing for approximately 18 months, and operation beginning by November 30, 2009. Construction of the Cushing Extension section would proceed after this initial period, in late 2009 or early 2010, beginning service by 2010. The pipeline would be constructed in five spreads, four for the Mainline Project and one for the Cushing Extension, proceeding north to south. The Mainline Project spreads would be constructed concurrently, and the Cushing extension spread would commence construction thereafter.

As described in Section 2.2, the typical pipeline construction period would include surveying and staking; clearing and grading; trenching; pipe stringing, bending, and welding; lowering-in and backfilling; hydrostatic testing; pipe geometry inspection; final tie-in welding; commissioning; and cleanup and restoration. In some areas, special construction techniques may be used for rugged or steep terrain, waterbodies, wetlands, paved roads, and railroads. Typical construction at one point would last for only a few days.

Keystone has made several schedule commitments in its Mitigation Plan. Landowners would be provided a minimum of 24 hours notice that Keystone intends to access their land for construction purposes. Notice would be made via personal or telephone contact, or by mail or hand delivery if a landowner cannot be reached. During construction, Keystone would provide access across the ROW to landowners at locations requested by the landowners, if practicable. Any restricted activity would continue for the duration of construction activities on any particular parcel of land and is not expected to last for more than a few days. Construction activities are expected to cause temporary and minor impacts to landowners.

Center Pivot Irrigation

Pivot irrigation systems typically involve an overhead irrigation mechanism consisting of several segments of pipe mounted on wheeled towers, with a row of sprinklers attached. The system moves in a circular pattern and is fed with water from the pivot point at the center, with crops planted in a circle to conform to the system geometry. Center pivot equipment also can be configured to move in a straight line, where the water is pulled from a central ditch.

The proposed pipeline crosses primarily agricultural lands, some of which use pivot irrigation systems. During scoping, public comments indicated concerns regarding the potential for pipeline installation to disrupt ongoing pivot irrigation.

While disruption of irrigation may occur during construction due to the location of trenching activity in relation to the pivot/tower system, these impacts would be temporary, and operations would return to normal following final restoration of the ROW. Keystone proposes to work with landowners to allow pivot irrigation to continue, as feasible and mutually acceptable, across land on which a pipeline is being constructed. If use of the irrigation system must be disrupted for pipeline construction, Keystone would establish with a landowner the acceptable amount of time that the system can remain out of operation. If

interrupted irrigation due to pipeline construction would adversely affect agricultural production, Keystone would reasonably compensate the landowner for damages both on and off the ROW. Construction impacts on irrigation systems are anticipated to be temporary and minor. Pipeline operation is not expected to affect irrigation systems of any type.

Surface and Subsurface Drainage, Ponds, Waterlines, and Drainage Ditches

During scoping, commentors sought clarification concerning impacts to subsurface drainage, ponds, waterlines, and drainage ditches. In its Mitigation Plan, Keystone proposes to avoid initial disruption of surface drainage and to reestablish all original contours and drainage patterns following construction. For subsurface drainage, a major concern is migration of water within the pipeline trench. This would be prevented by installation of trench breakers on slopes at regular intervals to prevent water movement and subsequent erosion.

During land acquisition and permitting, Keystone would identify the locations of potentially affected public and private waterlines. No water lines would be cut without the permission of the landowner or public agency. Waterlines would merit the same treatment as irrigation systems—Keystone would attempt to allow continued operation of waterlines during construction and would establish with the landowner an acceptable amount of time that the waterline could be out of service, in the event that operation must be temporarily interrupted. If interruption of waterline service were to lead to damages to agricultural resources, Keystone would provide reasonable compensation to the landowner for lost productivity. The pipeline would be installed beneath the waterline in most cases, leaving a minimum of 12 inches of clearance between the waterline and the Keystone pipeline. If there is sufficient depth of cover available, in some areas, the Keystone pipeline could cross above the waterline with 12 inches of clearance and the additional 4 feet of cover on the oil pipeline (TransCanada 2007c).

During construction, a small backhoe or hand excavation would be used to expose the waterline, which then would be left exposed and flagged. The pipeline section to be installed beneath the waterline would be welded and left adjacent to the exposed waterline for installation by the tie-in crew. During connection, the waterline would be supported across the trench to prevent it from breaking. During backfilling of the trench, native material would be used and care would be taken to prevent damage to the waterline (TransCanada 2007c).

Underground drainage tiles would be repaired by Keystone if damaged during construction, either through settlement with the landowner or the county (in the case that a drainage tile system is publicly owned), or by directly repairing the system. In the Mitigation Plan, Keystone has adopted a set of guidelines and procedures for managing impacts to drainage tile systems. Keystone intends to avoid interrupting irrigation ditch flows, except for the time required for trenching, lowering-in pipe, and backfilling (typically 1 day or less).

Keystone proposes to avoid agricultural ponds by adjusting the pipeline route as necessary. If it is not possible to avoid a pond, Keystone would work with the landowner to remove or lower the water level in the agricultural pond prior to construction, to allow dry terrain installation (TransCanada 2007c). Where dry installation is not practical or acceptable to the landowner, the open-cut wet crossing method would be used to cross the pond. This method entails trenching through the water body, depositing trench spoils at least 10 feet from the edge of the water, installing pipeline that was previously assembled next to the pond, and backfilling with native material. The pipe would be weighted with concrete to provide negative buoyancy, and the banks would be restored. For a full description of this construction method, see Section 2.2. Cleanup of the adjacent banks and restoration, which would include installing temporary erosion controls and re-seeding the banks, would be completed following construction (TransCanada 2007c).

Construction impacts related to drainage systems, ponds, ditches, and waterlines would be temporary and minor, and Keystone would fully compensate or remediate any resulting damages. Operation of the underground pipeline is not expected to affect surface or subsurface drainage, water delivery, or water storage systems. (See Section 3.3.1.2 for a discussion of impacts on surface waters in the project area.)

Conservation Reserve Program Lands

Several scoping comments requested information about impacts on lands in the CRP. In reviewing the proposed alignment, FSA determined that there are landownership tracts along the proposed corridor that total 16,648 acres that have some portion of the tract enrolled in the CRP program. They are unable to determine based on existing information how many acres of actual CRP lands within these tracts are impacted by the proposed corridor. However, the actual potentially affected acreage of CRP land is likely to be a small percentage of the total acreage within these landownership tracts.[2] Those CRP acres that are directly crossed by the corridor could be required to exit the program, and in this case the landowner would be required to pay 25 percent of the annual rental payment, in addition to the federal cost-shares received, all annual rental payments, and interest. Keystone and FSA would determine the actual amount of enrolled acres that would be affected by the ROW through site visits. These visits would document whether the ROW crosses CRP acreage and the site-specific impact based on the type of affected habitat.

Certain CRP lands, such as grasslands (approximately 80 percent of the potentially affected acreage reported by FSA), that would be affected by the construction period would require up to 5 years to fully regenerate to pre-construction conditions. Nevertheless, these areas could be managed in the same manner and for the same priorities following restoration. Enrolled CRP land containing woody vegetation and trees would be more intensively affected, because the permanent ROW would need to be cleared and maintained in an open condition for the life of the pipeline. The construction ROW also, would be affected over the long-term in woodlands, due to the long regeneration times for these cleared areas. Tree conservation acres represented less than 1 percent of the potentially affected acres reported by FSA. Impacts on CRP would be long term but minimal and localized.

To mitigate the impacts of land disturbance in CRP and other FSA conservation program areas, in addition to the mitigation already included within the Keystone mitigation plan, **the following measure is recommended:**

- **For all verified enrolled acreage intersected by the ROW, Keystone should provide the following to the appropriate FSA county office:**
  - **The program participant's name, location of impacted program land, and FSA program(s) the affected land is currently enrolled in, obtained from the landowner.**
  - **A description of construction techniques to be used, including a sediment/erosion control plan, a time schedule of proposed activities, and a contact person.**
  - **The length of time the FSA program land would be affected.**

[2] FSA is unable release the precise location of acreage enrolled in its programs. The analysis that generated the amount of 16,648 acres affected during construction and 6,595 acres affected during operation was created by calculating the acreage of tracts *on which enrolled CRP acreage exists* that would be intersected by the proposed ROW. The ROW could intersect tracts of land with enrolled acreage and still avoid intersecting the enrolled acreage.

- **Proposed site remediation to return the land to its condition before impacts. Remediation of the site should be consistent with the appropriate NRCS Field Office Technical Guide Standard (Appendix M). The contractor should meet with the appropriate NRCS State Agronomist/Resource Conservationist to review the proposed sediment erosion control plan, time schedule of activities, remediation activities, and management requirements prior to the start of the project.**
- **The proposed maintenance plan for the permanent ROW, including weed control.**
-

In comments on the preliminary draft EIS, the FSA outlined that the FSA county office would in turn ensure that:

- The proposed construction, remediation, and maintenance meet the minimum requirements of the FSA program(s) land affected and all requirements defined under their approved conservation plan for the affected FSA program land.
- If crops are to be affected, that the proposed impact would not adversely affect their base acreage, or affect their current eligibility to maintain program participation or future eligibility to participate in FSA programs.
- The receipt of income would not affect the participant's ability to fulfill any FSA farm loan financial requirements or affect the participant's outstanding indebtedness (a Farm Loan Officer should be consulted).
- Any proposed construction activities on CRP program land would not occur during the primary nesting season specified for that state.
- All FSA program participant files would be updated to reflect any changes associated with the pipeline project.

In the event that a landowner with current CRP contracts would need to remove land from the program because of pipeline construction and operation, Keystone would be responsible for covering all agricultural losses incurred because of pipeline construction and operation, as described in its Mitigation Plan (Appendix B). Keystone would restore the ROW to its original condition following construction.

Farmable Wetland Program Lands and Other FSA Programs

Some scoping comments asked about potential impacts on farmers who are currently eligible for federal payments from FSA associated with protection of wetlands on their farmland. The FWP is a voluntary program to restore up to 1,000,000 acres of farmable wetlands and associated buffers by improving the land's hydrology and vegetation. Eligible producers in all states can enroll eligible land in the FWP through the CRP. Eligible acreage includes farmed and prior converted wetlands that have been affected by farming activities. The maximum acreage for enrollment of wetlands and buffers is 40 acres per tract (FSA 2007b). Pipeline construction in these areas would follow Keystone's guidelines for wetlands construction (see Section 2.2.2.4 for more information).

As with CRP lands, impacts on enrolled FWP lands and all FSA programs would be determined by site-specific visits. The CRP mitigation listed above also would apply to these lands. Keystone would be responsible for any agricultural impact resulting from pipeline construction and would restore the ROW to its original condition following construction.

NRCS Programs

NRCS determined that the Mainline Project would affect one WRP easement in Missouri. The WRP is a voluntary program offering landowners the opportunity to protect, restore, and enhance wetlands on their property. NRCS provides technical and financial support to help landowners with their wetland restoration efforts. The goal is to achieve the greatest wetland functions and values, along with optimum wildlife habitat, establishing long-term conservation and wildlife practices and protection.

Keystone agreed to re-route the ROW to avoid an easement in South Dakota but determined that relocating the alignment at the Missouri site would result in greater potential impacts than crossing the easement. NRCS agreed with this rationale for crossing the easement. To minimize the potential impacts of crossing this WRP easement, **the following measure is recommended:**

- **Keystone should utilize the state-specific NRCS Field Office Technical Guide (Appendix M) for mitigation and revegetation of areas damaged by construction. Keystone should consult with the local NRCS representatives to determine the adequacy of Keystone's Mitigation Plan and supplement the plan as needed.**

Implementation of this measure would reduce potential impacts to agriculture on the one NRCS easement that would be crossed by the Mainline Project. The effect of the crossing would be considered long term but minor, with revegetation requiring up to 5 years to reestablish itself to pre-construction conditions. Maintenance of vegetation would not be conducted over the full width of the permanent ROW in non-forested areas, and no permanent impacts would result in this instance. Keystone would compensate the affected landowner construction or operations impacts that affect the easement's continued enrollment in the WRP.

Access to Farmland

During construction of the pipeline, landowners may be temporarily unable to access farmland for agricultural activities. Keystone proposes to inform landowners a minimum of 1 day in advance of accessing their lands for construction purposes. In addition, Keystone would provide access during construction across the ROW, at locations requested by the landowners, if practicable. Construction impacts on farmland access would be temporary and minor, and Keystone would compensate landowners for any damage due to construction-related restriction of access. Operation of the pipeline would not affect access, as full access to the ROW would be restored to landowners following the construction period.

During construction, Keystone anticipates that farmers would be able to access farmlands that are surrounded by wetlands because Keystone would coordinate with the landowner to maintain access using the existing access roads. Access would be maintained by leaving hard plugs or soft plugs, or by creating temporary bridges using mats or other bridging materials where needed (TransCanada 2007c).

Windbreaks, Shelterbelts, and Living Snow Fences

Windbreaks, shelterbelts, and living snow fences are important resources in the Plains states for preventing soil erosion, reducing evaporation from soils, increasing crop yields, and providing habitat and wind protection for livestock (Haugen et al. 2002). The Mainline Project would intersect many windbreaks planted on private lands. At these intersection points, Keystone would need to remove trees and brush to provide access for construction equipment. During the operational life of the Keystone Project, the ROW would be maintained in an open condition, and trees and brush would not be allowed to

revegetate the permanent ROW. Keystone has pledged that the construction ROW would be reduced to the minimum necessary width to construct the pipeline when crossing a shelterbelt.

To ensure that impacts on windbreaks, shelterbelts, and living snow fences are minimized, **the following measures are recommended:**

- **Keystone should implement all Mitigation Plan measures pertaining to impacts, mitigation, and reclamation in forested areas for impacts on windbreaks, shelterbelts, and living snow fences.**
- **Keystone should provide non-vegetative remediation for affected windbreaks, shelterbelts, and living snow fences within the permanent and construction ROWs in the form of windbreak nets, mesh, or fencing and snow fencing.**

Revegetation with trees or woody vegetation would not be possible within the permanent ROW for the life of the Keystone Project, and revegetation within the construction ROW would take many decades to mature. Construction and operation of the pipeline, even with implementation of preventive and remedial measures, would result in permanent, significant impacts to vegetative windbreaks, shelterbelts, and living snow fences.

3.9.3.3 Rangeland

Construction of Mainline Project facilities would affect about 2,609 acres of rangeland/grassland, representing approximately 15 percent of the total acres affected by the Mainline Project. Missouri has the highest percentage of affected rangeland/grassland acres of all states (23 percent), and Illinois has the lowest (about 2 percent). Affected rangeland acreage in other states along the Mainline Project alignment ranges between 11 and 17 percent (TransCanada 2007c).

Potential Impacts and Mitigation

Construction activities would displace or halt grazing activities and would disturb the surface of livestock foraging areas. In addition, construction activities such as trenching could put livestock at risk of falling or being trapped in open trenches.

During the scoping period, the public asked how cattle would be protected during construction. To reduce overall risks to livestock grazing in rangelands, Keystone has proposed to work with the individual landowners to reach mutually agreeable terms regarding exclusion of livestock from construction work areas. These measures may include installation of fencing or use of hard (short lengths of unexcavated trench) or soft trench plugs (areas where the trench is excavated and replaced with minimal compaction) at agreed-upon livestock crossing intervals. Soft plugs would be constructed with a ramp on each side to allow a means of exit for animals that fell into the trench. In addition, Keystone has agreed to install temporary gates for livestock fences that must be breached. The following rangeland-specific mitigation measures are outlined in Keystone's Mitigation Plan:

- Access across the ROW during construction shall be provided at locations requested by landowners, if practicable;
- Bevel shavings during pipe bevel operations are to be removed immediately to ensure that livestock and wildlife do not ingest this material;
- Litter and garbage shall be collected and removed from the construction site at the end of the day's activities;

- Temporary gates shall be installed at fence lines for access to the construction ROW; gates shall remain closed at all times and shall be removed and replaced with permanent fencing upon completion of construction;
- Feeding or harassment of livestock or wildlife is prohibited;
- Construction personnel shall not be permitted to have firearms or pets on the construction ROW;
- All food and wastes shall be stored and secured in vehicles and/or appropriate facilities;
- Areas of disturbance in native rangelands shall be seeded with a native seed mix after top soil replacement; and
- Improved pasture shall be seeded with a seed mix approved by individual landowners after top soil replacement.

Keystone has proposed to avoid impacts to livestock and to restore disturbed areas according to its Mitigation Plan, which requires grading and revegetation in rangelands to be conducted in consultation with landowners and land managing agencies. Following restoration, affected rangelands would be restored and reseeded, and rangeland activities may resume. Implementation of the proposed rangeland-specific mitigation measures discussed above would reduce potential impacts to minimal levels. Although restoration activities would begin soon after the end of construction in rangeland areas, herbaceous grasslands may take up to 5 years to recover to the point where visual scarring is no longer evident. Therefore, construction impacts to rangelands are expected to be long term, but minor.

For the Mainline Project, approximately 140 acres located on agricultural/cropland or rangeland/grassland would be set aside for permanent aboveground facilities (such as for pump stations and MLVs). Approximately 22 of these 140 acres consist of rangeland (TransCanada 2007c). Construction and operation of aboveground facilities on rangeland/grassland would result in permanent conversion of rangeland to industrial/commercial use. Rangeland affected by operation of the aboveground facilities would be purchased or leased from the current landowners. Keystone would attempt to locate facilities to be as unobtrusive as possible to ongoing agricultural activities, and to cause the least disturbance to adjacent agricultural operations. In addition, Keystone would attempt to locate aboveground facilities near public roads to allow year-round access and would construct short permanent access roads to these facilities within the permanent ROW only when necessary. Operations impacts from aboveground facilities are considered permanent but minor, as the amount of land to be converted from rangeland to industrial land uses is small in comparison to the amount of productive rangeland in the region. Other pipeline operational activities are not expected to affect rangeland.

3.9.3.4 Forestland

Construction and operation of the Mainline Project facilities would affect about 797 acres of forestland of both upland and wetland types. This represents about 5 percent of the total acres affected by the Mainline Project. The majority of affected forestland is located in Missouri (538 acres) and Kansas (113 acres). Forest vegetative types are discussed in Section 3.5. None of the forested land that would be crossed by the pipeline is used for timber or Christmas tree production (TransCanada 2007c).

Mainline construction would affect forested wetlands in Missouri. Forested wetlands were once a dominant component of Missouri's landscape but are now considered at risk (Missouri Department of Conservation 2007d). Table 3.4.3-1 shows that 44.6 acres of this community would be affected, with 19.7 acres affected permanently.

Potential Impacts and Mitigation

Construction activities would remove trees and brush from forested areas. During operation, the permanent ROW would be maintained, and revegetation of these types of woody materials would be prevented. This would result in a permanent loss of tree growth within the permanent ROW.

Keystone has proposed to minimize impacts to affected forested areas in several ways, as outlined in its Mitigation Plan. Trees would be felled such that they fall toward the center of the ROW, to minimize disturbance and limb breakage outside of the ROW. Tree stumps would not be grubbed beyond 5 feet on either side of the trench line and only where necessary for grading a level surface for construction equipment to operate safely. All debris would be recovered and landowners would be given the option of salvaging any materials removed; all unsalvaged materials would be properly disposed of. Disposal may not take place in wooded areas along the ROW; however, chipped material may be spread and incorporated with mineral soil over the forest floor at a density that would not prevent grass revegetation. See Section 2.2.2.8 for a more thorough discussion of forest construction methods and mitigation measures.

These measures would reduce impacts on forested lands. However, areas within the permanent ROW would not be allowed to regenerate over the life of the Keystone Project, and cleared areas in the construction ROW would not regenerate for many decades. Therefore, pipeline construction in forested areas would cause a long-term, significant impact on forestland. Pipeline operations in forested areas would constitute a permanent, significant impact on forestland. Section 3.5 describes potential impacts on forests and applicable mitigation measures.

3.9.3.5 Residences and Planned Development

The Mainline Project would cross and affect residential land. Based on 2006 aerial photography, Keystone identified 985 potential residential structures within 500 feet of the proposed Mainline Project ROW. Keystone is currently conducting field surveys that will determine the location of residential structures and other buildings within 50 feet of the proposed ROW. These surveys are scheduled for completion in June 2007, and survey results are scheduled to be filed with DOS in July 2007. The majority of potential residential structures are in Missouri (579) and Nebraska (112). Most structures in Missouri are situated where the Mainline Project route would collocate with the existing Platte pipeline. Additional non-residential structures (e.g., grain bins, silos, and outbuildings) should be identified in the June surveys. When Keystone has concluded field surveys, it will provide site-specific construction plans for each of the residential structures within 25 feet of the construction workspace.

Keystone is not aware of any residential or commercial developments planned within 0.25 mile of the ROW. This assertion will be verified by the ground surveys concluding in June 2007.

Potential Impacts and Mitigation

The principal measures proposed by Keystone to mitigate impacts in existing residential areas include ensuring that construction proceeds quickly through such areas and limiting the hours during which activities with high-decibel noise levels could be conducted. Landowners would be notified at least 24 hours prior to construction. As specified in its Mitigation Plan, Keystone has proposed several mitigation measures for construction in all residential areas. Keystone would:

- Develop site-specific construction plans to mitigate the impacts of construction on residential and commercial structures;
- Notify landowners prior to construction;

- Post warning signs as appropriate;
- Reduce the construction ROW width, if practicable, by eliminating the construction equipment passing lane, reducing the size of work crews, or utilizing "stove pipe" or "drag section" construction techniques (stove pipe construction consists of welding pipe sections together away from residences, with trenching, pipeline lower in, and backfilling proceeding quickly to minimize construction duration; drag section construction techniques consist of layout and pre-assembly of the pipeline, followed by pull back of the assembled pipe to its proper position);
- Remove fences, sheds, and other improvements as necessary for protection from construction activities;
- Preserve mature trees and landscaping to the extent possible, while ensuring safe operation of the construction equipment;
- Fence the edge of the construction work area adjacent to a residence for a distance of 100 feet on either side of the residence to ensure that construction equipment and materials, including the spoil pile, remain within the construction work area;
- Limit the hours during which construction activities with high-decibel noise levels can be conducted;
- Limit dust impacts through prearranged work hours and by implementing dust minimization techniques;
- Ensure that construction proceeds quickly through residential and developed areas;
- Maintain access and traffic flow during construction activities, particularly for emergency vehicles;
- Clean up construction trash and debris daily;
- Fence or plate open ditches during non-construction activities;
- Restore all lawn areas, shrubs, specialized landscaping, fences, and other structures consistent with its pre-construction appearance or the requirements of the landowner immediately after backfilling; and
- Ensure that the pipe is ready for installation if the pipeline centerline is within 25 feet of a residence prior to excavating the trench; backfill immediately following pipe installation.

Construction of the pipeline and aboveground facilities may cause minor interference with the use of residential properties and other uses near the ROW, mainly from increased noise, heavy vehicle traffic, and dust. The adverse effects would be short term, lasting 2 to 3 months on any particular property, depending on weather and terrain. Equipment would be required to have effective mufflers installed to minimize construction noise. Access, including emergency access, to residences would be maintained at all times during construction. Keystone has not yet developed site-specific plans for residential structures in proximity to the pipeline. The potential impacts in residential areas are accentuated on weekends, when individuals and families are more likely to be at the residence throughout the day. To ensure that impacts in residential areas are minimized, **the following measure is recommended:**

- **Keystone should prohibit all construction work during weekends and major holidays in the vicinity of residences.**

Based on measures in Keystone's Mitigation Plan and the recommended measure, construction-related effects on residences would be temporary and minor.

Operation of the pipeline has the potential to cause interference with the long-term use of residential property and may result in ongoing noise impacts. Refer to Section 3.12.2 for a discussion of potential noise impacts and mitigation. Dwellings and ancillary structures would not be permitted to be placed over the permanent ROW for the operational life of the proposed Project. Prohibiting placement of structures above the permanent ROW would be a substantial constraint on landowners' property usage in the vicinity of the 50-foot-wide permanent ROW. Therefore, operations impacts on residential land uses would be permanent and are considered significant.

Keystone contacted planning and development departments in each of the counties that would be crossed by the proposed Mainline Project facilities to determine whether any residential or commercial development is planned within 0.25 mile of the proposed construction ROW. Planned development projects would include those that are permitted and not yet constructed and those with permit applications that have been filed but have not yet been approved. Keystone's initial consultations indicate that no known planned residential or commercial developments are within 0.25 mile of the proposed Mainline Project facilities; consequently, construction and operation of the Mainline Project would not affect planned development. Keystone would meet with landowners as part of the easement negotiations. Discussions would include whether residential and commercial developments are planned in close proximity to the ROW. Keystone then would determine whether minor property-specific adjustments to the route are feasible (TransCanada 2007c).

3.9.3.6 Commercial and Industrial Land

Construction of the Mainline Project facilities would affect about 1,701 acres of developed land. Table 3.9.3-6 provides a breakdown of developed land categories by state for the Keystone Mainline Project.

TABLE 3.9.3-6
Developed Land Categories by State for the Keystone Mainline Project (acres)

State	Residential	Commercial/Industrial	Pre-Existing ROW	Total Developed
North Dakota	315	25	33	373
South Dakota	15	402	30	447
Nebraska	6	236	38	280
Kansas	2	95	0	97
Missouri	32	286	76	398
Illinois	4	140	29	173
Mainline Project total	**378**	**1,184**	**206**	**1,768**

Source: TransCanada 2007c.

Affected developed acreage is distributed rather evenly among the states along the Mainline Project. For the Mainline Project route as a whole, developed land represents approximately 10 percent of the affected acres.

Potential Impacts and Mitigation

Construction of the Mainline Project could affect commercial and industrial land through restricted access and the presence of construction activity. Impacts on a specific commercial or industrial area are anticipated to last only for several days. Keystone has adopted mitigation measures for commercial and industrial land in its Mitigation Plan. Keystone would mitigate impacts on commercial and industrial landowners by:

- Notifying business owners prior to construction;
- Reducing the construction corridor width to 85 feet, if feasible;
- Removing fences and other improvements as necessary for construction activity;
- Fencing the construction work area adjacent to businesses for approximately 100 feet on either side of a building to keep construction equipment and materials in the work area;
- Preserving mature trees and landscaping to the extent possible, while ensuring safe operation of construction equipment;
- Limiting hours during which construction activities with high-decibel noise levels can be conducted;
- Limiting dust impacts through prearranged work hours and implementing dust minimizing techniques;
- Proceeding quickly with construction through commercial and industrial areas;
- Maintaining access and traffic flow during construction, particularly for emergency vehicles;
- Cleaning up daily after construction;
- Fencing or plating open ditches during non-construction periods;
- Restoring landscaping, fences, and other structures immediately after backfilling;
- Employing site restoration personnel familiar with local horticultural and turf establishment practices; and
- Prefabricating the pipe so it is ready for immediate lowering-in where the pipeline centerline is within 25 feet of a commercial or industrial building.

Given the mitigation procedures described above, construction of the Mainline Project would cause temporary minor impacts on any commercial and industrial land.

Buildings of any type, including commercial and industrial structures, would not be permitted within the permanent ROW for the life of the proposed Keystone Project. This would place a substantial constraint on the use of commercial and industrial property in the vicinity of the 50-foot-wide permanent ROW. Therefore, operations impacts on commercial and industrial land use are considered permanent and significant. Keystone would compensate landowners for these impacts on a case-by-case basis (TransCanada 2007c).

3.9.3.7 Recreation and Special Interest Areas

The proposed Mainline Project facilities would cross various recreation and special interest areas and other recreation areas, resulting in temporary construction impacts and potential permanent impacts. Table 3.9.3-7 details the recreation and special interests lands that would be intersected by the Mainline

Project. No other national, state, or local parks or forests are located with 500 feet of the proposed Mainline Project centerline.

As shown in Table 3.9.3-7, the proposed Mainline Project would cross multiple conservation and wildlife reserve easements, the majority of which are privately owned. Several of the areas listed in the table are discussed in further detail below.

Tetrault Woods State Forest and Pembina River, North Dakota

Tetrault Woods is a 432-acre area located along the banks of the Pembina River, in Cavalier and Pembina Counties. It preserves some of the riparian forest typical of the Pembina River Valley, including specimens of oak, ash, birch, elm, and aspen. The forest contains hiking trails and a scenic overlook of the valley (NDFS 2007). Tetrault Woods is one of very few public forest areas in North Dakota. The Mainline Project would cross Tetrault Woods between MP 6.9 and 7.7, traversing 0.8 mile of forestland and the Pembina River. The Pembina River has been classified by the National Rivers Inventory as having outstanding resource values for scenery and geology, although it is not classified as a National Wild and Scenic River (http://www.rivers.gov/agencies.html) or a National Recreation River (NPS 2007b). The Pembina River is a popular paddling and canoeing destination (NDPRD 2007). Keystone proposes to cross the Pembina River using the open-cut wet crossing method (see Section 2.2.2.3), crossing a public hiking trail south of the river. The Mainline Project also would intersect another section of forestland, managed by the North Dakota Forest Service, at MP 25.

Game Production Area, South Dakota

The SDGFP manages game production areas around the state to create habitat for game species and provide hunting opportunities (SDGFP 2007). The Mainline Project would intersect a game production area at MP 228.4, traversing a distance of 0.5 mile.

Missouri National Recreational River

The section of the Missouri River south of Yankton, South Dakota is designated a National Recreational River by the NPS. Rivers selected for this designation are to be preserved for having remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values (NPS 2007a). The Mainline Project would intersect the Missouri River and surrounding recreation lands at MP 433.5, and would traverse approximately 3 miles in South Dakota and Nebraska.

Keystone proposes using HDD (see Section 2.2.2.3) to cross the Missouri River. This method is not expected to affect the bed, banks, or water quality of the Missouri River. Additionally, this method would not interrupt recreational activity on the river or on its banks.

Keystone's preliminary HDD plan would avoid direct land disturbance within the NPS National Recreational River administrative boundary. The HDD entry point would be on City of Yankton land on the north shore, and the exit would be on privately owned land on the south shore. NPS administers land at the crossing location, but it does not own this land. Keystone conducted preliminary discussions with NPS and the City of Yankton in February 2006, and provided the proposed HDD procedure at a May 19, 2006 meeting in Yankton.

TABLE 3.9.3-7
Special Interest Areas Crossed by the Keystone Mainline Project

Site Name	Milepost	Miles Crossed	Ownership
North Dakota			
Tetrault Woods State Forest	6.9–7.7	0.8	North Dakota Forest Service
Pembina River	8	NA	NA
Conservation Reserve	10–10.5	0.5	Privately owned North Dakota Game and Fish Easement
Forest	25–28.5	3.5	State Forest Service
Conservation Reserve	77–78	1	Privately owned North Dakota Game and Fish Easement
Conservation Reserve	79.5–80	0.5	Privately owned North Dakota Game and Fish Easement
Conservation Reserve	80.2–82.3	2.1	Privately owned North Dakota Game and Fish Easement
Conservation Reserve	83.3–84.3	1	Privately owned North Dakota Game and Fish Easement
Conservation Reserve	110.1–111.1	1	Privately owned North Dakota Game and Fish Easement
Wildlife Preserve	187.2–187.7	0.5	Privately owned North Dakota Game and Fish Easement
South Dakota			
Game Production Area	228.4–228.9	0.5	South Dakota Game, Fish and Parks Department
Missouri National Recreational River	433.5–435.8	2.3	Privately owned Designated Wild and Scenic (National Park Service)
Nebraska			
Missouri National Recreational River	435.8–436.2	0.4	National Park Service
Kansas			
None identified	NA	NA	NA
Missouri			
Pigeon Hill Conservation Area	748.5–748.6	0.1	Missouri Department of Conservation
Western Missouri River Alluvial Plain Conservation Opportunity Area (COA)	758.4–759.1	0.6	Private and Missouri Department of Conservation
Pigeon Hill Conservation Area	758.4–759.1	0.6	Missouri Department of Conservation
Platte River Loess Prairie/Woodland Hills COA	767.4–769	1.4	Private
Little Platte River Woodland COA	771–772.25	1.25	Private
Cameron River Upland Prairie Plain COA	779.3–781.5	2.2	Private
Shoal Creek Prairie	823–823.8	0.5	Private
Shoal Creek Prairie/Woodland Scarped Plain COA	825.9–826.5	0.6	Private

TABLE 3.9.3-7
(Continued)

Site Name	Milepost	Miles Crossed	Ownership
Missouri (continued)			
Lower Grand River Lowland Plains/Missouri Grand River Lowland Plains COA	838.8–841.6	2.8	Private
Lower Chariton Woodland/Forest Hills COA	867.7–869	1.3	Private
Lower Chariton Woodland/Forest Hills COA	871.4–872.2	0.5	Private
West Fork Cuivre River	923.4	NA	NA
Cuivre River Woodland/Forest Hills COA	961.1–963	1.9	Private
Cuivre River Woodland/Forest Hills COA	970.5–972.8	2.3	Private
Cuivre River Woodland/Forest Hills COA	983–983.2	0.2	Private
Cuivre River Woodland/Forest Hills COA	983.7–984.3	0.6	Private
St. Charles County Prairie/Woodland Low Hills, St. Charles/Lincoln Alluvial Plain, Mairas Temp Clair Alluvial Plain, West Allan Alluvial Plain, St. Louis County Prairie/Savannah Dissected Karst Plain COA	984.9–1019.9	35	Private
Riverlands Environmental Demonstration Area	1015–1017.8	1.1	U.S. Army Corps of Engineers
Jones-Confluence Point State Park	1019.9–1021.1	1.2	Missouri Department of Natural Resources
Illinois			
Carlyle Lake Wildlife Management Area	1069.6–1072.7	3.1	U.S. Army Corps of Engineers
Mainline Project total		**70.25**	

NA = Not available.

Source: ENSR 2006a.

Pigeon Hill Conservation Area, Missouri

The Pigeon Hill Conservation Area is owned and managed by the MDC. Pigeon Hill is a 424-acre conservation area with a shooting range and hunting and fishing opportunities. Most of the acreage is forested (MDC 2007c), consisting of 250 acres of upland forest that includes areas of improved and high-value forest stands. The Mainline Project would intersect this area twice, first in a 0.1-mile segment at MP 748.5 and again in a 0.6-mile segment from MP 758.4 to 759.1.

Conservation Opportunity Areas, Missouri

The Mainline Project would cross numerous privately owned Conservation Opportunity Areas (COAs), including approximately 51 miles in 13 separate COAs located throughout Missouri. The MDC partners with stakeholders and landowners to identify places where partners can best apply technology, expertise, and resources for conservation efforts (MDC 2007a). See Table 3.9.3-7 for the specific locations and names of COAs in Missouri.

West Fork Cuivre River, Missouri

The National Rivers Inventory has classified the West Fork of the Cuivre River as having outstanding resource values for scenery, geology, and fish; however, it is not classified as a National Wild and Scenic River (http://www.rivers.gov/agencies.html). The West Fork can be navigated by canoe or small johnboat during normal flows (MDC 2007b). The Mainline Project would cross the West Fork of the Cuivre River at MP 923.4, using the HDD drilling method.

Riverlands Environmental Demonstration Area, Missouri

This educational and wildlife viewing area is located on the Mississippi River, just west of the Missouri-Mississippi River confluence. The COE owns and manages the area, consisting of a 2,500-acre prairie marsh restoration site named the Riverlands Migratory Bird Sanctuary. The Audubon Society has designated this area as an Important Bird Area. The flow-through wetland supports an abundant array of waterfowl, shorebirds, and raptors. The National Great Rivers Museum is part of the area, located on the Illinois side of the Mississippi River. More than 2 million visitors recreate within the Riverlands Migratory Bird Sanctuary annually, enjoying wildlife viewing, boating, hiking, biking, fishing, and other activities. The Mainline Project would cross approximately 1.25 miles of the Riverlands area over three stretches between MP 1015 and 1017.

Jones-Confluence Point State Park, Missouri

This state park is situated at the confluence of the Missouri and Mississippi Rivers; work is ongoing to restore the natural floodplain of the area. The restored 1,118-acre park would include native vegetation, natural wetlands, forests, prairies, and marshes. Visitors can engage in high-quality bird watching and native plant species viewing (MSPHS 2007). Keystone's Mainline Project would intersect Jones-Confluence State Park at MP 1,019.9 and traverse approximately 1 mile of the park. In addition, the pipeline ROW would traverse 35 miles of private COA land prior to entering state park lands.

Carlyle Lake Wildlife Management Area, Illinois

Carlyle Lake, managed by COE, is the largest reservoir in Illinois, with 26,000 surface acres of water and 11,000 acres of adjacent public land. It is a major recreation destination for residents in the St. Louis metropolitan area. Recreation activities include fishing, hunting, wildlife viewing, boating, swimming, camping, and golfing. The Carlyle Lake Wildlife Management Area (WMA) is located at the north end

of the reservoir and is managed by the IDNR under a 25-year lease from COE. The WMA includes 2,000 acres of woodland, 5,800 acres of open water and wetlands, 200 acres of grassland, and 1,500 acres of cropland planted for wildlife food and cover (IDNR 2007). The Mainline Project would cross approximately 3 miles of the WMA between MP 1,069.6 and 1,072.7.

U.S. Fish and Wildlife Service Wetland Easements

The proposed Mainline Project route also would cross multiple USFWS easements in North Dakota and South Dakota. Table 3.9.3-8 shows the location of USFWS wetland easements. USFWS easements and wetlands of special concern or value are discussed in depth in Section 3.4.2. Wetland easements are signed agreements with private landowners to permanently protect valuable wetlands. The landowner receives a one-time payment. Protected wetland basins cannot be drained, burned, filled, or leveled.

When these wetlands naturally dry up, they can be farmed, grazed, or hayed. The land remains in private ownership, remains on the tax rolls, and the landowner controls access (USFWS 2007b). USFWS wetland easements are important habitat areas for a variety of flora and fauna, and they serve as private hunting areas. The Mainline Project would cross approximately 37.7 miles of USFWS wetland easements (see Table 3.9.3-8).

Wildlife Management Areas and Hunting

Hunting occurs on publicly and privately owned lands along the proposed Mainline Project route. Most affected cover for game species would be located on private land that would require landowner permission for access; however, two public wildlife areas (Pigeon Hill Conservation Area, Missouri at MP 748.5 and Carlyle Lake WMA, Illinois at MP 1,069.6) would be crossed by the pipeline route. The Mainline Project also would cross a South Dakota game production area at MP 228.4 that is owned and managed by the SDGFP. Hunting also is permitted in Tetrault Woods State Forest (North Dakota).

Wilderness Areas

The proposed Mainline Project route would not cross any designated Wilderness Areas or Wilderness Study Areas.

Potential Impacts and Mitigation

Public scoping comments questioned the effect of the Keystone Project on bicycle trails in Madison County, South Dakota and on special use areas (including walnut tree groves and a tree nursery in Sargent County, North Dakota).

General Recreation Activities

For recreation areas and special management areas, the Keystone Project is expected to cause temporary impacts to recreational traffic and use patterns during construction. Sightseers, hikers, wildlife viewers, and other recreationists would be displaced from the immediate area during construction. Keystone would continue to coordinate with agency managers to minimize conflicts between construction activities and recreational uses for which these special areas were established. Following construction, all affected recreational lands would return to previous uses; Keystone would restore any affected trails or bicycle routes that cross the construction and permanent ROWs, and pipeline operation would not be expected to impact recreational activities. Construction impacts on general recreation activities are considered temporary and minor. Pipeline operation is not expected to affect general recreation.

TABLE 3.9.3-8
U.S. Fish and Wildlife Service Wetland Easements Crossed by the Keystone Mainline Project

North Dakota		South Dakota	
Milepost	Miles Crossed	Milepost	Miles Crossed
79–77	1.0	216.9–218.8	1.9
79.1–79.6	0.5	219.3–219.8	0.5
80.1–82.3	2.2	222.3–222.8	0.5
85.8–86.5	0.7	261.3–261.6	0.3
87–88.1	1.1	210.5–211	0.5
89.6–89.9	0.3	316.4–316.9	0.5
91.7–92.7	1.0	318.8–319.3	0.5
97.7–98.3	0.6	321.9–322.4	0.5
100.9–101.2	0.3	324.4–324.6	0.2
109.6–110.1	0.5	325.5–326.5	1.0
110.6–111.1	0.5	329.2–329.6	0.4
117.3–117.7	0.4	332.2–332.7	0.5
118.9–119.2	0.3	333.7–334.7	1.0
121.8–122.3	0.5	334.9–335.2	0.3
127.6–127.9	0.3	338.9–340	1.1
128.3–128.6	0.3	349.2–349.8	0.6
137.3–138.2	0.9	355.5–356.0	0.5
138.9–140	1.1	360.5–361.7	1.2
169.3–170.3	1.0	363.4–364.7	1.3
172.5–173.0	0.5		
170.5–170.8	0.3		
174–174.5	0.5		
175.5–176	0.5		
176.5–177	0.5		
177.6–179.1	1.5		
180.6–183.2	2.5		
183.2–183.4	0.3		
186.7–187.2	0.5		
187.7–189.2	1.5		
198.8–199.1	0.3		
214.9–216.9	2.0		
Mainline Project total			**37.7**

Source: ENSR 2006a.

Missouri National Recreational River

The Mainline Project would cross the Missouri National Recreational River at Yankton, South Dakota. Approximately 3 miles of protected land would be affected by this crossing. Keystone has developed a site-specific crossing plan for the Missouri River, which details the HDD methods to be used (Drawing K-31-P-6001-A-1.06, ENSR 2006a). The site plan shows that the HDD entry and exit points would be set well back from the river banks (more than 500 feet, in each case), and that views from the river of the entry and exit points would be shielded by vegetation. In addition, the site plan specifies that the water quality of the Missouri would not be affected by hydrostatic test water or excess drilling mud, which may not be disposed of in the water body or in existing wetlands but must be deposited in upland erosion control structures or as directed under conditions of the permit to conduct the HDD. The HDD drilling process would have the potential to create frac-outs, or a rupture of drilling mud to the surface or riverbed, where it could affect water quality and recreation on the Missouri River. Keystone proposes to contain and collect any inadvertently released drilling mud to the extent possible, and to dispose of it in compliance with the drilling permit.

NPS would require Keystone to apply for a Special Use Permit to conduct geotechnical drilling near the banks of the Missouri River. On August 17, 2006, Keystone filed an application for an NPS Special Use Permit, including the Missouri River HDD site plan. Approval of this permit is pending. Keystone submitted copies of the NPS consultation documents to DOS in its September 15, 2006 filing.

Construction activities are anticipated to cause only temporary impacts, such as noise and dust from drilling at the entry and exit points for the HDD. Pipeline operation is not expected affect recreation on the Missouri River or its banks.

Wetland Easements

As mentioned above, the Mainline Project would intersect multiple USFWS wetland easements in North Dakota and South Dakota. Construction in wetland easements would proceed in the same manner as outlined for general wetland areas. All mitigation for pipeline construction in wetlands of all types would apply to wetlands easements. Keystone would use trench construction in wetland areas. Soil stability at the time of construction largely would determine which wetland crossing method would be used. Refer to Section 2.2.2.4 for more information on construction methods in wetlands.

USFWS wetland easements also have a financial component that is paid to the landowner in return for maintaining the wetland (although the land may be grazed, farmed, or hayed if the wetland dries up due to natural causes). USFWS wetlands easements are perpetual, and payment is made to a consenting landowner at one time as a lump sum. Given proposed mitigation measures, construction impacts on wetland easements are expected to be short term and minor. These temporary impacts would be associated with vegetation removal, grading, grubbing, trenching, and soil stockpiling; they would be minimized by following the mitigation measures described in Appendix B (TransCanada 2007c).

Pipeline operation is not anticipated to affect wetland easements. Maintenance of vegetation would not be conducted over the full width of the permanent ROW in these wetland areas. Therefore, no permanent impacts are anticipated from crossing wetlands on USFWS easements (TransCanada 2007c).

Groves and Tree Nurseries

Keystone's proposed mitigation measures would minimize impacts on groves and tree nurseries. For these special interest areas, trees in the path of the construction and permanent ROWs would be removed, and no trees would be allowed to regenerate above the permanent ROW for the life of the Keystone

Project. Any construction ROW areas cleared of trees during the construction process would take many decades to regenerate, which is considered a long-term significant impact. Operations impacts on groves and nurseries, given the need to maintain the permanent ROW in an open condition, are considered permanent and significant. The same construction and operation impacts would apply to any Sargent County, North Dakota walnut tree groves or tree nurseries identified in the scoping comments. Review of aerial strip maps of the proposed Keystone Project route indicates that the proposed route may affect small, isolated tree groves and windbreaks, some of which may be walnut trees or nurseries. Based on a review of aerial photography, helicopter reconnaissance, and limited ground surveys, Keystone has determined that no vineyards, orchards, or hops plantations would be crossed by the proposed Keystone Project (TransCanada 2007c). Additional verification will be accomplished through ground surveys (concluding in June 2007) and discussions with landowners.

Forests and Woodlands

Some state forestland (Tetrault Woods State Forest, North Dakota), state park land (Jones-Confluence Point State Park, Missouri), state conservation land (game production area, South Dakota; Pigeon Hill Conservation Area, Missouri; Carlyle Lake WMA, Illinois), and private woodlands (COAs in Missouri) would be crossed by the Mainline Project. Recreation activities such as hiking, fishing, and hunting in these areas would be temporarily interrupted during the pipeline construction period, and these activities could resume following construction. The quality of the recreational experience following construction likely would be diminished due to the permanent clearance of most vegetation in the permanent ROW, long-term clearance of vegetation in the construction ROW, and permanent maintenance activities required to maintain the permanent ROW in an open condition. These activities would result in long-term impacts on vegetation and would induce habitat fragmentation, which would decrease enjoyment of private and public recreational resources. Specific impacts and mitigation for forests can be found in Section 3.5. Impacts and mitigation for woodland habitat are discussed in Section 3.6. Permanent clearance of forestland and woodlands would result in permanent significant impacts on recreation resources.

Keystone has adopted construction, mitigation, and restoration measures for forested land in its Mitigation Plan (see Section 2.2.2.8 for more details on construction procedures in forestland areas). To further decrease the impact of forest clearance on recreation, **the following measures are recommended:**

- **Keystone should consult with state wildlife management and natural resource officials to schedule construction activities in order to avoid important recreational periods (such as hunting seasons) and to create a maintenance plan for the permanent ROW that avoids important recreational periods and results in minimal disturbance to the area.**

- **Where the pipeline follows an existing ROW in forested areas, Keystone should attempt to route the pipeline as close as possible to the existing ROW in order to minimize the overall Project footprint.**

Implementation of these measures would substantially reduce the potential impacts on recreation activities in forested areas; nevertheless, clearance of woodlands would cause a permanent and significant impact in forested areas that would remain throughout the operational life of the pipeline.

Privately Owned Conservation Areas

The Mainline Project would intersect multiple private conservation areas in North Dakota and Missouri. These privately owned conservation areas consist of woodlands, grasslands, and wetlands. The ROW crosses the Missouri-Mississippi confluence area in Missouri, where numerous COAs have been

designated. Many of these COAs are managed as hunting grounds for private duck clubs and as conservation land for wildlife habitat and flood control. For all of these areas, recreational activities would be temporarily interrupted during the pipeline construction process and could resume following restoration. As described for recreational resources in forests and woodlands, privately owned conservation areas could be adversely affected by a decline in the recreation experience and enjoyment of recreational resources due to habitat fragmentation, tree removal, and visible scarring from the construction and mechanical maintenance processes.

Impacts to private conservation areas would differ depending on the land use type. For grasslands and wetlands, proposed construction mitigation and restoration measures would reduce effects to minimal levels. Mitigation would include relieving compaction, rock removal, reseeding, erosion control, stream bank stabilization, and repair or replacement fencing (as outlined in Section 4.11 of the Mitigation Plan, see Appendix B). Even with mitigation, however, grasslands may take up to 5 years to mature to levels where the visible construction scars are no longer evident. Construction impacts on grassland and wetland conservation areas are expected to be long term but minor, while pipeline operation would not affect grassland and wetland conservation areas following restoration, because regular maintenance would not occur above the permanent ROW in these areas.

For wooded conservation areas, impacts associated with pipeline construction and operation would be the same as for forested areas. Construction and operation impacts on wooded conservation areas would be long term or permanent, respectively, and significant.

To mitigate potential impacts on recreational resources in privately owned conservation areas, **the following measures are recommended:**

- **Keystone should consult with owners of private conservation areas and local advocacy groups to schedule construction activities in order to avoid important recreational periods (such as hunting seasons), and to create a maintenance plan for the permanent ROW that avoids important recreational periods and results in minimal disturbance to the area.**

- **Where the pipeline follows an existing ROW, Keystone should attempt to route the pipeline as close as possible to the existing ROW in order to minimize the overall footprint of these features in privately owned conservation areas.**

Implementation of these measures would reduce potential impacts on recreation resources at privately owned conservation areas; nevertheless, permanent impacts would remain, particularly for forested areas.

Riverlands Environmental Demonstration Area

Riverlands is a prairie marsh restoration, designed as a flow-through wetland. It is a designated bird sanctuary and has been identified by the Audubon Society as an Important Bird Area. Construction in Riverlands would proceed in the same manner as outlined for general wetland areas. All mitigation for pipeline construction in wetlands (as identified in the Construction Mitigation and Reclamation Plan) apply to Riverlands. Keystone would use open cut trench construction in wetlands. Soil stability at the time of construction largely would determine which wetland crossing method would be used. Refer to Section 2.2.2.4 for more information on construction methods in wetlands.

Given proposed mitigation measures, construction impacts on wetlands are expected to be long term but minor. These temporary impacts would be associated with vegetation removal, grading, grubbing, trenching, and soil stockpiling; they would be minimized by following the mitigation measures described in Appendix B (TransCanada 2007c). The visible impact of the construction zone would be apparent for

as many as 5 years, during which time the wetland vegetation would be allowed to return. Any disruption to trails, wildlife viewing areas, public access roads, parking, or boat access areas would be restored by Keystone; construction impacts would be long term but minor.

Pipeline operation is not anticipated to affect Riverlands or recreation within the area. Maintenance of vegetation would not be conducted over the full width of the permanent ROW in wetland areas. Therefore, no permanent impacts are anticipated from crossing wetlands (TransCanada 2007c). The COE would be free to manage the area using its present practices, including seasonal flooding and prescribed burning.

To further mitigate possible impacts on the Riverlands area, **the following measures are recommended:**

- **Keystone should attempt to route the pipeline as close as possible to the existing ROW (Platte pipeline) in order to minimize the overall footprint of these features in Riverlands.**

- **Keystone should pay special attention to the soils in the Mississippi-Missouri confluence region and their uniqueness, taking care to avoid alteration of the hydrology of the area due to disruption of the ridge/swale topography.**

- **Keystone should minimize construction impacts by scheduling construction activities in Riverlands during early summer and ending construction prior to autumn.**

Wildlife Management Areas and Hunting

The Mainline Project would intersect one public WMA (Carlyle Lake WMA, Illinois), a public conservation area (Pigeon Hill Conservation Area, Missouri), a public game production area (South Dakota), and a public state forest where hunting is allowed (Tetrault Woods State Forest, North Dakota). Public access to these areas for hunting and wildlife viewing could be impeded during construction. In addition, the Mainline Project would intersect many private areas regularly used for hunting. The impacts of pipeline construction in any one of these areas would be of limited duration; however, construction during the fall hunting and migratory season, in particular, could create conflicts with hunters and wildlife viewers.

To decrease possible conflicts with hunting and other recreational activities in wildlife management and public conservation areas, **the following measures are recommended:**

- **Keystone should consult with public land managers to schedule construction activities in wildlife management and public conservation areas to avoid important recreational periods, and to create a maintenance plan for the permanent ROW that avoids important recreational periods and results in minimal disturbance to these areas.**

- **Where the pipeline follows an existing ROW in a wildlife management or public conservation area, Keystone should attempt to route the pipeline as close as possible to the existing ROW in order to minimize the overall footprint of these features in wildlife management and public conservation areas.**

Implementation of these measures would substantially reduce the potential for conflicts with hunting and other recreation activities; nevertheless, some degree of recreational impact would persist throughout the life of the pipeline due to habitat fragmentation and routine maintenance activities.

Pipeline construction and operation activities have the potential to substantially affect forested portions of WMAs, public conservation areas, public game production areas, and public forest lands. Trees would be removed from both the construction and permanent ROWs. Woody vegetation along the permanent ROW would be periodically cleared by mechanical mowing or cutting. Trees would not be allowed to regrow within the permanent ROW for the life of the Keystone Project, and revegetation within the construction ROW would require many decades. For these forested special interest areas, impacts related to construction activities are considered significant and long term. Pipeline operation would result in a permanent significant impact on forested parts of these public areas.

Carlyle Lake WMA (a COE property managed by the IDNR) and Riverlands Environmental Demonstration Area (a COE property) are subject to the Land and Water Conservation Fund (LWCF) Act. These areas may be funding recipients of the LWCF, which was established to assist states and federal agencies in meeting present and future outdoor recreation demands. Section 6.f.3 of the LWCF Act states that: "No property acquired or developed with assistance under this section shall, without the approval of the Secretary [of the Interior], be converted to other than public outdoor recreation uses" (16 USC §4601-8[f.3]). Land may be converted, however, if it is deemed that the change is in accordance with existing statewide outdoor recreation plans, and given that the land is substituted for other recreation properties of "at least equal fair market value and or reasonably equivalent usefulness and location." Construction and operation of Keystone Project facilities would affect the recreational use of Carlyle Lake WMA and Riverlands Environmental Demonstration Area by temporarily disturbing access and recreational activities during construction, and by affecting the overall recreational experience and enjoyment of individuals through habitat fragmentation and visible scarification of the landscape following construction and during operation. Woodlands, grasslands, and wetlands would be affected as described above, and the same mitigation measures would apply.

Off-Road Vehicles and Trespassing

Pipeline projects have the potential to create trespassing problems, particularly when off-road vehicles (ORVs) and snow mobiles use the restored ROW after construction. The construction process creates a cleared, graded route and opens up a potential pathway for ORV use. No designated ORV areas were noted in the vicinity of the proposed route; however, many states allow ORV riders to use rural roadways and road shoulders, which would provide access to points where the pipeline ROW would cross these routes. Snow mobiles also may be permitted to operate on road shoulders, and trespassers could access the pipeline ROW by foot, bicycle, cross-country skis, and snow shoes.

While ROWs would be restored relatively quickly in agricultural areas such as cropland, revegetation would require longer periods in some land use types. In forests, revegetation of trees would not be allowed above the permanent ROW. Grasslands may take up to 5 years for the visible scar from pipeline construction activities to disappear. In forested areas, Keystone has committed to using gates, boulders, or other barriers to minimize unauthorized access, if requested by landowners. Keystone would install and maintain these control measures, as detailed in Section 2.15 of its Mitigation Plan. The Mitigation Plan does not, however, specifically mention trespass as a potential problem beyond ORV users and does not mention land use types other than forests that may be affected by trespass. Therefore, **the following measures are recommended:**

- **Keystone should use fencing and gates to prevent unauthorized access to the ROW immediately following the start of construction activities. Keystone should maintain and monitor fences and gates until permanent mitigation measures can be put in place.**

- **Keystone should commit to prevention of trespass in all of its potential forms on the construction and permanent ROW, using the stated mitigation measures, to be implemented at the time of restoration and mitigation,**

Implementation of these mitigation measures would reduce potential trespassing and ORV impacts to minimal levels, and prevent them entirely in most cases. With mitigation, pipeline construction and operation would not create ORV or trespassing problems.

3.9.3.8 Visual Resources

General visual impacts associated with the construction ROW, additional temporary workspaces, and operation of the Cushing Extension pipeline include clearing and removal of existing vegetation; exposure of bare soils; earthwork and grading scars associated with heavy equipment tracks; trenching; rock formation alteration or removal; machinery and pipe storage; landform changes that introduce contrasts in visual scale, spatial characteristics, form, line, color, or texture; and new aboveground structures.

Potential Impacts and Mitigation

Agricultural Lands and Rangeland

Some of the proposed Mainline Project route would be located within or adjacent to existing ROWS for pipelines, utilities, or roads ROWs—or in previously disturbed agricultural lands and herbaceous rangeland. The majority (approximately 61 percent) of the route, however, would consist of new ROW. Visual impacts associated with pipeline construction in rangeland and agricultural areas along the route would be temporary and would result from the presence of construction equipment and post-construction visual scarring. In cultivated croplands, visual scarring would persist until the ROW is replanted with new crops. Once crops are replanted, only a minor visual impact from pipeline construction would be evident in cultivated croplands. However, visual scarring in herbaceous rangeland and previously disturbed areas may last for 5 or more years in the Keystone Project region.

Temporary minor impacts could result from the presence of construction equipment along the ROW, but the remote location and short duration of the construction sequence in a given area would minimize these potential visual impacts, and they would cease immediately following construction. As scarring in rangeland areas may continue for up to 5 years, visual impacts resulting from construction are expected to be long term but minor in these areas. Construction-based visual impacts on agricultural lands are anticipated to be short term and minor, with the visual ROW impacts fading with subsequent replanting of crops. Visual impacts from pipeline operation in agricultural and rangeland areas would be limited to the introduction of aboveground facilities, discussed below.

In many agricultural and rangeland areas, landowners plant trees or shrubs to act as windbreaks, shelterbelts, or living snow fences; these features reduce wind erosion, reduce evaporation from soils, increase crop yields, provide wildlife habitat and wind protection for livestock, and serve as visual screens. Keystone has proposed mitigation to minimize impacts to these features; however, any access of the pipeline ROW through a windbreak would result in a permanent segmentation of the visual feature (see Section 3.9.3.2 for a detailed discussion of windbreaks). Pipeline construction and operation are expected to result in permanent but minor visual impacts on windbreaks.

The proposed aboveground facilities that are not adjacent to existing crude oil or other industrial facilities could affect visual resources because they would be new permanent industrial facilities located in relatively flat open areas. However, these facilities would primarily be situated in rural herbaceous

rangeland and agricultural areas that have not been designated as primary viewsheds or scenic corridors, with only nominal viewer traffic. Keystone proposes to provide a landscaped visual screen for aboveground facilities where appropriate. Construction-based visual impacts on rangeland and agricultural areas from these facilities would be temporary and minor, consisting of the presence of construction equipment and staging areas along the ROW. Aboveground facilities would be permanent landscape fixtures in agricultural and rangeland areas. To further reduce visual impacts from these facilities, **the following measures are recommended:**

- **Aboveground facilities should be painted with a non-reflective coating similar in color to the surrounding terrain and several shades darker, using colors that account for seasonal change in landscape colors.**
- **Keystone should use a vegetative barrier to shield a facility from sight when it is within viewing distance of a residence, or when otherwise appropriate.**

With implementation of these measures, the operational visual impact of these facilities is expected to be permanent but minor, based on the generally remote location.

Forestland

The Mainline Project would affect almost 800 acres of forestland (see Table 3.9.3-3); most of these acres are in Missouri and Kansas. Keystone construction standards for forested areas dictate that trees above the permanent ROW would be removed prior to trenching. Removal of additional trees and grubbing of tree stumps would occur along the construction ROW for the safe operation of construction vehicles. Keystone has proposed construction mitigation and restoration measures to reduce potential impacts to forested land to minimal levels; however, trees would not be allowed to regenerate within the permanent ROW for the life of the Keystone Project. In addition, trees likely would not regenerate within the construction ROW for many decades. Removal of trees along both the permanent and construction ROWs would leave a highly visible deforestation line that would persist for the duration of pipeline operation. The visual impact related to the construction ROW is considered long term and significant, while the visual impact related to the permanent ROW is considered permanent and significant.

Connected Action – Wood River Refinery Upgrade

The Wood River Refinery would undergo numerous upgrades to achieve the capacity to refine the additional crude oil resources from the Project. These upgrades would become permanent visible fixtures within the landscape. Among these, vertical structures would be most visible, including a new water tower and coking flare. The flare also would constitute a visible source of light when it is in use. The upgrades also are likely to include additional facility lighting, which would constitute a permanent addition to the existing amount of light produced by the refinery.

The visual impact of new structures would be permanent but minor, as these new structures would be located near numerous existing industrial features. The visual impact of new lighting also would be permanent but minor, as it would contribute incrementally to an already substantial light source in an industrial setting.

3.9.4 CUSHING EXTENSION

3.9.4.1 General Land Use

As proposed, the approximately 294-mile Cushing Extension would disturb a total of 4,595 acres of land while traversing the states of Nebraska (approximately 2 miles), Kansas (approximately 210 miles), and

Oklahoma (81 miles); 1,807 acres of this total would be retained as the permanent ROW. All disturbed acreage would revert to previous uses following construction, except for 17 acres to be retained as space for aboveground facilities, including pump stations, MLVs, delivery facilities, densitometer sites, and pigging facilities.

At the time of this EIS, Keystone does not plan to construct any permanent roads to access the construction ROW for the Cushing Extension (TransCanada 2007c). Existing roads would be used on a temporary basis during construction; and some of these roads may require improvements. A total of 24 new temporary roads or expanded existing roads are planned for construction of the Cushing Extension. The length of these roads ranges from 0.02 to 1.10 miles, and they all would cross agricultural land or grasslands. (See Section 2.1.1.3 for further discussion of access roads.) None of the Cushing Extension pipeline would be located within existing pipeline, utility, or road ROWs (TransCanada 2007c). Consequently, the entire 294-mile Cushing Extension would require a new ROW. However, about 26 miles of the pipeline would be adjacent to existing facility ROWs. Table 3.9.4-1 shows the number of acres that would be affected during construction and operation of the Cushing Extension.

TABLE 3.9.4-1
Land Requirements for the Keystone Cushing Extension

State	Land Affected during Construction (acres)	Permanent Right-of-Way (acres)
Nebraska	51	15
Kansas	3,266	1,284
Oklahoma	1,278	508
Cushing Extension total	**4,595**	**1,807**

Note:

Discrepancies between acreages for individual features and totals are attributable to rounding.

Sources: ENSR 2006a, TransCanada 2007c.

Additional Aboveground Facilities

The Cushing Extension would include three new pump stations, 12 MLVs, two delivery facilities, two densitometer sites, and two pigging facilities (one each at the Ponca City and Cushing Terminals). Table 3.9.4-2 catalogues the number of acres required to accommodate aboveground facilities during construction and operation, as well as affected acreage for the pipeline and lateral ROWs, additional workspaces, and contractor and pipe yards. Some facilities would be located within the affected acreage of other facilities (e.g., all pig launchers and receivers would be located within delivery facilities) or would be located entirely within the 50-foot-wide permanent ROW (the location for all densitometer stations and MLVs).

TABLE 3.9.4-2
Acres Affected by Construction and Operation of Pipeline Facilities for the Keystone Cushing Extension

Pipeline Facility	Construction	Operation
Nebraska		
Pipeline right-of-way (ROW)	32	15
Lateral ROWs	0	0
Additional temporary workspaces	4	0
Pipe and contractor yards	39	0
Pump stations and delivery facilities	0	0
Nebraska subtotal	*75*	*15*
Kansas		
Pipeline ROW	2,802	1,273
Lateral ROWs	0	0
Additional temporary workspaces	158	0
Pipe and contractor yards	351	0
Pump stations and delivery facilities	11	11
Kansas subtotal	*3,322*	*1,284*
Oklahoma		
Pipeline ROW	1,079	496
Lateral ROWs	11	6
Additional temporary workspaces	77	0
Pipe and contractor yards	123	0
Pump stations and delivery facilities	6	6
Oklahoma subtotal	*1,296*	*506*
Cushing Extension		
Total pipeline ROW	3,913	1,784
Total lateral ROW	11	6
Total additional temporary workspaces	239	0
Total pipe and contractor yards	513	0
Total pump stations and delivery facilities	17	17
Cushing Extension total	**4,693**	**1,807**

Notes:

Discrepancies between acreages for individual features and totals and subtotals are attributable to rounding.

Affected acreage for densitometer sites and mainline valves is effectively included within the 50-foot-wide permanent ROW of the pipeline and therefore is not listed separately here.

All pig launching and receiving facilities would be located within pump stations and would not require any additional acreage.

Sources: ENSR 2006a, TransCanada 2007c.

Turnouts and access roads from public roads would be installed for each aboveground facility. Drainage would be maintained by installing ditches or culverts, and the short access roads would be surfaced with crushed rock. The delivery facility sites would be enclosed with a chain-link security fence. (TransCanada 2007c.)

Land Use

The Cushing Extension primarily would affect agriculture and grassland/rangeland land uses. Of lands crossed by the Cushing Extension, agriculture and rangeland account for 51 and 32 percent, respectively, of the acres affected by the Cushing Extension pipeline. Table 3.9.4-3 shows affected land use acreage by state for the Cushing Extension.

TABLE 3.9.4-3
Acres Affected during Construction by Land Use Type for the Keystone Cushing Extension

Land Use Type	Nebraska	Kansas	Oklahoma	Total	Percent of Total (%)
Agriculture/cropland	36	1,893	455	2,384	51
Grassland/rangeland	18	887	598	1,503	32
Forestland	6	104	28	138	3
Wetlands	0	90	63	153	3
Developed	15	339	147	501	11
Water	<1	9	5	14	0
Cushing Extension total	**75**	**3,322**	**1,296**	**4,693**	

Notes:

Agriculture includes cultivated crops, flood or pivot irrigation crops, and fallow cropland.

Rangeland includes herbaceous and mixed rangeland characterized by short-grass prairie, mixed-grass prairie, and lands that appear to be used for cattle or other livestock grazing—with or without a shrub component.

Forestland includes upland and wetland forested areas.

Wetlands include palustrine forested wetlands and palustrine emergent/scrub-shrub wetlands.

Developed land includes both industrial/commercial and residential uses. Industrial/commercial includes electric power or gas utility stations, manufacturing or industrial plants, livestock feedlots, landfills, mines, quarries, commercial or retail facilities, and roads. Residential includes residential yards, subdivisions, and planned new residential developments.

Sources: ENSR 2006a, TransCanada 2007c.

Rangeland/grassland is the predominant land use that would be affected in Oklahoma (35 percent of the acres affected in that state), while agriculture is the predominant land use that would be affected in Nebraska and Kansas (48 and 57 percent of the acres affected in those states, respectively). A total of 339 acres (10 percent of the total affected acreage) in Kansas and 147 acres (11 percent of the total affected acreage) in Oklahoma are developed land. For the Cushing Extension route as a whole, developed land accounts for about 11 percent of the total affected acreage.

Ownership

Nearly 99 percent of lands that would be crossed by the pipeline along the Cushing Extension route are privately owned (see Tables 3.9.4-4 and 3.9.4-5). In Nebraska, land along the entire route is privately owned. In Kansas, about 1 percent of the affected land is federally owned, and the remainder is privately owned. In Oklahoma, approximately 3 percent of the land that would be crossed is owned by the state, less than 0.5 percent is municipal land, and the remainder is privately held.

TABLE 3.9.4-4
Ownership of Land Crossed by the Keystone Cushing Extension

Land Owner	Miles Crossed	Percent of Total (%)
Nebraska		
Federal	0	0.0
State	0	0.0
Private	2.4	100.0
Nebraska subtotal	*2.4*	
Kansas		
Federal	1.9	0.9
State	0.0	0.0
Private	208.2	99.1
Kansas subtotal	*210.1*	
Oklahoma		
Federal	0.0	0.0
State	2.4	2.9
Municipality	0.3	0.3
Private	78.4	96.8
Oklahoma subtotal	*81.0*	
Cushing Extension		
Federal	1.9	0.6
State	2.4	0.8
Municipality	0.3	
Private	289	98.5
Cushing Extension total	**293.5**	

Note:

Discrepancies between acreages for individual features and totals and subtotals are attributable to rounding.

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

TABLE 3.9.4-5 Ownership of Acres Crossed by the Keystone Cushing Extension				
Location	Federal	State	Private	Total
Nebraska	0	0	75	75
Kansas	52	0	3,270	3,322
Oklahoma	0	53	1,243	1,296
Cushing Extension total	**52**	**53**	**4,588**	**4,693**

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

As noted, temporary and permanent ROWs would be acquired through negotiations with private landowners on a case-by-case basis. The Cushing Extension route would cross approximately 2 miles of state-owned land in Oklahoma; all applicable state statutes would apply.

Where the pipeline would traverse federal land (approximately 2 miles in Kansas), all applicable federal statutes would apply. For the Cushing Extension ROW, Keystone will apply in July 2008 for Right-of-Way Grants pursuant to the Mineral Leasing Act, which provides for authorizations for temporary construction use and long-term use of federal land for pipeline purposes. A Right-of-Way Grant is issued for a 30-year term and contains a right of renewal if the project continues to be used for its initial purpose.

3.9.4.2 Agricultural Land

The principal land use that would be affected by the proposed pipeline would be agricultural. The Cushing Extension would cross a substantial amount of agricultural cropland that is presently in private ownership. Construction and operation of the Cushing facilities would affect about 2,384 acres of agricultural land, along approximately 294 miles of the pipeline route. Of this, approximately 212 miles is considered prime farmland by NRCS (this includes land considered potential prime farmland, if adequate protection from flooding and drainage are provided). Prime farmland accounts for 66 percent of the proposed Cushing Extension route mileage in Oklahoma and 75 percent of the route in Kansas. No prime farmland would be crossed in Nebraska.

To determine the amount of agricultural land that potentially would be affected, Keystone reviewed aerial photographs and made general observations during reconnaissance activities. Further refinements to the assessment of various types of cover were completed during an August 2006 grassland survey. Based on the aerial photography evaluations and ground surveys, Keystone has indicated that no known orchards would be crossed by the Keystone Project. One landowner indicated in scoping comments that pecan trees would be removed along the Cushing Extension. Ground survey verification of the orchard category lands will conclude in June 2007.

Potential Impacts and Mitigation

Construction-related activities such as grading, trenching, stringing, welding, backfilling, and restoration could impact agricultural lands by leading to soil erosion, interference with and damage to agricultural surface and subsurface drainage and irrigation systems, mixing or loss of fertile topsoil and subsoil, and soil compaction. All of these impacts could result in reduced productivity of agricultural lands or direct crop loss.

During the scoping period for the Keystone Project, concerns were expressed over a number of agricultural issues, as discussed in Section 3.9.3.2. To address impacts on agricultural lands, Keystone

has proposed mitigation measures that are discussed in detail in the Mitigation Plan (Appendix B). Keystone proposes to restore all areas disturbed during construction of the Keystone Project in accordance with the Mitigation Plan and all other applicable federal, state, and local permit requirements. In particular, Keystone intends to repair or restore drain tiles, fences, and land productivity as these may be affected during the construction process.

Following construction, all agricultural land affected by the Cushing Extension can revert to its previous use, except for 23 acres that would be set aside for permanent aboveground facilities; Keystone would purchase this acreage from landowners. These 23 acres would be permanently converted from agricultural to industrial land use. When construction and cleanup have been completed, all other affected land along the temporary and permanent ROWs could be returned to agricultural production.

Potential agricultural land use impacts and all proposed and recommended mitigation measures for the Cushing Extension are the same as those for the Mainline Project (see Section 3.9.3.2). Specific agricultural topics discussed in Section 3.9.3.2 include soil compaction; construction schedule; center pivot irrigation; surface and subsurface drainage, ponds, waterlines, and drainage ditches; CRP lands; FWP lands and other FSA programs; NRCS programs; access to farmland; and windbreaks, shelterbelts, and living snow fences. The recommended additional mitigation for CRP lands; FWP lands; NRCS programs; and windbreaks, shelterbelts, and living snow fences would minimize impacts on these features associated with the Cushing Extension.

3.9.4.3 Rangeland

The Cushing Extension would cross substantial amounts of grassland and rangeland. Construction and operation of the Cushing Extension facilities would affect about 1,503 acres of rangeland/grassland along the approximately 294-mile route. Approximately 23 acres would be set aside for permanent aboveground facilities (such as pump stations and MLVs); approximately 1 acre of this amount would be located on grassland/rangeland. This acreage would be converted permanently from grassland to industrial land uses.

Affected rangeland acres represent about 32 percent of the total acres affected by the Cushing Extension. Of states that would be crossed by the Cushing Extension, Oklahoma has the highest percentage of affected rangeland/grassland acres (46 percent, representing 598 acres), while Kansas has the lowest (27 percent, representing 887 acres). Approximately 24 percent (18 acres) of the Cushing Extension ROW that would cross Nebraska is comprised of rangeland acres.

Potential Impacts and Mitigation

Construction activities would displace or halt grazing activities and would disturb the surface of livestock foraging areas. In addition, construction activities such as trenching could put livestock at risk of falling or being trapped in open trenches. Land that would be set aside for operation of aboveground facilities would be permanently converted from rangeland to industrial uses.

During the scoping period, commentors questioned how cattle would be protected during construction. To reduce overall risks to livestock grazing in rangelands, Keystone has proposed a number of construction guidelines and mitigation measures that are outlined in its Mitigation Plan (Appendix B). Potential impacts and proposed and recommended mitigation measures related to rangeland for the Cushing Extension are the same as those for the Mainline Project (see Section 3.9.3.3).

3.9.4.4 Forestland

Construction and operation of the Cushing Extension facilities would affect about 138 acres of forestland along approximately 9 miles of the Cushing Extension route. This represents about 3 percent of the total acres that would be affected by the Cushing Extension. The majority of affected forestland is located in Kansas (94 acres). Section 3.5 includes a detailed discussion of forest vegetative types. None of the forested land along the Cushing Extension route is used for timber or Christmas tree production (TransCanada 2007c).

Potential Impacts and Mitigation

Construction activities would remove trees and brush from forested areas. For the life of pipeline operation, the ROW would be maintained in an open condition, and woody revegetation would be periodically removed. This would result in a permanent loss of tree growth in the permanent ROW. In addition, Keystone anticipates that 0.2 acres of forestland may be part of the 13 acres reserved for permanent aboveground facilities. This acreage would be converted permanently from forestland to industrial land uses.

To reduce impacts on forestlands, Keystone has proposed a number of construction guidelines and mitigation measures that are outlined in its Mitigation Plan. Construction and operation impacts and mitigation measures related to forestland are the same for the Cushing Extension as discussed for the Mainline Project (see Section 3.9.3.4).

3.9.4.5 Residences and Planned Development

The Cushing Extension would cross and affect residential land. Based on 2006 aerial photography, Keystone identified 211 potential residential structures within 500 feet of the proposed Cushing Extension ROW. Keystone is currently conducting field surveys that will determine the location of residential structures and other buildings within 50 feet of the proposed ROW. These surveys are scheduled for completion in June 2007 with survey results scheduled to be filed with DOS in July 2007.

Keystone is not aware of any residential or commercial developments planned within 0.25 mile of the Cushing Extension ROW. This assertion will be verified by the ground surveys concluding in June 2007. The majority of potential residential structures are in Kansas (124) and Oklahoma (86), with only one structure near the ROW in Nebraska. Once Keystone has concluded field surveys, it will provide site-specific construction plans for each of the residential structures within 25 feet of the construction workspace.

Potential Impacts and Mitigation

The principal measure proposed by Keystone to mitigate impacts in existing residential areas is to ensure that construction proceeds quickly through such areas and that the hours during which activities with high-decibel noise levels would be conducted are limited. Landowners would be notified at least 24 hours prior to construction. As specified in the Mitigation Plan, Keystone has proposed mitigation measures for potential impacts on all residential land. These measures, along with potential impacts and recommended mitigation, are the same as those discussed in Section 3.9.3.5 for the Mainline Project.

3.9.4.6 Commercial and Industrial Land

Construction and operation of the Cushing Extension facilities would affect about 501 acres of developed land (Table 3.9.4-6). Most of the developed acreage on the Cushing Extension route is located in Kansas

(339 acres), with 147 acres in Oklahoma, and 15 acres in Nebraska. For the Cushing Extension route as a whole, developed land represents approximately 11 percent of total acres affected by the Cushing Extension.

Potential Impacts and Mitigation

Construction of the Cushing Extension could affect commercial and industrial land through restricted access and the presence of construction activity. Impacts to a specific commercial or industrial area are anticipated to last for only several days. Keystone has adopted mitigation measures for commercial and industrial land in its Mitigation Plan. Construction and operation impacts and mitigation related to commercial and industrial land is the same for the Cushing Extension as described for the Mainline Project (see Section 3.9.3.6).

TABLE 3.9.4-6
Developed Land Categories by State for the Keystone Cushing Extension (acres)

State	Residential	Commercial/Industrial	Pre-Existing ROW	Total Developed
Nebraska	0	15	>1	15
Kansas	5	295	39	339
Oklahoma	6	116	25	147
Cushing Extension total	**11**	**426**	**64**	**501**

Source: TransCanada 2007c.

3.9.4.7 Recreation and Special Interest Areas

The proposed Cushing Extension facilities would cross only one special interest area, resulting in temporary construction impacts and possible permanent impacts. Table 3.9.4-7 details the recreational and special interests lands intersected by the Cushing Extension route; no other national, state, or local parks or forests are located within 500 feet of the proposed Cushing Extension centerline.

The proposed Cushing Extension would cross the Milford Wildlife Area in Kansas at four points (MPs 50, 50.2, 52.8, and 53.7), affecting a total of approximately 3 miles along the route (representing 52 affected acres). The Cushing Extension would not intersect any recreational or special interest areas in Nebraska or Oklahoma.

Milford Wildlife Area, Kansas

The Milford Wildlife Area consists of approximately 19,000 acres of public land surrounding the western and northern sides of Milford Reservoir. The Kansas Forestry, Fishing & Game Commission manages the wildlife area, which is owned by COE along with the adjacent Milford Reservoir. The area includes a public hunting area, a wildlife area, and a number of recently created wetlands along the Republican River between the reservoir and Clay Center, Kansas (KDWP 2007).

TABLE 3.9.4-7
Special Interest Areas Crossed by the Keystone Cushing Extension

Site Name	Milepost	Miles Crossed	Ownership
Nebraska			
None identified	NA	NA	NA
Kansas			
Milford Wildlife Area	50–51.8	1.8	U.S. Army Corps of Engineers (COE)
Milford Wildlife Area	52.2–52.7	0.5	COE
Milford Wildlife Area	52.8–53.3	0.5	COE
Milford Wildlife Area	53.7–54.3	0.6	COE
Oklahoma			
None identified	NA	NA	NA
Cushing Extension total		**3.4**	

NA = Not applicable.

Source: ENSR 2006a.

Wilderness Areas

The Cushing Extension would not cross any designated Wilderness Areas or Wilderness Study Areas.

Potential Impacts and Mitigation

Construction activities would cause temporary impacts to recreational traffic and use patterns during construction. Sightseers, hikers, wildlife viewers, hunters, and other recreationists would be displaced from the immediate area during construction. Public hunting access to this area could be impeded during construction. Although impacts of pipeline construction would be of limited duration, construction during the fall hunting and migration season, in particular, could create conflicts with hunters and wildlife viewers. Keystone would continue to coordinate with agency managers to minimize conflicts between construction activities and recreational uses for which these special areas were established. Following construction, all affected recreational and special interest would return to their previous uses.

Operation of the pipeline would not affect hunting in the Milford Wildlife Area. Milford is primarily a wetland restoration area. Given proposed wetland mitigation measures, construction impacts are expected to be long term but minor. These temporary impacts would be associated with vegetation removal, grading, grubbing, trenching, and soil stockpiling; they would be minimized by following the measures described in Keystone's Mitigation Plan (TransCanada 2007c). The ROW may be visible for up to 5 years as wetland and grassland vegetation reestablishes, resulting in a long term, minor impact. Other temporary and minor construction impacts may occur, including decreased access and closure of trails, parking, and wildlife viewing areas. Keystone would restore all of these areas following construction.

Maintenance of vegetation would not be conducted over the full width of the permanent ROW in wetland areas. Therefore, no permanent impacts are anticipated from crossing wetlands of the Milford Wildlife Area (TransCanada 2007c).

For the Milford Wildlife Area, the primary concerns would be limited access and conflicts with hunters during construction. Therefore, **the following measures are recommended:**

- **Keystone should develop a site-specific crossing plan for the Milford Wildlife Area.**
- **Keystone should work with Milford Wildlife Area managers to schedule construction activities in order to avoid seasonal hunting conflicts with the public hunting area.**

As described in Section 3.3.7 for the Carlyle Lake WMA and Riverlands Environmental Demonstration Area, Milford Wildlife Area may be a funding recipient of the LWCF and could be subject to the requirements of Section 6.f.3 of the LWCF Act. Construction and operation of Keystone facilities would not change the recreational use of Milford Wildlife Area, although temporary and minor recreational impacts would be expected.

Other general impacts related to recreation and special interest areas and associated recommended mitigation measures are the same for the Cushing Extension as discussed for the Mainline Project (see Section 3.9.3.7).

3.9.4.8 Visual Resources

General visual impacts associated with the construction ROW, additional temporary workspaces, and operation of the Cushing Extension pipeline include clearing and removal of existing vegetation; exposure of bare soils; earthwork and grading scars associated with heavy equipment tracks; trenching; rock formation alteration or removal; machinery and pipe storage; landform changes that introduce contrasts in visual scale, spatial characteristics, form, line, color, or texture; and new aboveground structures.

Potential Impacts and Mitigation

Impacts on visual resources and associated recommended mitigation measures are the same for the Cushing Extension as described for the Mainline Project (see Section 3.9.3.8).

3.9.4.9 Connected Action

In modifying or constructing transmission line substations to support the Keystone Project, Western would implement the following mitigation measures for Land Use, Recreation and Special Interest Areas, and Visual Resources:

- Removal of vegetation would be minimized to avoid creating a swath along the ROW.

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3.10 SOCIOECONOMICS

This section describes existing socioeconomic conditions that could be affected by the proposed Keystone Project and evaluates the potential socioeconomic impacts that may result from project implementation. The key resource topics addressed in this section include population; housing, including property values; local economic activity, as measured primarily by employment and income parameters; tax revenues; public services; transportation; and environmental justice.

Several key socioeconomic issues have been identified for the proposed Keystone Project. These include: (1) compensation to property owners for conveyance of temporary and permanent ROW easements, in addition to restrictions on land use and damage to property; (2) indirect economic effects from displacing agricultural land uses and related effects on federal farmland protection program payments; (3) construction worker demands on local infrastructure; (4) economic benefits from the purchase of goods and services during construction and operations; and (5) fiscal impacts associated with property, sales and other tax revenues, as well as public service costs generated by the proposed Keystone Project.

3.10.1 Environmental Setting

This section provides a general overview of the socioeconomic resources that could be affected by the Keystone Project and represents existing (or current) socioeconomic conditions in the project area. Further, it provides context to the analysis of socioeconomic impacts and establishes baseline conditions against which the potential socioeconomic impacts of the proposed Keystone Project were evaluated. The data used to establish baseline socioeconomic conditions are based on a variety of federal, state, and local sources. Both text and tables in this section are organized by Keystone Project segment, namely the Mainline Project and the Cushing Extension.

3.10.1.1 Region of Influence

The proposed Keystone Project, including the Cushing Extension, would consist of an approximately 1,370-mile interstate crude oil pipeline and associated ancillary facilities, as described in Section 2.0. From its point of origin in the United States, the Mainline Project route would cross 48 counties in six states (North Dakota, South Dakota, Nebraska, Kansas, Missouri, Illinois, and Oklahoma); the Cushing Extension would span an additional nine counties in Nebraska, Kansas, and Oklahoma. Within each county, several local communities are expected to incur most of the direct socioeconomic impacts of the Keystone Project, both positive and negative. For the purposes of this analysis, these are communities located within 2 miles of new pipeline facilities or surface disturbance activities associated with pipeline refurbishment. Potentially affected states, counties, and communities are listed in Table 3.10.1-1, with the communities and counties representing the "region of influence" for this socioeconomic analysis. Table 3.10.1-1 organizes communities based on their general proximity to the pipeline and also reports community-level population figures, which are intended to supplement the population data presented in Section 3.10.1.2.

TABLE 3.10.1-1
Affected Counties and Communities along the Keystone Project Route

State/County	Community (2000 Population)	
	Within 0.5 Mile	Within 2.0 Miles
MAINLINE PROJECT		
North Dakota		
Cavalier	–	–
Pembina	–	Walhalla (1,057)
Walsh	Lankin (131)	–
Nelson	–	–
Steele	–	Sharon (109); Luverne (44)
Barnes	–	Sibley (46)
Ransom	–	Fort Ransom (70)
Sargent	–	–
Dickey	–	–
Grand Forks [a]	–	Niagara (57)
South Dakota		
Brown	–	–
Marshall	–	–
Day	–	–
Clark	Raymond (86)	–
Beadle	–	–
Kingsbury	Iroquois (278)	–
Miner	Roswell (21)	Carthage (187)
Hansen	–	Emery (439)
McCook	–	Spencer (157)
Hutchinson	–	–
Yankton	Yankton (13,528)	–
Nebraska		
Cedar	–	Randolph (955); Fordyce (182)
Wayne	Sholes (24)	Hoskins (283)
Stanton	–	Stanton (1,627)
Platte	–	–
Colfax	Leigh (442); Richland (89)	–
Butler	Garrison (67)	Bellwood (446)
Seward	–	Seward (6,319); Staplehurst (270)
Saline	–	Dorchester (615); Swanton (106)
Jefferson	–	Plymouth (477); Steele City (84); Harbine (56)
Gage	–	–
Kansas		
Marshall	–	Oketo (87)
Nehama	–	Seneca (2,122); Oneida (70)

TABLE 3.10.1-1
(Continued)

State/County	Community (2000 Population)	
	Within 0.5 Mile	Within 2 Miles
MAINLINE PROJECT (CONTINUED)		
Kansas (continued)		
Brown	--	Fairview (271)
Doniphan	--	Denton (186); Severance (108)
Missouri		
Buchanan	Agency (599)	St. Joseph (73,990); Gower (1,399)
Clinton	--	Turney (155)
Caldwell	Cowgill (247)	Polo (582)
Carroll	--	Bosworth (382); Tina (193)
Chariton	Salisbury (1,726); Keytesville (533)	Triplett (64)
Randolph	Renick (221)	Moberly (11,945)
Audrain	--	Mexico (11,320)
Montgomery	--	--
Lincoln	Troy (6,737); Moscow Mills (1,742); Chain of Rocks (91)	Old Monroe (250); Fountain N' Lakes (129); Truxton (96); Cave (7)
St. Charles	West Alton (573)	St. Charles (60,321); St. Peters (51,381); St. Paul (1,634); Portage Des Sioux (351)
Illinois		
Madison	Edwardsville (21,491); Highland (8,438); South Roxana (1,888); Roxana (1,547) Hartford (1,545); Grantfork (254)	Granite City (31,301); Alton (30,496); Godfrey (16,286); Wood River (11,296); East Alton (6,830)
Bond	Pocahontas (727)	--
Fayette	--	--
Marion	Vernon (178)	Patoka (633)
CUSHING EXTENSION		
Nebraska		
Jefferson [b]	--	Steele City (84)
Kansas		
Washington	Greenleaf (357); Hollenberg (31)	Washington (1,223)
Clay	--	Wakefield (838); Green (147)
Dickinson	Chapman (1,241)	Hope (372)
Marion	--	Marion (2,110); Ramona (94)
Butler	Townda (1,338); Potwin (457)	Augusta (8,423); Douglass (1,813)
Cowley	--	Winfield (12,206); Arkansas City (11,963)

TABLE 3.10.1-1 (Continued)		
State/County	Community (2000 Population)	
	Within 0.5 Mile	Within 2 Miles
CUSHING EXTENSION (CONTINUED)		
Oklahoma		
Kay	Ponca City (25,919)	Newkirk (2,243)
Noble	–	Morrison (636); Marland (280)
Payne	Cushing (8,371)	–

Notes:

Affected communities include those where new pipeline facilities or surface disturbance activities associated with pipeline refurbishment are proposed.

States and counties are listed geographically from north to south as the proposed Keystone Project crosses the area.

[a] The proposed pipeline does not travel through Grand Forks County, although the community of Niagara is located within 2 miles of the pipeline route.

[b] Also addressed in the Mainline Project route.

Sources: U.S. Bureau of the Census 2000, ENSR 2006a.

Several types of socioeconomic effects could occur within the region of influence, as described in more detail in the impact analysis presented in Section 3.10.2. Temporary effects during construction of the proposed Keystone Project could include changes in population levels or local demographics, changes in the demand for housing and public services, disruption of local transportation corridors, increased employment opportunities and related labor income benefits, and increased government revenues associated with sales and payroll taxes. Isolated impacts on individual property owners and economic land use also could occur along the pipeline route. The primary socioeconomic impacts associated with long-term operation of the proposed Keystone Project likely would include employment and income benefits resulting from long-term staffing requirements and local operating expenditures, as well as an increased property tax base and associated tax revenues.

3.10.1.2 Population

Population-related characteristics in the region of socioeconomic influence are summarized in Table 3.10.1-2. (Population data at the community level is presented in Table 3.10.1-1.) The pipeline route is predominantly rural and sparsely populated, with the population tending to increase from north to south along the route. For the Mainline Project, the total population in the counties comprising the region of influence was nearly 1.3 million in 2005. The comparable figure for the Cushing Extension was approximately 279,200 people. In total, the population in 2005 across all counties was over 1.5 million; however, the average population density was only 34.3 people per square mile, demonstrating the rural nature of the pipeline route.

The least populated areas along the route are in North Dakota, including Steele County with a population of just over 2,000 and population density of 2.81 people per square mile. Relatively urban areas of the route include Buchanan County, Missouri, which contains the St. Joseph metropolitan area; Lincoln and St. Charles counties in Missouri and Madison County in Illinois, which correspond to the St. Louis metropolitan area; and Payne County, Oklahoma, which includes the Stillwater metropolitan area. The most populated county in the Keystone Project area is St. Charles County, Missouri, with nearly 330,000 people and a population density of 557 people per square mile. Similar population patterns are evident at the community level. Many of the potentially-affected communities along the northern portions of the route have populations less than 100, while the largest community of St. Joseph, Missouri has a population of almost 74,000.

The population in the region of influence has increased at a compound rate of 0.7 percent per year since 1990, rising from 1.37 million then to 1.57 million in 2005. As expected, this increase has been mainly in urban areas. Between 2000 and 2005, the highest growth rate occurred in Lincoln County, Missouri, 18.4 percent. Conversely, many rural counties, particularly those in North Dakota, South Dakota, and Kansas, have actually experienced population declines. In fact, three counties have experienced double-digit population declines since 2000—Pembina and Steele Counties in North Dakota and Miner County, South Dakota.

TABLE 3.10.1-2
Population Characteristics in Affected Counties along the Keystone Project Route

State/County	Population			Population Change (%)			Population Density (Population per Square Mile)
	1990 (April 1)	2000 (April 1)	2005 (July 1 Estimates)	1990–2005	1990–2000	2000–2005	
MAINLINE PROJECT							
North Dakota	**638,800**	**642,200**	**636,677**	**-0.16**	**0.70**	**-0.87**	**9.23**
Cavalier	6,064	4,831	4,330	-40.05	-25.52	-11.57	2.87
Pembina	9,238	8,585	8,038	-14.93	-7.61	-6.81	7.17
Walsh	13,840	12,389	11,607	-19.24	-11.71	-6.74	8.97
Nelson	4,410	3,715	3,424	-28.80	-18.71	-8.50	3.39
Steele	2,420	2,258	2,007	-20.58	-7.17	-12.51	2.81
Barnes	12,545	11,775	11,075	-13.27	-6.54	-6.32	7.32
Ransom	5,921	5,890	5,810	-1.91	-0.53	-1.38	6.72
Sargent	4,549	4,366	4,150	-9.61	-4.19	-5.20	4.79
Dickey	6,107	5,757	5,487	-11.30	-6.08	-4.92	4.81
South Dakota	**697,101**	**754,844**	**775,933**	**10.16**	**7.65**	**2.72**	**10.23**
Brown	35,580	35,460	34,706	-2.52	-0.34	-2.17	20.05
Marshall	4,844	4,576	4,418	-9.64	-5.86	-3.58	4.99
Day	6,978	6,267	5,757	-21.21	-11.35	-8.86	5.28
Clark	4,403	4,143	3,799	-15.90	-6.28	-9.06	3.93
Beadle	18,253	17,023	15,896	-14.83	-7.23	-7.09	12.57
Kingsbury	5,925	5,815	5,532	-7.10	-1.89	-5.12	6.41
Miner	3,272	2,884	2,584	-26.63	-13.45	-11.61	4.52
Hanson	2,994	3,139	3,747	20.10	4.62	16.23	8.60
McCook	5,688	5,832	5,930	4.08	2.47	1.65	10.27
Hutchinson	8,262	8,075	7,581	-8.98	-2.32	-6.52	9.31
Yankton	19,252	21,652	21,718	11.35	11.08	0.30	40.78
Nebraska	**1,581,660**	**1,711,263**	**1,758,787**	**10.07**	**7.57**	**2.70**	**22.88**
Cedar	10,131	9,615	9,066	-11.75	-5.37	-6.06	12.16
Wayne	9,364	9,851	9,211	-1.66	4.94	-6.95	20.77
Stanton	6,244	6,455	6,534	4.44	3.27	1.21	15.16
Platte	29,820	31,662	31,262	4.61	5.82	-1.28	45.37
Colfax	9,139	10,441	10,433	12.40	12.47	-0.08	24.92

TABLE 3.10.1-2
(Continued)

State/County	Population			Population Change (%)			Population Density (Population per Square Mile)
	1990 (April 1)	2000 (April 1)	2005 (July 1 Estimates)	1990–2005	1990–2000	2000–2005	
MAINLINE PROJECT (CONTINUED)							
Nebraska (continued)							
Butler	8,601	8,767	8,720	1.36	1.89	-0.54	14.92
Seward	15,450	16,496	16,739	7.70	6.34	1.45	29.07
Saline	12,715	13,843	14,195	10.43	8.15	2.48	24.64
Jefferson	8,759	8,333	7,925	-10.52	-5.11	-5.15	13.77
Gage	22,794	22,993	23,306	2.20	0.87	1.34	27.10
Kansas	**2,481,349**	**2,688,418**	**2,744,687**	**9.59**	**7.70**	**2.05**	**33.55**
Marshall	11,705	10,965	10,405	-12.49	-6.75	-5.38	11.51
Nemaha	10,446	10,717	10,443	-0.03	2.53	-2.62	14.52
Brown	11,128	10,724	10,239	-8.68	-3.77	-4.74	17.89
Doniphan	8,134	8,249	7,816	-4.07	1.39	-5.54	19.68
Missouri	**5,128,880**	**5,595,211**	**5,800,310**	**11.58**	**8.33**	**3.54**	**84.20**
Buchanan	83,083	85,998	84,904	2.14	3.39	-1.29	204.80
Clinton	16,595	18,979	20,715	19.89	12.56	8.38	48.92
Caldwell	8,380	8,969	9,307	9.98	6.57	3.63	21.66
Carroll	10,748	10,285	10,193	-5.44	-4.50	-0.90	14.51
Chariton	9,202	8,438	8,124	-13.27	-9.05	-3.87	10.57
Randolph	24,370	24,663	25,336	3.81	1.19	2.66	51.96
Audrain	23,599	25,853	25,759	8.39	8.72	-0.36	36.97
Montgomery	11,355	12,136	12,166	6.67	6.44	0.25	22.52
Lincoln	28,892	38,944	47,727	39.46	25.81	18.40	74.53
St. Charles	212,907	283,883	329,940	35.47	25.00	13.96	557.00
Illinois	**11,453,316**	**12,419,293**	**12,763,371**	**10.26**	**7.78**	**2.70**	**229.62**
Madison	249,238	258,941	264,309	5.70	3.75	2.03	357.01
Bond	14,991	17,633	18,027	16.84	14.98	2.19	47.11
Fayette	20,893	21,802	21,713	3.78	4.17	-0.41	29.93
Marion	41,561	41,691	40,144	-3.53	0.31	-3.85	69.73

TABLE 3.10.1-2
(Continued)

State/County	Population			Population Change (%)			Population Density (Population per Square Mile)
	1990 (April 1)	2000 (April 1)	2005 (July 1 Estimates)	1990–2005	1990–2000	2000–2005	
CUSHING EXTENSION							
Nebraska [a]	**1,581,660**	**1,711,263**	**1,758,787**	**10.07**	**7.57**	**2.70**	**22.88**
Jefferson	8,759	8,333	7,925	-10.52	-5.11	-5.15	13.77
Kansas	**2,481,349**	**2,688,418**	**2,744,687**	**9.59**	**7.70**	**2.05**	**33.55**
Washington	7,073	6,483	6,009	-17.71	-9.10	-7.89	6.69
Clay	9,158	8,822	8,629	-6.13	-3.81	-2.24	13.17
Dickinson	18,958	19,344	19,209	1.31	2.00	-0.70	22.54
Marion	12,888	13,361	12,952	0.49	3.54	-3.16	13.58
Butler	50,580	59,482	62,354	18.88	14.97	4.61	43.11
Cowley	36,915	36,291	35,298	-4.58	-1.72	-2.81	31.17
Oklahoma	**3,148,825**	**3,450,654**	**3,547,884**	**11.25**	**8.75**	**2.74**	**51.67**
Kay	48,056	48,080	46,480	-3.39	0.05	-3.44	49.18
Noble	11,045	11,411	11,211	1.48	3.21	-1.78	15.10
Payne	61,507	68,190	69,151	11.05	9.80	1.39	99.19
Mainline Project subtotal	**1,110,789**	**1,211,758**	**1,262,264**	**12.00**	**8.33**	**4.00**	**34.69**
Cushing Extension subtotal	**264,939**	**279,797**	**279,218**	**5.11**	**5.31**	**-0.21**	**31.38**
Keystone Project total	**1,366,969**	**1,483,222**	**1,533,547**	**10.86**	**7.84**	**3.28**	**34.30**

Notes:

Affected counties include those where new pipeline facilities or surface disturbance activities associated with pipeline refurbishment are proposed.

States and counties are listed geographically from north to south as the proposed Keystone Project crosses the area.

[a] Also addressed in the Mainline Project route.

Source: U.S. Bureau of the Census 2006.

3.10.1.3 Housing

Available housing to serve the Keystone Project is a function of the housing stock (mainly rental and short-term accommodations), recent economic and population growth, and demand for housing from other sources. An overview of the existing housing stock in the region of influence is presented in Table 3.10.1-3. The total number of housing units in the counties crossed by the Keystone Project was estimated at over 655,000 in 2004, with about 535,000 units and 124,000 units in those counties affected by the Mainline Project and the Cushing Extension, respectively. The greatest number of units is found in urban counties in Missouri and Illinois. Most of the existing housing stock is occupied single-family residences that would not be available for use by Keystone Project workers.

More pertinent to the analysis is the number of rental units and short-term accommodations, such as motel and hotel rooms and recreational vehicle (RV) parks, and related vacancy rates. The total number of rental units located across all affected counties was about 158,500 in 2000. Rental vacancy rates and available rental housing vary considerably across states and counties. The highest vacancy rates for rental units are in North Dakota, ranging from 7.9 to 17.8 percent in the affected counties, compared with a weighted average of nearly 13 percent across the state. The lowest vacancy rates are in Nebraska, with an average vacancy rate of just below 8 percent across affected counties. Based on these data, approximately 14,400 vacant rental units are available in the region of influence. At the county level, the number of available units is smallest in North Dakota and South Dakota counties and largest in counties throughout Missouri and Illinois. Across the entire region of influence, 23 of the 58 counties had less than 100 vacant rental units, and seven counties had less than 50 units vacant.

Alternatives to rental housing are temporary short-term accommodations in hotels/motels, RV and mobile home parks, and campgrounds. In some cases, recreational cabins and seasonal housing for migratory workers also may be available. Short-term accommodations are more flexible and likely would be the preferred form of housing for construction workers. It is estimated that approximately 445 hotels and 285 campgrounds (including RV parks) are located within a 50-mile corridor of the pipeline route (TransCanada 2007b). Based on the average number of accommodations (i.e., rooms or RV/campground spaces) by facility type, there are approximately 41,200 hotel/motel rooms and 35,600 RV and campground spaces throughout the region of influence. The total number of hotels/motels and campgrounds by county is presented in Table 3.10.1-4. The availability of short-term accommodations varies throughout the year and depends on a number of factors, including seasonal fluctuations and timing of local events. Based on national average hotel and RV campground occupancy rates, roughly 34,100 vacant rooms and/or RV and campground spaces are available in the region of influence at any one time.

3.10.1.4 Economic Base

The economic base of an area reflects its major industries. Along the pipeline route, the predominant land use is agriculture, particularly in the northern reaches of the alignment; thus, agricultural production and agricultural support industries represent a major component of the economic base in the region of influence. In addition, local government is typically a substantial economic driver in many rural areas, generating jobs and income for local residents. In more urban areas, such as those larger communities and counties in the region of influence, service, manufacturing, and trade industries tend to generate the most economic activity.

TABLE 3.10.1-3
Housing Stock in Affected Counties along the Keystone Project Route

State/County	Total Housing Units (July 2004 Estimated)	Building Permits (2005)	Total Rental Units (2000)	Rental Vacancy Rate (2000)	Estimated Vacant Rental Units (2000)
MAINLINE PROJECT					
North Dakota	**300,815**	**4,038**	--	--	--
Cavalier	2,748	2	454	17.8	81
Pembina	4,100	1	902	15.3	138
Walsh	5,747	6	1,331	12.5	166
Nelson	2,028	2	373	13.7	51
Steele	1,240	11	228	7.9	18
Barnes	5,657	50	1,574	10.5	165
Ransom	2,740	5	641	9.5	61
Sargent	2,049	26	415	13.0	54
Dickey	2,677	1	779	16.4	128
North Dakota subtotal	*28,986*	*104*	*6,697*	*12.9* [a]	*862*
South Dakota	**342,620**	**5,685**	--	--	--
Brown	16,239	130	5,423	9.0	488
Marshall	2,626	26	482	15.1	73
Day	3,689	30	725	14.5	105
Clark	1,888	15	356	11.5	41
Beadle	8,279	57	2,731	15.1	412
Kingsbury	2,796	19	651	10.0	65
Miner	1,425	9	308	8.1	25
Hanson	1,249	6	243	4.1	10
McCook	2,507	30	512	9.4	48
Hutchinson	3,562	11	724	6.5	47
Yankton	9,147	135	2,798	9.7	271
South Dakota subtotal	*53,407*	*468*	*14,953*	*10.6* [a]	*1,586*
Nebraska	**757,743**	**9,929**	--	--	--
Cedar	4,288	19	811	13.4	109
Wayne	3,724	12	1,278	5.5	70
Stanton	2,491	22	483	5.0	24
Platte	13,167	69	3,538	8.8	311
Colfax	4,126	19	999	8.6	86
Butler	4,122	13	917	9.7	89
Seward	6,685	81	1,793	6.2	111
Saline	5,709	47	1,598	4.8	77

TABLE 3.10.1-3
(Continued)

State/County	Total Housing Units (July 2004 Estimated)	Building Permits (2005)	Total Rental Units (2000)	Rental Vacancy Rate (2000)	Estimated Vacant Rental Units (2000)
MAINLINE PROJECT (CONTINUED)					
Nebraska (continued)					
Jefferson	3,975	20	932	9.4	88
Gage	10,441	47	2,941	8.7	256
Nebraska subtotal	*58,728*	*349*	*15,290*	*8.0* [a]	*1,221*
Kansas	**1,185,114**	**14,048**	--	--	--
Marshall	5,074	9	1,047	12.7	133
Nemaha	4,445	25	821	7.6	62
Brown	4,914	6	1,342	8.0	107
Doniphan	3,540	15	886	8.8	78
Kansas subtotal	*17,973*	*55*	*4,096*	*9.3* [a]	*381*
Missouri	**2,564,340**	**33,114**	--	--	--
Buchanan	37,292	204	11,745	7.4	869
Clinton	8,550	206	1,627	7.4	120
Caldwell	4,607	206	853	6.3	54
Carroll	4,984	36	1,215	10.8	131
Chariton	4,384	0	817	17.7	145
Randolph	10,997	34	3,141	18.3	575
Audrain	11,087	34	2,849	10.5	299
Montgomery	6,021	65	1,147	10.5	120
Lincoln	16,704	65	3,010	11.2	337
St. Charles	122,829	4,112	19,489	6.1	1,189
Missouri subtotal	*227,455*	*4,962*	*45,893*	*8.4* [a]	*3,839*
Illinois	**5,094,186**	**66,942**	--	--	--
Madison	113,914	1,519	29,223	8.6	2,513
Bond	6,973	112	1,342	7.1	95
Fayette	9,274	13	1,805	8.7	157
Marion	18,405	45	4,195	7.4	310
Illinois subtotal	***148,566***	***1,689***	***36,566***	***8.4*** [a]	***3,076***
CUSHING EXTENSION					
Nebraska [b]	**757,743**	**9,929**	--	--	--
Jefferson	3,975	20	932	9.4	88
Nebraska subtotal	*3,975*	*20*	*932*	*9.4* [a]	*88*

TABLE 3.10.1-3
(Continued)

State/County	Total Housing Units (July 2004 Estimated)	Building Permits (2005)	Total Rental Units (2000)	Rental Vacancy Rate (2000)	Estimated Vacant Rental Units (2000)
CUSHING EXTENSION (CONTINUED)					
Kansas	**1,185,114**	**14,048**	--	--	--
Washington	3,204	0	631	13.0	82
Clay	4,150	14,048	973	13.6	132
Dickinson	8,841	58	2,214	9.9	219
Marion	6,049	50	1,153	10.9	126
Butler	24,844	50	5,327	9.8	522
Cowley	16,081	79	4,689	12.6	591
Kansas subtotal	*63,169*	*14,285*	*14,987*	*11.2* [a]	*1,672*
Oklahoma	**1,572,756**	**18,362**	--	--	--
Kay	21,955	12	6,117	11.4	697
Noble	5,157	8	1,268	12.2	155
Payne	30,283	338	12,680	7.3	926
Oklahoma subtotal	*57,395*	*358*	*20,065*	*8.93* [a]	*1,778*
Mainline Project total	**535,115**	**7,627**	**123,496**	**8.9** [a]	**10,965**
Cushing Extension total	**124,539**	**14,663**	**35,984**	**9.8** [a]	**3,537**
Keystone Project total	**655,679**	**22,270**	**158,648**	**9.1** [a]	**14,415**

Notes:

Affected counties include those where new pipeline facilities or surface disturbance activities associated with pipeline refurbishment are proposed.

States and counties are listed geographically from north to south as the proposed Keystone Project crosses the area.

[a] Average.

[b] Also addressed in the Mainline Project route.

Sources: U.S. Bureau of the Census 2000, 2006.

TABLE 3.10.1-4
Number of Hotels/Motels and Campgrounds by County along the Keystone Project Route

County	Hotels/Motels	Campgrounds
MAINLINE PROJECT		
North Dakota		
Pembina	4	4
Cavalier	4	1
Walsh	5	4
Nelson	3	1
Grand Forks	1	3
Traill	1	1
Ramsey	0	2
Griggs	4	1
Barnes	6	5
Cass	0	2
Ransom	5	3
Lemoure	1	1
Sargent	2	2
Dickey	4	3
South Dakota		
Marshall	4	2
Brown	7	1
Day	5	0
Clark	2	1
Spink	2	0
Hamlin	1	0
Kingsbury	5	2
Beadle	8	1
Sanborn	1	0
Miner	1	0
Davison	11	7
McCook	7	2
Hutchinson	3	0
Clay	1	0
Bon Homme	1	0
Yankton	8	9
Clay	3	0
Nebraska		
Knox	3	1
Cedar	4	1
Pierce	2	2
Wayne	3	1
Madison	16	1
Cuming	2	0
Colfax	2	0
Platte	13	2
Butler	2	0
Polk	1	0
Seward	4	1
York	0	2
Lancaster	9	7

TABLE 3.10.1-4
(Continued)

County	Hotels/Motels	Campgrounds
MAINLINE PROJECT (continued)		
Nebraska (continued)		
Saline	6	0
Gage	8	2
Jefferson	2	0
Pawnee	1	2
Richardson	2	1
Kansas		
Marshall	6	0
Nemaha	3	1
Brown	7	5
Jackson	3	0
Atchison	5	1
Doniphan	1	1
Missouri		
Atchison	1	2
Holt	0	2
Buchanan	7	1
Andrew	0	2
Platte	4	1
Clay	3	3
Clinton	2	3
Dekalb	5	1
Ray	1	2
Livingston	2	1
Carroll	6	0
Saline	3	1
Linn	6	1
Howard	2	0
Chariton	1	0
Macon	0	1
Randolf	4	2
Boone	14	2
Callaway	5	1
Monroe	0	2
Audrain	7	0
Ralls	2	2
Montgomery	7	4
Gasconade	1	0
Pike	3	1
Warren	4	2
Lincoln	4	2
St. Charles	16	5
St. Louis	10	2

TABLE 3.10.1-4
(Continued)

County	Hotels/Motels	Campgrounds
MAINLINE PROJECT (continued)		
Illinois		
Calhoun	1	0
Jersey	5	0
Madison	31	13
Macoupin	1	2
Bond	9	2
Clinton	3	10
Fayette	4	3
Marian	5	1
CUSHING EXTENSION		
Kansas		
Washington	2	2
Clay	4	1
Riley	1	3
Geary	11	4
Dickinson	9	3
Marion	5	0
Harvey	6	2
Butler	12	3
Sedgwick	16	4
Sumner	4	4
Cowley	12	5
Oklahoma		
Kay	16	10
Osage	1	0
Noble	6	2
Pawnee	2	0
Payne	13	5
Logan	1	0
Creek	1	2
Lincoln	6	3

Source: TransCanada 2007c.

Employment and income patterns also provide insight into local economic conditions, including the strength of the local economy and well being of its residents. Summary statistics covering these economic parameters are shown in Table 3.10.1-5. Average income levels vary throughout the region. In 2004, per-capita income ranged from approximately $22,900 in Steele County, North Dakota to $36,200 in Sargent County, North Dakota; this variation within the same state shows the diversity in socioeconomic conditions along the pipeline route. At the household level, median income levels varied from $30,600 in Miner County, South Dakota to nearly $63,200 in St. Charles County, Missouri.

The civilian labor force within the region of influence totals about 815,600 individuals, and unemployment in the region ranged from about 2 to 7 percent in 2005. The lowest unemployment rates, about 2.7 percent, were in Sargent and Dickey Counties in North Dakota and Cedar County, Nebraska. Conversely, the highest unemployment rates, about 6.5 percent, were in Fayette and Marion Counties in Illinois and Pembina County, North Dakota. Based on the size of the labor force and unemployment rates, it is estimated that about 38,100 unemployed people reside in the region of influence.

3.10.1.5 Tax Revenue

The proposed Keystone Project would generate varied tax revenues for local and state jurisdictions, as well as the federal government. The major incremental tax revenue at the state and local levels would be property taxes, which are based on the assessed value of Keystone Project facilities and applicable tax rates. Generally, states assess the value of pipelines in order to facilitate consistent valuation among counties crossed within the state. Table 3.10.1-6 reports the total government revenue, property tax mill levy values, and effective[1] property tax rates for all of the counties within the region of influence.

Effective property tax rates in the region of influence for the Mainline Project range from 0 percent in Illinois to between 3 and 4 percent in Kansas. The highest rate is in Marshall County, Kansas, at 4.08 percent. Property tax rates in North Dakota, South Dakota, Nebraska, and Missouri range between approximately 1.50 and 2.25 percent. On the Cushing Extension, property tax rates are relatively higher. Rates in Kansas vary between 3.85 and 4.70 percent, which are higher than most jurisdictions along the Mainline Project. In Oklahoma, the effective rate is 2.40 percent in all affected counties.

Other fiscal revenues that may be generated by the proposed Keystone Project include sales and use taxes, which are based on the value of goods and materials purchased for the Keystone Project and by construction workers, as well as income taxes levied on labor earnings. In addition, federal agencies assess fees for use of public lands for activities such as pipelines and transmission ROWs. Applicable sales and income tax rates vary across counties.

[1] The effective property tax rate is defined as the percentage of total assessed value that is levied as a property tax.

TABLE 3.10.1-5
Existing Income and Employment Conditions in Affected Counties and States along the Keystone Project Route

State/County	Per Capita Personal Income ($) (2004)	Median Household Income ($) (2003)	Labor Force (2005)	Unemployment Rate (%) (2005)
MAINLINE PROJECT				
North Dakota	**29,494**	**38,223**	**358,960**	**3.4**
Cavalier	30,334	36,869	2,179	3.8
Pembina	27,294	39,001	4,220	6.5
Walsh	26,792	35,833	5,977	4.9
Nelson	23,837	32,365	1,723	4.1
Steele	22,879	44,213	1,168	2.8
Barnes	27,683	36,372	6,134	3.5
Ransom	28,455	42,103	3,139	3.1
Sargent	36,217	42,570	2,477	2.7
Dickey	29,592	33,951	2,994	2.7
South Dakota	**30,209**	**38,008**	**432,032**	**3.9**
Brown	34,640	39,863	20,964	3.4
Marshall	28,515	32,393	2,130	4.8
Day	27,958	31,998	3,043	6.1
Clark	28,721	30,968	1,881	5.1
Beadle	30,995	33,631	8,892	4.5
Kingsbury	30,924	34,312	3,109	3.9
Miner	25,608	30,627	1,221	5.0
Hanson	26,047	39,381	2,024	3.1
McCook	29,783	37,902	3,016	3.5
Hutchinson	30,216	33,329	4,489	4.0
Yankton	27,765	37,021	11,953	3.6
Nebraska	**32,341**	**41,984**	**986,296**	**3.8**
Cedar	31,981	38,865	5,108	2.7
Wayne	27,366	35,091	5,616	3.0
Stanton	26,175	39,195	3,771	3.0
Platte	28,325	41,425	17,336	3.7
Colfax	27,697	37,186	5,993	2.8
Butler	27,371	38,113	4,758	3.6
Seward	30,464	45,149	9,428	3.1
Saline	27,695	39,633	8,426	3.2
Jefferson	28,959	34,640	4,423	3.8
Gage	30,561	36,770	13,112	4.3
Kansas	**31,078**	**43,113**	**1,475,791**	**5.1**
Marshall	31,522	34,648	6,009	3.7
Nemaha	28,432	35,677	5,457	3.6
Brown	27,097	33,478	5,619	4.9
Doniphan	22,501	33,729	4,546	6.2

TABLE 3.10.1-5
Continued

State/County	Per Capita Personal Income ($) (2004)	Median Household Income (2003)	Labor Force (2005)	Unemployment Rate (%) (2005)
MAINLINE PROJECT (CONTINUED)				
Missouri	**30,475**	**40,870**	**3,024,478**	**5.4**
Buchanan	27,368	35,344	46,008	5.9
Clinton	26,486	44,459	10,586	5.2
Caldwell	24,485	34,722	4,479	5.8
Carroll	24,124	32,352	4,964	5.5
Chariton	25,304	33,661	4,226	5.5
Randolph	23,462	32,154	12,707	5.3
Audrain	23,694	32,586	11,359	5.6
Montgomery	24,806	34,690	6,286	5.7
Lincoln	24,504	46,925	24,047	5.2
St. Charles	32,686	63,178	185,066	4.0
Illinois	**34,721**	**47,367**	**6,469,338**	**5.7**
Madison	29,979	43,747	137,300	5.4
Bond	25,990	38,358	8,605	5.8
Fayette	21,067	32,549	10,399	6.5
Marion	25,330	34,641	18,239	6.5
CUSHING EXTENSION				
Nebraska [a]	**32,341**	**41,984**	**986,296**	**3.8**
Jefferson	28,959	34,640	4,423	3.8
Kansas	**31,078**	**43,113**	**1,475,791**	**5.1**
Washington	24,309	30,564	3,504	3.7
Clay	29,018	35,015	4,911	4.1
Dickinson	25,724	37,097	10,595	4.5
Marion	23,095	35,106	6,843	4.1
Butler	29,503	48,096	31,832	5.6
Cowley	25,487	35,945	17,411	5.8
Oklahoma	**27,840**	**35,634**	**1,741,753**	**4.4**
Kay	26,865	33,032	21,877	5.5
Noble	23,371	23,227	5,637	3.8
Payne	23,399	30,898	36,339	3.7

Notes:

Affected counties include those where new pipeline facilities or surface disturbance activities associated with pipeline refurbishment are proposed.

States and counties are listed geographically from north to south as the proposed Keystone Project crosses the area.

[a] Also addressed in the Mainline Project route.

Source: U.S. Bureau of the Census 2006.

TABLE 3.10.1-6
Property Mill Levies and Tax Rates for the Keystone Project

State/County	Portion of Pipeline through State (%)	Government Revenue (Existing) ($)	Property Tax Mill Levy (mills)	Effective Property Tax Rate (%)	Tax Revenue per County ($)	Capital Cost of Project ($)
MAINLINE PROJECT						
North Dakota (2006 Total Ad Valorem Property Taxes)						
Cavalier	0.43	6,295,726	324.33	1.620	19,457	1,199,826
Pembina	14.57	10,212,016	354.14	1.770	713,843	40,314,170
Walsh	11.34	12,382,781	395.51	1.980	620,070	31,355,466
Nelson	16.89	4,364,556	401.15	2.010	936,951	46,713,245
Steele	14.00	3,814,357	356.84	1.780	690,742	38,714,401
Barnes	19.90	13,006,449	370.65	1.850	1,019,881	55,032,042
Ransom	11.36	6,607,588	413.04	2.070	649,205	31,435,454
Sargent	11.51	6,040,508	406.01	2.030	646,274	31,835,396
South Dakota (2006 Total Revenue from All Sources)						
Marshall	11.07	1,806,615	21.50	2.150	719,444	33,462,489
Day	13.93	3,390,223	21.50	2.150	905,346	42,109,127
Clark	16.65	3,013,792	21.50	2.150	1,081,954	50,323,433
Beadle	7.18	7,188,817	21.50	2.150	466,616	21,703,062
Kingsbury	7.12	1,924,014	21.50	2.150	462,898	21,530,129
Miner	11.36	2,882,361	21.50	2.150	738,034	34,327,153
Hanson	6.24	1,807,719	21.50	2.150	405,268	18,849,671
McCook	5.21	2,663,670	21.50	2.150	338,343	15,736,881
Hutchinson	10.90	3,463,049	21.50	2.150	708,289	32,943,391
Yankton	10.33	28,120,617	21.50	2.150	671,109	31,214,363
Nebraska (Department of Revenue, Property Assessment and Taxation Department, Taxes Levied in 2006)						
Cedar	17.14	14,373,607	17.42	1.742	848,105	48,685,714
Wayne	8.72	12,999,096	18.66	1.866	461,839	24,756,851
Stanton	11.40	10,581,066	18.37	1.837	594,587	32,374,344
Platte	1.46	39,424,920	16.50	1.650	68,326	4,139,942
Colfax	10.67	14,080,472	17.90	1.790	542,448	30,304,373
Butler	11.08	15,539,120	17.43	1.743	548,347	31,463,557
Seward	11.84	23,915,026	17.73	1.773	596,017	33,616,327
Saline	11.57	19,624,429	19.82	1.982	651,342	32,817,137
Jefferson	12.42	13,079,964	19.62	1.962	692,043	35,272,303
Gage	3.70	27,964,647	19.32	1.932	203,148	10,515,452
Kansas (2006 Total All Property Tax Dollars)						
Marshall	29.34	11,772,795	123.49	4.080	1,395,178	34,236,909
Nemaha	25.55	9,482,614	116.84	3.860	1,149,747	29,819,243
Brown	25.11	10,209,742	118.30	3.900	1,143,945	29,303,849
Doniphan	20.00	7,299,226	103.64	3.420	798,217	23,340,000

TABLE 3.10.1-6
(Continued)

State/County	Portion of Pipeline through State (%)	Government Revenue (Existing) ($)	Property Tax Mill Levy (mills)	Effective Property Tax Rate (%)	Tax Revenue per County ($)	Capital Cost of Project ($)
MAINLINE PROJECT (CONTINUED)						
Missouri (2006 Assessed Valuations)						
Buchanan	7.20	1,061,552,284	70.00	2.240	628,976	28,079,289
Clinton	7.88	227,936,441	70.00	2.240	688,689	30,745,044
Caldwell	9.00	94,313,724	70.00	2.240	786,220	35,099,111
Carroll	9.66	133,562,042	70.00	2.240	843,943	37,676,008
Chariton	11.62	115,832,051	70.00	2.240	1,015,120	45,317,840
Randolph	8.07	304,867,379	70.00	2.240	704,612	31,455,913
Audrian	14.10	271,818,136	70.00	2.240	1,232,077	55,003,418
Montgomery	7.72	168,475,439	70.00	2.240	674,756	30,123,035
Lincoln	9.98	558,363,794	70.00	2.240	871,809	38,920,027
St. Charles	14.76	6,609,549,616	70.00	2.240	1,289,799	57,580,314
Illinois (Most Recently Available/Published 2002 Equalized Assessed Values)						
Madison	49.51	2,404,001	0.00	0.000	0	49,262,786
Bond	34.39	108,000	0.00	0.000	0	34,213,275
Fayette	11.21	133,000	0.00	0.000	0	11,151,795
Marion	4.90	217,001	0.00	0.000	0	4,872,144
CUSHING EXTENSION						
Nebraska [a] (Department of Revenue, Property Assessment and Taxation Department, Taxes Levied in 2006)						
Jefferson	100.00	13,079,964	19.62	1.962	72,594	3,700,000
Kansas (2006 Total All Property Tax Dollars)						
Washington	14.46	8,435,597	142.43	4.700	2,096,285	44,600,000
Clay	14.37	9,041,595	140.63	4.640	2,060,555	44,400,000
Dickinson	17.43	16,579,757	116.80	3.850	2,073,703	53,800,000
Marion	17.34	13,669,639	125.70	4.150	2,219,216	53,500,000
Butler	20.40	65,397,029	135.28	4.460	2,808,048	62,900,000
Cowley	16.00	31,923,989	143.69	4.740	2,342,500	49,400,000
Oklahoma (Tax Revenue Information Provided by the Oklahoma Tax Commission, Ad Valorem Department)						
Kay	35.99	23,853,655	105.00	2.400	1,014,883	1,014,883
Noble	31.15	8,943,669	105.00	2.400	878,126	878,126
Payne	32.86	32,315,508	105.00	2.400	926,111	926,111

TABLE 3.10.1-6
(Continued)

Notes:

Affected counties include counties where new pipeline facilities or surface disturbance activities associated with pipeline refurbishment are proposed.

States and counties are listed geographically from north to south as the proposed Keystone Project crosses the area.

[a] Also addressed in the Mainline Project route.

Source: Information was based on discussions with the counties in January 2005 to obtain the current local tax rates and valuation methodology (from ENSR 2006a).

Public Services

The region of influence is served by a range of public services and service providers. Public services most pertinent to the proposed Keystone Project include police and fire protection and medical facilities.[2] Table 3.10.1-7 shows selected information for relevant public services in the region of influence. Generally, the extent of public service resources in a region is a function of its size, population, and number of established communities. Accordingly, public service infrastructure is typically not as developed in remote rural areas relative to urban areas.

There are multiple law enforcement service providers in the region of influence, including state patrols, county sheriff departments, local police departments, and special law enforcement agencies such as university police. In many cases, mutual aid or cooperative agreements allow one agency to provide support to other agencies in emergencies. On average, from one to 10 law enforcement agencies serve any one given county. In the region of influence, the exception is Madison County, Illinois, which is served by 24 law enforcement agencies.

A network of fire departments and districts provides fire protection and suppression services throughout the region of influence. Many of these organizations are staffed by volunteers, particularly in rural areas. In larger urban areas, fire protection staff typically are housed in fire stations. At the county level, the number of fire departments is approximately the same as the number of law enforcement agencies.

Table 3.10.1-7 also shows the nearest medical facilities to the proposed Keystone Project, specifically all critical access facilities that are located within 50 miles of the pipeline route. Non-federal, short-term, acute care facilities nearest the route are distinguished in the table based on their likelihood of serving Keystone Project-related medical needs. In every county along the pipeline route, there is at least one acute care facility within the county or nearby in a neighboring county. These facilities would provide emergency medical care and, in some cases, would serve as the base for local emergency medical response and transport services for construction accidents or operating concerns.

3.10.1.6 Transportation and Traffic

Mainline Project

Highways and Rural Roads

Many utility crossings (roadways, railroads, and other pipelines) would be required for the Keystone Project. The Mainline Project route would cross the following interstates and major U.S. highways:

- Interstate (I)-94 and U.S. Highway (US)-2 in North Dakota;
- I-90, US-12, US-212, US-14, US-81, and US-16 in South Dakota;
- I-80, US-20, US-275, US-30, US-34, US-6, and US-136 in Nebraska;
- US-35, US-77, US-75, US-73, and US-59 in Kansas;
- I-29, I-35, , US-59, US-169, US-69, US-65, US-24, US-63, US-54, and US-61 In Missouri; and
- I-55 and I-70 in Illinois.

[2] Education facilities are not addressed in the section because most construction workers are not expected to relocate with school-aged children; therefore, impacts on schools would be negligible.

TABLE 3.10.1-7
Existing Public Service Facilities along the Keystone Project Route

State/County	Police/Sheriff Departments [a] (Number)	Fire Departments [b] (Number)	Nearest Medical Facilities [c]
MAINLINE PROJECT			
North Dakota			
Cavalier	2	4	Cavalier County Memorial Hospital (Langdon)
Pembina	5	8	Pembina County Memorial Hospital (Cavalier)
Walsh	3	10	First Care Health Center (Park River) Unity Medical Center & Grafton Family Clinic (Grafton) Mercy Hospital (Devils Lake)
Nelson	2	5	Nelson County Health Systems (McVile) Northwood Deaconess Health Center (Northwood) * Altru Hospital (Grand Forks)
Steele	1	2	Cooperstown Medical Center (Cooperstown) Union Hospital (Mayville) Hillsboro Medical Center (Hillsboro)
Barnes	3	8	Mercy Hospital (Valley City) Jamestown Hospital (Jamestown) * Dakota Clinic at Innovis Health (Fargo) * MeritCare Hospital (Fargo) * MeritCare South University (Fargo)
Ransom	2	3	Lisbon Area Health Services (Lisbon)
Sargent	4	4	Lisbon Area Health Services (Lisbon) Oaks Community Hospital (Oakes)
Dickey	2	5	Oakes Community Hospital (Oakes)
South Dakota			
Brown	3	10	* Avera Saint Lukes (Aberdeen) * Marshall County Healthcare Center / Avera Health (Britton) Coteau Des Prairies Hospital (Sisseton)
Marshall	1	5	* Marshall County Healthcare Center / Avera Health (Britton) * Avera Saint Lukes (Aberdeen) Coteau Des Prairies Hospital (Sisseton)
Day	4	5	Lake Area Hospital (Webster)

TABLE 3.10.1-7
(Continued)

State/County	Police/Sheriff Departments [a] (Number)	Fire Departments [b] (Number)	Nearest Medical Facilities [c]
MAINLINE PROJECT (CONTINUED)			
South Dakota (continued)			
Clark	2	3	* Prairie Lakes Healthcare Systems – Hospital (Watertown) Community Memorial Hospital (Redfield)
Beadle	3	4	* Huron Regional Medical Center (Huron)
Kingsbury	4	5	De Smet Memorial Hospital (De Smet) * Brookings Hospital (Brookings)
Miner	2	2	Madison Community Hospital (Madison) Avera Weskota Memorial Medical Center (Wessington Springs)
Hanson	1	2	* Avera Queen of Peace Hospital (Mitchell)
McCook	2	3	* Sioux Valley USD Medical Center (Sious Falls) * Avera McKennan Hospital & University Health Center (Sioux Falls) Dell Area Health Center (Dell Rapids)
Hutchinson	6	4	Freeman Community Hospital & Nursing Home (Freeman) Avera Saint Benedict Health Center (Parkston) Douglas County Memorial Hospital (Armour) Pioneer Memorial Hospital (Viborg) Canton-Inwood Memorial Hospital (Canton)
Yankton	2	5	Landemann-Jungmann Memorial Hospital (Scotland) Saint Michael's Hospital & Nursing Home (Tyndall) * Avera Sacred Heart Hospital (Yankton) South Dakota Human Services Center (Yankton) * Sioux Valley Vermilion Medical Center (Vermilion) Wagner Community Memorial Hospital (Wagner)

TABLE 3.10.1-7
(Continued)

State/County	Police/Sheriff Departments [a] (Number)	Fire Departments [b] (Number)	Nearest Medical Facilities [c]
MAINLINE PROJECT (CONTINUED)			
Nebraska			
Cedar	4	8	* Avera Sacred Heart Hospital (Yankton, SD) * Sioux Valley Vermilion Medical Center (Vermilion, SD) * Lundberg Memorial Hospital (Creighton) * Mercy Medical Center (Sioux City, IA) * Saint Luke's Regional Medical Center
Wayne	2	3	Providence Medical Center (Wayne) Plainview Public Hospital (Plainview) Osmond General Hospital (Osmond) Pender Community Hospital (Pender)
Stanton	2	2	* Faith Regional Health Services (Norfolk) Norfolk Regional Center (Norfolk) Saint Francis Memorial Hospital (West Point)
Platte	3	5	* Columbus Community Hospital (Columbus)
Colfax	5	3	Memorial Hospital (Schuyler) Saint Francis Memorial Hospital (West Point)
Butler	2	7	Annie Jeffrey Memorial County Health Center (Osceola) Butler County Health Care Center (David City)
Seward	3	5	* Bryan LGH Medical Center East/West (Lincoln) * Saint Elizabeth Regional Medical Center (Lincoln) Memorial Hospital (Seward) York General Hospital (York)
Saline	4	5	Warren Memorial Hospital (Friend) Crete Area Medical Center (Crete) Fillmore County Hospital (Geneva)
Jefferson	3	5	Jefferson Community Health Center (Fairbury) Thayer County Health Services (Hebron)
Gage	3	6	* Beatrice Community Hospital (Beatrice)

TABLE 3.10.1-7
(Continued)

State/County	Police/Sheriff Departments [a] (Number)	Fire Departments [b] (Number)	Nearest Medical Facilities [c]
MAINLINE PROJECT (CONTINUED)			
Kansas			
Marshall	6	6	Washington County Hospital (Washington) Community Memorial Healthcare, Inc. (Marysville)
Nemaha	3	5	Sabetha Community Hospital (Sabetha) Nemaha Valley Community Hospital (Seneca) * Community Hospital Onaga, Inc. (Onaga) Humboldt Health Care Inc. (Humboldt, NE) Pawnee County Medical Center (Pawnee City, NE)
Brown	4	5	Hiawatha Community Hospital (Hiawatha) Holton Community Hospital (Holton) Community Medical Center Inc. (Falls City, NE)
Doniphan	4	4	* Atchison Hospital (Atchison) Jefferson County Memorial Hospital (Winchester)
Missouri			
Buchanan	5	4	* Heartland Regional medical Center (St. Joseph) * Saint Francis Hospital & Health Services (Maryville) * Saint Luke's Hospital (Kansas City) * Truman Medical Center (Kansas City) * North Kansas City Hospital (North Kansas City) * Baptist-Lutheran Medical Center (Kansas City) * Saint Joseph Medical Center (Kansas City) Kindred Hospital (Kansas City)
Clinton	6	2	* Cameron Regional Medical Center (Cameron) * Saint Luke's Northland Hospital (Smithville) * Excelsior Springs Medical Center (Excelsior Springs) * Liberty Hospital (Liberty) * Independence Regional Health Center (Independence) * Medical Center of Independence (Independence)
Caldwell	6	4	* Hedrick Medical Center (Chillicothe) * Ray County Memorial Hospital (Richmond) Wright Memorial Hospital (Trenton)

TABLE 3.10.1-7
(Continued)

State/County	Police/Sheriff Departments [a] (Number)	Fire Departments [b] (Number)	Nearest Medical Facilities [c]
MAINLINE PROJECT (CONTINUED)			
Missouri (continued)			
Carroll	4	4	* Carroll County Memorial Hospital (Carrollton) * Fitzgibbon Hospital (Marshall) * Lafayette Regional Health Center (Lexington)
Chariton	4	6	Pershing Memorial Hospital (Brookfield)
Randolph	5	5	* Moberly Regional Medical Center (Moberly) * Cooper County Memorial Hospital (Boonville) Samaritan Hospital (Macon)
Audrain	4	5	* Audrain Medical Center (Mexico) * Boone Hospital Center (Columbia) * Columbia Regional Hospital (Columbia) * University of Missouri Hospital (Columbia)
Montgomery	6	8	Hermann Area District Hospital (Hermann)
Lincoln	9	6	Lincoln County Medical Center (Troy) * Pike County Memorial Hospital
St. Charles	8	11	* Saint Luke Hospital (Chesterfield) * Northwest Healthcare (Florissant) CenterPointe Hospital (St. Charles) * Barnes-Jewish Hospital (St. Louis) * Christian Hospital (St. Louis) * Des Peres Hospital (St. Louis) * Forest Park Hospital (St. Louis) * Missouri Baptist Medical Center (St. Louis) * Saint Alexius Hospital (St. Louis) * Saint Anthony Medical Center (St. Louis) * Saint John Mercy Hospital (St. Louis) * Saint Louis University Hospital (St. Louis) * SSM DePaul Health Center (St. Louis) * SSM Saint Joseph Health Center (St. Charles / Wentzville)

TABLE 3.10.1-7
(Continued)

State/County	Police/Sheriff Departments [a] (Number)	Fire Departments [b] (Number)	Nearest Medical Facilities [c]
MAINLINE PROJECT (CONTINUED)			
Missouri (continued)			
St. Charles (continued)	8	11	* SSM Saint Joseph Health Center (St. Louis / Lake St. Louis) * SSM Saint Mary Hospital (St. Charles) Kindred Hospital (St. Louis)
Illinois			
Madison	24	38	* Saint Anthony's Health Center (Alton) * Alton Memorial Hospital (Alton) * Memorial Hospital (Belleville) * Touchette Regional Hospital (Centreville) * Gateway Regional Medical Center (Granite City) * Jersey Community Hospital (Jerseyville) * Saint Elizabeth Hospital (Belleville) * Saint Joseph Hospital (Highland) * St. Francis Hospital (Litchfield) * Anderson Hospital (Maryville) Community Memorial Hospital (Staunton) Thomas H. Boyd Memorial Hospital (Carrollton) *Also see St. Charles County, Missouri (St. Louis)*
Bond	4	5	* Saint Joseph Hospital (Breese) Edward A. Utlaut Memorial Hospital (Greenville)
Fayette	6	6	* Fayette County Hospital (Vandalia) Hillsboro Area Hospital (Hillsboro) Washington County Hospital (Nashville)
Marion	9	8	* Saint Mary's Hospital (Centralia) * Good Samaritan Regional health Center (Mount Vernon) * Crossroads Community Hospital (Mount Vernon) * Clay County Hospital (Flora) * St. Anthony's Memorial Hospital (Effingham) Pana Community Hospital (Pana) Salem Township Hospital (Salem)

TABLE 3.10.1-7
(Continued)

State/County	Police/Sheriff Departments [a] (Number)	Fire Departments [b] (Number)	Nearest Medical Facilities [c]
CUSHING EXTENSION			
Nebraska			
Jefferson [d]	*See above*	*See above*	*See above*
Kansas			
Washington	2	10	Washington County Hospital (Washington) Community Memorial Healthcare, Inc. (Marysville) Republic County Hospital (Belleville)
Clay	4	3	Clay County Medical Center (Clay Center) * Mercy Regional Health Center (Manhattan)
Dickinson	6	8	* Morris County Hospital (Council Grove) * Salina Regional Health Center (Salina)
Marion	5	9	* Augusta Regional Medical Center (Augusta) * Mercy Hospital, Inc. (Moundridge) * Newman Regional Health (Emporia)
Butler	8	12	* Newton Medical Center (Newton) * Susan B. Allen Memorial Hospital (El Dorado) * Via Christie Riverside Medical Center (Wichita) * Wesley Medical Center (Wichita)
Cowley	6	7	* South Central Kansas Regional Medical Center (Arkansas City) * William Newton Memorial Hospital (Winfield) * Sumner Regional Medical Center (Wellington)
Oklahoma			
Kay	5	11	* Integris Blackwell Regional Hospital (Blackwell) * Via Christi Oklahoma Regional Medical Center (Ponca City)
Noble	3	5	* Integris Bass Baptist Health Center (Enid) * Perry Memorial Hospital (Perry) * Saint Mary's Regional Medical Center (Enid)

TABLE 3.10.1-7
(Continued)

State/County	Police/Sheriff Departments [a] (Number)	Fire Departments [b] (Number)	Nearest Medical Facilities [c]
CUSHING EXTENSION (CONTINUED)			
Oklahoma (continued)			
Payne	7	5	* Cushing Regional Hospital (Cushing) * Bristow Medical Center (Bristow) * Hillcrest Medical Center (Tulsa) * Saint Francis Hospital (Tulsa) * Saint John Medical Center (Tulsa) * Stillwater Medical Center (Stillwater) * Tulsa Regional Medical Center (Tulsa) Saint John Sapulpa (Sapulpa) Prague Municipal Hospital (Prague) Logan Hospital & Medical Center (Guthrie) Cleveland Area Hospital (Cleveland) * Pawnee Municipal Hospital (Pawnee)

Note:

States and counties are listed geographically from north to south as the proposed Keystone Project crosses the area.

[a] Police/sheriff departments include special law enforcement units for universities.
[b] Fire departments include volunteer, district, city, and town fire departments.
[c] Medical facilities include critical access facilities within approximately 50 miles of the Project.
[d] Addressed in the Mainline Project route.
* Facilities marked with an asterisk (*) are non-federal, short-term, acute care facilities.

Sources: Capitol Impact 2006, American Hospital Directory 2006.

The rural road network is well developed across all the states that would be traversed by the pipeline. In addition to the major highways, numerous smaller state, county, and municipal roads and rural routes would be crossed by the pipeline or used by contractors during construction.

The proposed ROW for the Mainline Project would parallel or possibly share the ROW with highways and rural routes. In particular, the Mainline Project would parallel US-81 for a short distance near Yankton, South Dakota, as well as Nebraska just past its border with South Dakota. The Mainline Project route also parallels I-70 near St Louis; the route parallels and then crosses US-169 in western Missouri.

Railroads

The Burlington Northern Santa Fe (BNSF) railway has numerous main and branch tracks and smaller spur lines in the states affected by the Mainline Project route. The Twin Cities Division of BNSF has track concentrated in the eastern portion of North Dakota and South Dakota, and it is likely that the pipeline corridor would cross several main tracks of this division. The BNSF Kansas and Nebraska divisions have main, branch, and spur tracks in the vicinity of the Keystone pipeline ROW, and the Springfield division covers territory in Missouri and Illinois that coincides with the Keystone Project. For more information on BNSF divisions and routes, see <http://www.bnsf.com/tools/reference/division_maps/>.

The Union Pacific Railroad has main, branch, and spur track lines across Nebraska, Kansas, Missouri, and Illinois (<http://www.uprr.com/aboutup/maps/sysmap/index.shtml>). These lines connect many of the larger cities in these states, such as St. Louis in Missouri, Kansas City and Topeka in Kansas, and Omaha and North Platte in Nebraska, with Chicago to the east and California cities to the west. It is likely that the Mainline Project route would intersect track owned by the Union Pacific Railroad.

Several other railroad corporations operate in the vicinity of the Mainline Project ROW. CSX Railroad Corporation has a line connecting Salem and East St. Louis, Illinois that may run in the vicinity of the pipeline as the corridor nears the proposed terminals at Wood River and Patoka, Illinois (<http://www.csx.com/share/general/fastfacts/docs/ Ill_Fact_Sheets_0506-11-REF21841.pdf>). Amtrak has numerous regional routes running south and west from Chicago (<http://www.amtrak.com/servlet/ContentServer?pagename=Amtrak/Page/Browse_Routes_Page&c=Page&cid=1081256321432&ssid=133>). Many of these routes interconnect states that would be crossed by the Mainline Project route and could intersect the pipeline ROW.

Cushing Extension

Highways and Rural Roads

The Cushing Extension crosses through Kansas and into Oklahoma. This route would intersect the following interstates and major US highways:

- I-70, I-35, US-35, US-24, US-56, US-50, US-54 US-160, and US-166 in Kansas; and
- US-64 and US-412 in Oklahoma.

The rural road network is also well developed in Kansas and Oklahoma. In addition to these major highways, numerous smaller state, county, and municipal roads and rural routes would be crossed by the ROW or used by contractors during construction. The Cushing Extension parallels and crosses US-77 in Oklahoma in the vicinity of Ponca City; it also parallels that highway near the Oklahoma/Kansas border in the vicinity of Arkansas City, Kansas.

Railroads

The Kansas, Springfield, and Texas Divisions of BNSF all have mainline, branch, and spur tracks that could be affected by the pipeline crossings for the Cushing Extension (<http://www.bnsf.com/tools/reference/division_maps/>). The Union Pacific Railroad main, branch, and spur tracks cross Kansas and run south through Oklahoma to Texas (<http://www.uprr.com/aboutup/maps/sysmap/index.shtml>). The Cushing Extension may intersect track owned by the Union Pacific Railroad.

3.10.1.7 Environmental Justice

Other demographic characteristics of the local population are important to consider when evaluating potential environmental justice impacts of the Keystone Project. Environmental justice refers to the "fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." An analysis of potential environmental justice effects is included in this section pursuant to EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (1994). Related guidance—Environmental Justice: Guidance under the National Environmental Policy Act (1997)—also has been prepared by the CEQ. The key socioeconomic data pertinent for environmental justice are the racial/ethnic composition and income status of affected communities, which are summarized in Table 3.10.1-8.

Minority Populations

In accordance with the CEQ Guidance, minority populations should be identified where either (a) the minority population in the affected area exceeds 50 percent; or (b) the minority population of the affected area is meaningfully greater than the minority population in the general population of the surrounding area. For the purposes of this analysis, the "affected area" is defined as local communities, the "general population" refers to the state within which the community is located, and "meaningfully greater" means at least 1.5 times the corresponding measure for the general population.

The 2000 Census shows that minority groups do not exceed 50 percent of the population in any community in the region. However, some minority populations are "meaningfully greater" than the corresponding minority population at the state level, which are identified with an asterisk (*) in the relevant racial/ethnic category columns of Table 3.10.1-8. Along the Mainline Project, the areas with a minority population that is meaningfully greater than the corresponding state population include three communities in South Dakota (Yankton, Iroquois, and Raymond); one community in Nebraska (Garrison); five communities in Missouri (Renick, Turney, Fountain N' Lakes, Truxton, and Triplett); and five communities in Illinois (South Roxana, Grantfork, Vernon, Granite City, and Alton). There are no affected communities in North Dakota or Kansas with minority populations that meet the environmental justice criteria outlined above. Of the 14 communities, eight are located within 0.5 mile of the proposed Keystone Project route and six are located within 0.5 to 2 miles. Along the Cushing Extension, six communities have notable minority populations. They are Potwin, Winfield, Arkansas City, Douglass, and Green in Kansas, and Marland in Oklahoma. Of these, only Potwin is located within 0.5 mile of the Keystone Project route.

TABLE 3.10.1-8
Environmental Justice Statistics in Affected Communities along the Keystone Project Route

State/County	Relative Proximity to Route (miles)	Racial/Ethnic Categories (as Percent of Total Population) – 2000							Families with Income below the Poverty Level (1999)
		White	Black	Native American or Alaskan Native	Asian or Pacific Islander	Other	Two or More Races	Hispanic or Latino	
MAINLINE PROJECT									
North Dakota	--	**92.4**	**0.6**	**4.9**	**0.6**	**0.4**	**1.2**	**1.2**	**8.3**
Lankin	0.5	96.9	0.0	2.3	0.0	0.0	0.8	0.0	0.0
Walhalla	2	89.8	0.0	6.0	0.0	0.1	4.2	0.9	9.7*
Sharon	2	94.5	0.0	1.8	0.0	0.0	3.7	0.0	0.0
Fort Ransom	2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	11.8*
Niagara	2	94.7	0.0	1.8	0.0	0.0	3.5	0.0	0.0
Sibley	2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	14.3*
Luverne	2	97.7	0.0	2.3	0.0	0.0	0.0	0.0	0.0
South Dakota	--	**88.7**	**0.6**	**8.3**	**0.6**	**0.5**	**1.3**	**1.4**	**9.3**
Yankton	0.5	94.4	1.6*	1.6	0.5	0.9	1.0	2.5*	6.2
Iroquois	0.5	95.7	0.0	0.4	0.4	1.4	2.2	2.5*	18.8*
Raymond	0.5	96.5	0.0	0.0	0.0	3.5	0.0	4.7*	13.6*
Roswell	0.5	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Emery	2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8
Carthage	2	98.9	0.0	0.0	0.0	0.0	1.1	0.0	13.2*
Spencer	2	98.7	0.0	0.6	0.6	0.0	0.0	0.0	7.0
Nebraska	--	**89.6**	**4.0**	**0.9**	**1.3**	**2.8**	**1.4**	**5.5**	**6.7**
Leigh	0.5	99.5	0.0	0.0	0.0	0.0	0.5	1.8	4.5
Richland	0.5	97.8	1.1	1.1	0.0	0.0	0.0	1.1	0.0
Garrison	0.5	95.5	0.0	4.5*	0.0	0.0	0.0	0.0	0.0
Sholes	0.5	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Seward	2	98.0	0.5	0.1	0.5	0.4	0.6	1.0	4.1
Stanton	2	97.2	0.2	0.6	0.3	1.1	0.7	2.4	5.8
Randolph	2	99.0	0.1	0.3	0.3	0.2	0.1	0.2	4.9

TABLE 3.10.1-8
(Continued)

State/County	Relative Proximity to Route (miles)	Racial/Ethnic Categories (as percent of total population) – 2000							Families with Income below the Poverty Level (1999)
		White	Black	Native American or Alaskan Native	Asian or Pacific Islander	Other	Two or More Races	Hispanic or Latino	
MAINLINE PROJECT (CONTINUED)									
Nebraska (continued)									
Dorchester	2	97.2	0.0	0.0	0.0	2.6	0.2	4.1	4.1
Plymouth	2	99.4	0.0	0.0	0.0	0.4	0.2	0.8	1.5
Bellwood	2	100.0	0.0	0.0	0.0	0.0	0.0	0.4	1.6
Hoskins	2	99.6	0.0	0.0	0.0	0.0	0.4	0.4	5.3
Staplehurst	2	97.4	0.0	0.0	0.4	0.0	2.2	0.4	7.4*
Fordyce	2	100.0	0.0	0.0	0.0	0.0	0.0	4.9	2.4
Swanton	2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Steele City	2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	8.3*
Harbine	2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kansas	--	**86.1**	**5.7**	**0.9**	**1.7**	**3.4**	**2.1**	**7.0**	**5.7**
Seneca	2	98.8	0.4	0.0	0.0	0.0	0.6	0.7	4.4
Fairview	2	95.2	3.3	0.0	0.0	0.0	1.5	1.1	11.0*
Denton	2	99.58	0.0	0.0	0.0	0.0	0.5	0.5	0.0
Severance	2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	21.4*
Oketo	2	95.4	0.0	0.0	0.0	0.0	4.6	0.0	8.7*
Oneida	2	94.1	2.9	0.0	0.0	0.0	0.0	0.0	0.0
Missouri	--	**84.9**	**11.2**	**0.4**	**1.2**	**0.8**	**1.5**	**2.1**	**8.6**
Troy	0.5	93.9	2.9	0.4	0.1	0.8	1.9	1.7	7.6
Moscow Mills	0.5	94.3	3.2	0.3	0.1	0.3	1.8	0.9	5.3
Salisbury	0.5	94.8	4.2	0.2	0.2	0.1	0.5	0.6	7.1
Agency	0.5	98.5	0.0	0.0	0.5	0.5	0.5	1.7	3.7
West Alton	0.5	99.1	0.0	0.2	0.2	0.5	0.0	0.5	4.5

TABLE 3.10.1-8

(Continued)

State/County	Relative Proximity to Route (miles)	Racial/Ethnic Categories (as percent of total population) – 2000							Families with Income below the Poverty Level (1999)
		White	Black	Native American or Alaskan Native	Asian or Pacific Islander	Other	Two or More Races	Hispanic or Latino	
MAINLINE PROJECT (CONTINUED)									
Missouri (continued)									
Keytseville	0.5	95.3	3.9	0.0	0.0	0.2	0.6	0.2	10.9*
Cowgill	0.5	97.6	0.4	0.0	0.0	1.2	0.8	0.0	21.2*
Renick	0.5	95.5	0.0	0.9*	0.0	0.0	3.6*	0.0	10.0*
Chain of Rocks	0.5	100.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1
St. Joseph	2	91.9	5.0	0.5	0.5	0.7	1.4	2.6	9.1*
St. Charles	2	93.3	3.5	0.3	1.0	0.7	1.2	2.0	4.6
St. Peters	2	94.3	2.8	0.2	1.2	0.4	1.1	1.5	1.5
Moberly	2	90.5	6.7	0.4	0.6	0.4	0.3	1.7	11.1*
Mexico	2	88.8	9.2	0.3	0.5	0.3	0.9	0.9	10.0*
St. Paul	2	99.0	0.1	0.1	0.0	0.2	0.7	1.3	1.1
Gower	2	99.4	0.1	0.1	0.0	0.0	0.4	0.8	2.4
Polo	2	99.5	0.0	0.0	0.0	0.2	0.3	1.4	5.2
Bosworth	2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	11.7*
Portage Des Sioux	2	99.1	0.0	0.3	0.0	0.6	0.0	1.4	2.8
Old Monroe	2	98.4	0.0	0.0	0.0	0.8	0.8	2.8	0.0
Tina	2	99.5	0.0	0.0	0.0	0.0	0.5	0.0	5.4
Turney	2	95.5	0.6	1.3*	0.0	1.3	1.3	0.6	6.0
Fountain N' Lakes	2	99.2	0.0	0.8*	0.0	0.0	0.0	0.0	17.2*
Truxton	2	95.8	0.0	0.0	3.1*	0.0	1.0	1.0	4.5
Triplett	2	87.5	7.8	1.6*	1.6*	0.0	1.6	0.0	30.8*
Cave	2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 3.10.1-8
(Continued)

State/County	Relative Proximity to Route (miles)	Racial/Ethnic Categories (as percent of total population) – 2000							Families with Income below the Poverty Level (1999)
		White	Black	Native American or Alaskan Native	Asian or Pacific Islander	Other	Two or More Races	Hispanic or Latino	
MAINLINE PROJECT (CONTINUED)									
Illinois	--	**73.5**	**15.1**	**0.2**	**3.4**	**5.8**	**1.9**	**12.3**	**7.8**
Edwardsville	0.5	87.7	6.7	0.3	1.7	0.3	1.4	1.0	5.0
Highland	0.5	98.6	0.1	0.1	0.5	0.3	0.5	1.3	3.6
South Roxana	0.5	97.7	0.3	0.4*	0.3	0.3	1.0	0.8	17.4*
Roxana	0.5	98.5	0.1	0.3	0.3	0.4	0.5	0.6	2.5
Hartford	0.5	98.4	0.1	0.2	0.4	0.3	0.5	0.7	10.3*
Pocahontas	0.5	98.6	0.1	0.3	0.3	0.0	0.7	0.0	12.5*
Grantfork	0.5	99.2	0.0	0.4*	0.0	0.0	0.4	0.4	3.1
Vernon	0.5	98.3	0.0	0.6*	0.0	0.0	1.1	1.7	17.9*
Granite City	2	94.7	2.0	0.5*	0.5	0.9	1.4	2.9	8.8*
Alton	2	72.3	24.7*	0.2	0.4	0.7	1.7	1.5	14.7*
Godfrey	2	94.1	4.0	0.3	0.7	0.2	0.7	1.0	3.2
Wood River	2	97.6	0.6	0.3	0.5	0.4	0.7	1.2	13.2*
East Alton	2	96.7	0.9	0.2	0.4	0.2	1.5	1.0	7.8
Patoka	2	98.9	0.0	0.0	0.2	0.0	0.9	1.3	11.6*
CUSHING EXTENSION									
Nebraska [a]									
Kansas	--	**86.1**	**5.7**	**0.9**	**1.7**	**3.4**	**2.1**	**7.0**	**6.7**
Towanda	0.5	96.8	0.4	0.4	0.2	0.2	2.0	0.7	5.1
Chapman	0.5	94.8	0.5	1.0	0.4	0.7	2.7	3.0	4.3
Potwin	0.5	95.4	0.0	1.5*	0.2	0.0	2.8	0.9	4.7
Greenleaf	0.5	99.4	0.0	0.0	0.0	0.3	0.3	0.8	8.3*
Hollenberg	0.5	96.8	0.0	0.0	0.0	3.2	0.0	3.2	0.0

TABLE 3.10.1-8
(Continued)

State/County	Relative Proximity to Route (miles)	Racial/Ethnic Categories (as percent of total population) – 2000							Families with Income below the Poverty Level (1999)
		White	Black	Native American or Alaskan Native	Asian or Pacific Islander	Other	Two or More Races	Hispanic or Latino	
Kansas (continued)									
Winfield	2	88.1	3.3	1.1	3.7*	1.7	2.1	4.7	8.9*
Arkansas City	2	87.2	4.5	2.7*	0.6	1.9	3.0	4.5	12.4*
Augusta	2	96.1	0.2	0.8	0.4	0.7	1.9	2.6	4.1
Marion	2	97.6	0.0	0.8	0.1	0.2	1.2	1.4	5.3
Douglass	2	96.2	0.3	1.6*	0.2	0.5	1.2	1.7	4.5
Washington	2	98.9	0.1	0.2	0.0	0.2	0.5	0.6	8.6*
Wakefield	2	95.9	0.8	1.1	0.1	0.6	1.4	1.2	4.2
Hope	2	98.1	0.8	0.5	0.3	0.0	0.3	0.3	4.8
Green	2	96.6	0.7	2.7*	0.0	0.0	0.0	1.4	5.3
Ramona	2	95.7	0.0	0.0	0.0	4.3	0.0	6.4	0.0
Oklahoma	--	**76.2**	**7.6**	**7.9**	**1.5**	**2.4**	**4.5**	**5.2**	**11.2**
Ponca City	0.5	84.2	3.0	6.3	0.7	2.1	3.8	4.4	12.7*
Cushing	0.5	79.7	7.0	8.0	0.1	0.9	4.3	2.7	15.1*
Newkirk	2	83.7	1.2	8.7	0.1	0.8	5.4	2.1	11.0
Morrison	2	89.2	0.3	2.8	0.5	2.7	4.6	4.2	13.5*
Marland	2	48.9	0.0	38.6*	0.0	3.2	9.3	10.0*	31.0*

Notes:

Affected areas are those where existing facilities exist or communities where new pipeline facilities or surface disturbance activities associated with pipeline refurbishment are proposed.

Communities are listed in order by state as the proposed Keystone Project crosses from north to south, proximity to the proposed Keystone Project centerline, and descending size based on year 2000 population.

Minority populations—defined as black, Native American or Alaskan Native, Asian or Pacific Islander, or Hispanic with percentages meaningfully greater than 1.5 times that of the minority population percentage in the general population of the surrounding area (i.e., corresponding state)—are identified with an asterisk (*).

TABLE 3.10.1-8
(Continued)

Notes (continued):

Persons of Hispanic origin may be of any race, and for census-gathering purposes, Hispanic is a self-identified category. In this table, individuals may have reported themselves as only Hispanic or in combination with one or more of the other races listed. This may result in the sum of percentages for all ethnic categories to be greater than 100 percent for any community.

The poverty threshold is defined as the average threshold for a family of three and is not adjusted for regional, state, or local variations in the cost of living.

The percent of families with income below the poverty threshold in 2000, as defined by the Bureau of the Census for federal statistical purposes, based on a family of three. Communities with a higher percent of the population below the poverty level than occurring in the respective state are identified with an asterisk (*).

" Addressed in the Mainline Project route.

Source: U.S. Bureau of the Census 2000.

Low-Income Populations

Low-income populations are defined as those individuals or groups living below the established poverty threshold. In 2000, the poverty threshold for a family of three was $13,290. Low-income populations in the region of influence were identified using income data and poverty statistics from the U.S. Census. For the purposes of this analysis, low-income populations were evaluated at the community level. If the percentage of population living below the threshold was greater in a local community relative to the state in which it is located, it was considered to be a low-income population; these communities are noted with an asterisk (*) in the far right column of Table 3.10.1-8.

Although the income characteristics of the communities along the proposed pipeline route vary, affected communities in every state have low-income populations as defined here. In total, 28 communities along the Mainline Project and 8 communities along the Cushing Extension are classified as low-income populations along the Mainline Project and the Cushing Extension, respectively. Along the Mainline Project, these are Walhalla, Fort Ransom, and Sibley in North Dakota; Iroquois, Raymond, and Carthage in South Dakota; Staplehurst and Steele City in Nebraska; Fairview, Severance, Oketo, Keytesville, Cowgill, Renick, St. Joseph, Moberly, Mexico, Bosworth, Fountain N' Lakes, and Triplett in Missouri; and South Roxana, Hartford, Pocahontas, Vernon, Granite City, Alton, Wood River, and Patoka in Illinois. Additional low-income populations located along the Cushing Extension include Greenleaf, Winfield, Arkansas City, and Washington in Kansas, and Ponca City, Cushing, Morrison, and Marland in Oklahoma. The highest poverty rates are found in Triplett, Missouri (30.8 percent) and Marland, Oklahoma (31.0 percent).

3.10.2 Potential Impacts and Mitigation

The socioeconomic consequences of constructing and operating the proposed Keystone Project would vary in duration and magnitude. From a temporal perspective, impacts are characterized as temporary, short term, long term, or permanent. The significance of impacts is considered in the context of duration, magnitude (relative to baseline conditions), and any proposed measures or activities that Keystone would implement as part of the proposed Keystone Project. The following thresholds of significance for social and economic impacts were used in the analysis:

- Substantial disruption of local social or economic activities, including changes in employment and income levels, resulting from the proposed pipeline construction and operations.
- Overburdening of the local housing stock because of demand generated by the temporary and permanent workforce.
- Substantial changes in private property values.
- Substantial changes in fiscal revenues, including tax receipts, of local jurisdictions.
- Substantial burden on public service providers serving the Keystone Project area such that they would need to expand their service capacities in order to meet those demands.

Impacts are characterized as positive (beneficial) or negative (adverse) and, where possible, are evaluated relative to regional conditions to help assess the magnitude of socioeconomic effects and to determine the significance of identified impacts based on established significance criteria. The analysis of socioeconomic impacts is organized into two parts: Section 3.10.2.1 addresses the anticipated socioeconomic effects during Keystone Project construction, and Section 3.10.2.2 addresses operations-related impacts.

3.10.2.1 Construction Impacts

Keystone would construct the pipeline in five to seven construction spreads, with four to five spreads along the Mainline Project and one or two spreads along the Cushing Extension (see Table 3.10.2-1). It is anticipated that each construction spread would require approximately 15 months to complete. The construction spreads on the Mainline Project would be built concurrently, with construction expected to occur from early 2008 through the end of summer 2009. Construction along the Cushing Extension would commence in fall 2008. Construction of the aboveground facilities dispersed along the pipeline route, including pump stations and delivery facilities, would commence in 2008 and would likely be completed by the third quarter of 2009.

Population

The number of residents within the region of influence would increase temporarily during construction with the influx of construction workers and Keystone Project staff. The construction workforce would consist of approximately 2,500 to 3,000 workers, including Keystone employees, contractor employees, and construction and environmental inspection staff. These workers would be distributed across the pipeline route by construction spread, with approximately 500 to 600 construction personnel allocated to each spread. Construction of the pump stations and delivery facilities would require additional staff; it is anticipated that an additional 20 workers per station would be required, for 150 to 200 additional workers during peak periods (because not all pump stations would be constructed simultaneously).

TABLE 3.10.2-1
Construction Spreads Associated with the Keystone Project

Spread Number	Location	Approximate Distance within Construction Spread (miles)
Mainline Project		
Spread 1	U.S.-Canada Border (Cavalier County, North Dakota) through Clark County, South Dakota	300
Spread 2	Beadle County, South Dakota through Gage County, Nebraska	330
Spread 3	Marshall County, Kansas to Salisbury, Missouri (in Chariton County)	215
Spread 4	Salisbury, Missouri (in Chariton County) to Patoka, Illinois (in Marion County)	220
Cushing Extension		
Spread 5	Jefferson County, Nebraska to Cushing, Oklahoma (in Payne County)	300

Note:

An additional spread could be added to the Mainline Project and the Cushing Extension, resulting in four or five spreads along the Mainline Project and one or two spreads along the Cushing Extension.

Source: ENSR 2006a.

Population impacts in the region of influence would depend on the composition of the construction workforce in terms of local versus non-local workers. Keystone is expected to utilize temporary local construction labor where possible. It is estimated that 10 to 15 percent of the total construction workforce could be hired from local communities, with the remaining workers (85 to 90 percent) from outside the local area. It is anticipated that approximately 25 percent of non-local construction workers would

temporarily reside in the Keystone Project area with their spouses; however, few non-local workers are expected to be accompanied by their children or other family members because of the mobile nature of the workforce along the pipeline route during construction. Based on these data and assumptions, it is estimated that 2,800 to 3,600 non-local residents would temporarily move into the region of influence, resulting in short-term population increases during the construction period. Overall, the estimated increase in population is less than 1 percent in the region of influence.

These workers would be distributed throughout the region of influence according to construction spread, thereby potentially affecting isolated communities along the pipeline route. At the local level, construction workers and their spouses would account for about 560 to 720 temporary new residents per construction spread. Construction workers would be working concurrently in multiple locations within each construction spread; however, they would work from a single contractor yard. Therefore, all 560 to 720 temporary residents could reside in any one community at a given point in time, although it is more likely that they would be dispersed across several communities. Depending on the size of the local community and duration of stay, these influxes of construction workers may result in a range of short-term socioeconomic effects. The significance of these potential temporary increases in local population levels is addressed in the analysis of related resource topics in this section, including housing and public services.

Housing

Non-local construction workers moving into the region of influence would require short-term accommodations. Because workers are not expected to relocate with their families and their stay in any one community would be temporary, it is expected that most workers would use temporary housing, such as hotels/motels, RV parks, and campgrounds. Most workers likely would prefer short-term accommodations, primarily hotels and motels, in the more populated, service-oriented communities located within a reasonable commuting distance from the work site. As local accommodations fill, workers would be forced to seek alternative accommodations, including RV parks and campgrounds, in smaller, more distant communities. Further, some employees may elect to utilize furnished apartments and rental homes due to the constrained availability of other accommodations, although this is expected to be limited based on extended-period lease requirements. Depending on location and available accommodations, workers may elect to temporarily reside in one location during the construction period or relocate within each spread as needed as construction proceeds along the pipeline route.

There could be a need for nearly 2,900 housing units throughout the region of influence, or 450 to 575 housing units within any one construction spread, assuming that each worker would require his/her own unit, which would be shared with a spouse accompanying the worker. The availability of short-term housing varies across the pipeline route. In total, there are approximately 14,400 rental units and 34,100 hotel/motel rooms and campground spaces available to serve the housing needs of the Keystone Project. The anticipated project-related demand for housing would account for about 6 percent of all available temporary housing in the region of influence. At a regional scale, therefore, it appears that the temporary housing available within the region of influence would be sufficient to meet the temporary and moderately increased demand for housing resulting from construction activities.

In the northern, more rural portions of the pipeline route, particularly North Dakota and most areas in South Dakota, Nebraska, and Kansas, it may be difficult to meet the local housing needs based on the limited amount of short-term accommodations in proximity to the Keystone Project. In these areas, it is more likely that construction workers would drive extended distances to find accommodations in small towns, or rely more extensively on RV parks and campgrounds. Conversely, in more urban areas, such as most of Missouri and Illinois, short-term housing is more abundant, particularly hotels and motels;

therefore, it is more likely that the available housing stock in proximity to the Keystone Project would be sufficient to meet the increased housing demands generated by the Keystone Project.

Local Economic Activity

The proposed pipeline has the potential to generate substantial direct and indirect economic benefits, for local and regional economies along the pipeline route. During construction, these benefits are derived from the construction labor requirements of the Keystone Project and spending on construction goods and services. At the local level, these benefits would be in the form of employment of local labor as part of the construction workforce and related income benefits from wage earnings, construction expenditures made at local businesses, and construction worker spending in the local economy.

Construction of the proposed Keystone Project, including the pipeline and pump stations, would result in hiring approximately 2,650 to 3,200 workers over the 18-month construction period. As indicated above, Keystone expects that roughly 10 to 15 percent of the construction workforce would be hired from local labor markets, thus 265 to 480 local workers throughout the entire region of influence, or 50 to 100 local workers per construction spread. Related income benefits would be substantial. Keystone estimates that the total construction payroll for the Keystone Project would be between $280 and $320 million; at the local level, construction income benefits are expected to total $28 to $48 million.

In addition to payroll spending, construction would generate substantial expenditures on goods and services, both inside and outside of the region of influence. Typical construction spending includes expenditures on fuel supplies, hardware needs, and parts/equipment. In total, the cost of construction goods and services for the Keystone Project is estimated at $110 to $130 million. Of this amount, approximately 40 percent, or $44 to $52 million, would be spent locally in the region of influence, thereby providing economic benefits to local businesses and service providers—primarily equipment suppliers, aggregate and concrete suppliers, and industrial supply depots.

Construction also would generate indirect local economic benefits from secondary activity spurred by the direct effects described above. This includes spending by the non-local construction workforce within local economies during the construction period, including expenditures on food, clothing, lodging, gasoline, and entertainment. The extent of local spending by non-local workers would be tied to labor earnings and individual spending patterns. Construction worker spending, in conjunction with outlays for construction goods and services, also would generate indirect economic benefits as these monetary flows circulate throughout the economy based on economic linkages among industries. These "ripple" effects, commonly referred to as "multiplier effects," result from businesses buying from other businesses and can generate additional economic benefits within the region of influence.

Labor and income benefits also would extend outside the region of influence based on the employment of non-local labor for the Project and expenditures on construction materials and services that would be imported into the area. Although these benefits would not be realized locally, they do represent a substantial positive economic impact at the national level.

Overall, construction of the proposed Keystone Project would result in a substantial positive impact on the local economies in the region of influence. While subsequent operation and maintenance of the project also would require some labor, most of the construction-related impacts would be temporary and would conclude with the end of construction in approximately 18 months.

Agriculture

Unlike the construction spending benefits to the local economy described above, Keystone Project construction has the potential to both temporarily and permanently displace land uses, primarily agriculture, and result in adverse economic impacts on the agricultural sector. For purposes of this analysis, agriculture consists of cropland, grassland/rangeland, and forestland—and includes activities associated with harvested crops, timber production, livestock grazing, and/or dairy production.

Agriculture is the predominant land use along the pipeline corridor, comprising about 94 percent of land crossed by the Keystone Project. Based on the size of the construction ROW, approximately 13,007 acres of agricultural land would be temporarily removed from production during portions of the 18-month construction period. This would result in lost agricultural production values and any related indirect economic activity that is associated with agricultural production. The direct effect of lost production values on individual landowners would be offset by compensation paid by Keystone for pipeline easements, which theoretically would reflect lost production values and agricultural income. Construction-related effects on displacement of most agricultural uses would be temporary, lasting only through the construction period. (Refer to Section 3.9 for a discussion of easement acquisition.)

Tax Revenue and Fiscal Resources

The fiscal benefits of the Keystone Project include short-term tax revenues generated during construction and long-term tax revenues associated with property tax payments. The proposed project is not expected to require substantial new government expenditures. The range of potential tax revenues during construction is described below.

In the short term, the predominant source of tax revenues would be sales/use and fuel taxes levied on goods and services purchased during the construction period. This includes, for example, construction materials and construction worker spending in the local economy for basic living expenses such as food, housing, gasoline, and entertainment. It is difficult to quantify these short-term tax benefits because tax rates and their applicability vary by region and jurisdiction.

For construction-related purchases, tax benefits would be dependent on construction spending levels and the ability of local businesses to meet the demand for required materials and services. The total cost of construction goods and services is estimated at between $110 and $130 million, of which about 40 percent (or $44 to $52 million) would be spent locally in the region of influence. To the extent that these expenditures are taxed, local governments would benefit.

For employee-generated purchases, tax revenues would depend on the proportion of the workforce that is local, the behavior of individual workers, and the duration of their stay. The magnitude of these tax benefits would be related to the construction worker payroll, which is estimated at between $280 and $320 million. Some portion of the construction payroll would be retained and spent within the region of influence by the construction workforce over the approximate 18-month construction period. The resulting tax revenues generated by this spending represent additional fiscal benefits of the proposed Keystone Project.

Short-term fiscal benefits also may be derived from fees assessed by federal agencies for the use of public land for pipeline and transmission ROWs, as well as from local, state, and federal income taxes paid by corporations and employees serving the Project. These taxes and fees vary by region and have not been quantified for this analysis.

Some increases in spending by local jurisdictions may be associated with increases in public service levels. However, these expenditures are expected to be minor due to the temporary nature of construction activities.

Public Services

Various types of emergency events may occur during construction, such as worker accidents requiring medical attention. As a result, the proposed Keystone Project could temporarily increase the demand for emergency response, medical, police, and fire protection services during the construction period. Table 3.10.1-7 lists the public service providers located in the region of influence. Emergency response in more urban areas likely would be quick, based on the proximity of public service facilities to the pipeline. However, in more rural sections of the proposed route, particularly North Dakota and most of South Dakota, emergency response times may be long based on communication, dispatch, and travel time constraints. It is the intent of Keystone to work with local law enforcement, fire departments, and emergency services providers, including medical aid facilities, to establish appropriate measures that would ensure effective emergency response and provision of related services; this information would be included in the ERP developed as part of the Keystone Project (Appendix C). With implementation of applicable measures in the ERP, construction-related impacts on public services are expected to be minor.

The influx of construction workers, and possibly spouses, in local communities also has the potential to generate additional demands on local public services. The magnitude of public service impacts would vary by community, depending on the size of the non-local workforce and their accompanying families, the size of the community, and duration of stay. However, as noted above, few non-local workers are expected to be accompanied by family members because of the short construction period and transient nature of the work. Therefore, potential public service impacts associated with temporary increases in population would be short term and minor.

Transportation and Traffic

Construction activities could result in short-term impacts on the transportation infrastructure. These impacts could include disruption to traffic flow due to the movement of construction equipment, materials, and crew members; closure of existing roads and railways during construction of pipeline crossings; and damage to local roads from movement of heavy construction equipment and materials. In general, impacts on local traffic levels would be of short duration and would be located in rural areas. Pipeline construction schedules typically begin and end outside of peak commuting hours. Any temporary impacts would include damage to local unpaved roadways and disruption of traffic flow, particularly during the initial staging that requires transport of bulk construction equipment and materials to the respective spread areas, as well as closures and disruption of roads during open-cut pipeline installation.

Prior to beginning construction work, Keystone would obtain permits and approvals for all road and railroad crossings. Construction across paved roads, highways, and railroads would be in accordance with the requirements of these permits. In general, all major paved highways and state roads and all railroads would be crossed by boring beneath the road or railroad, thereby minimizing disturbance to the transportation corridor.

In several areas, the pipeline ROW parallels major highways such as I-70 and State Road 370, both in St. Charles County, Missouri. Boring techniques would result in minimal or no disruption to traffic at road, highway, or railroad crossings, but congestion could be increased in areas where the pipeline parallels existing major highways that experience heavy traffic during the morning and evening peak hours of travel. Keystone's construction contractors would work with state and local transportation authorities to

ensure that construction in the parallel areas will not greatly affect traffic conditions. This likely would include conducting major pipeline work during the off-peak traffic hours. Completing each boring would require from 1 to 2 days for most roads and railroads, and up to 10 days for long crossings such as interstates or four-lane highways.

The open-cut method would be used to cross smaller rural routes, unpaved roads, and driveways, where permitted by local authorities or private owners. The open-cut method requires establishment of detours and temporary closure of the road to traffic. If a reasonable detour is not available, at least one lane of traffic would be kept open, except during brief periods during actual installation of the pipe. Most open-cut road crossings would be completed and the road resurfaced within 1 or 2 days. Safety measures would be implemented, such as posting signs at open-cut road crossings and the use of flagging personnel to indicate safe passage through construction areas. These measures also would help to minimize traffic disruptions.

Keystone would use public and preexisting private roads to provide access to most of the construction ROW. To minimize the effects of large machinery and transport trucks on local roads, traffic flows, and related services, major highways would be used as much as possible to transport slow-moving, heavy construction equipment to the spread areas. Keystone does not anticipate the need to improve and maintain many temporary roads to access the work areas. Paved roads are not likely to require improvement or maintenance prior to or during construction. Gravel roads and dirt roads may require maintenance during the construction period due to high use. Road improvements such as blading and filling would be restricted to the existing road footprint (i.e., the road would not be widened). Private roads and new temporary access roads would be used and maintained only with permission of the landowner or local land management agency.

Damage to existing roads also would be minimized by following permit requirements for maximum vehicle loads and width limits. Any soil remaining on the road surface from construction equipment and activities would be removed, and any damage to roads would be repaired by Keystone to preexisting conditions or better, following construction. Public safety on the roads would be ensured by requesting local police assistance to manage traffic flows while equipment is being moved. Transportation planning conducted for the Keystone Project as necessary to support state and local permitting would identify possible routes to be used during construction. In addition, Keystone would conduct more detailed traffic studies in more populated areas, in conjunction with state and local permitting processes.

Property Damages and Values

Land use patterns along the pipeline route vary, as described in Section 3.9. The predominant land use, however, is agricultural, particularly in the northern portions of the route. Keystone would acquire permanent pipeline ROW easements along the pipeline route, thereby causing both temporary and minor permanent reductions in agricultural production and values in the region of influence during and after the construction period. This would result in a short-term decrease in revenues earned by agricultural landowners due to decreased commodity sales. Construction of the aboveground facilities would permanently displace existing land uses in these areas, primarily agriculture. Monetary compensation would be provided to affected property owners for the conveyance of ROW easements or fee-title acquisition of lands. Compensation would be negotiated between Keystone and private landowners based on fair market values. (Refer to Section 3.9 for a discussion of easement acquisition.)

Construction activities also could generate property damage on private lands (e.g., to drainage tiles, irrigation systems, and fences). Keystone would restore lands damaged during construction and would repair or restore drain tiles, irrigation systems, fences, and other features damaged or temporarily

disturbed (see Section 3.9). If repair or replacement is not possible, Keystone would compensate landowners for property damage.

In theory, the net economic impact of construction-related Keystone Project activities on individual landowners would be negligible. Lost revenue from existing land uses and property damage would be offset by monetary compensation such that the economic status of landowners would be similar to existing conditions. As such, potential construction-related economic effects on landowners would be negligible.

Environmental Justice

The analysis of environmental justice effects is presented in Section 3.10.2.2.

3.10.2.2 Operations Impacts

Population

During operation, Keystone estimates that the proposed Keystone Project would require approximately 26 permanent employees, including 20 field staff and 6 head office staff. If all employees moved into the region along with their families, the population in the region of influence could increase by about 65 people. Because the new population would be dispersed across the region of influence based on the location of facilities, long-term population effects at the community level would not be expected to alter local demographic characteristics and are considered negligible.

Housing

Housing demand for the approximately 26 permanent positions generated by operation of the proposed Keystone Project would represent a permanent, yet negligible, increase in housing demand in selected areas along the pipeline route. It is expected that existing available housing resources in these areas could accommodate this demand; therefore, this impact is considered minor.

Local Economic Activity

During operation, the proposed Keystone Project would generate a demand for goods and services, including power, which would result in economic benefits to the region. The cost of operational goods and services is estimated at $1.3 million per year, plus an additional $46.5 million for power (TransCanada 2007b). It is further estimated that approximately 90 percent of this total, or about $43.0 million, would be spent in the project area. In addition to the 26 permanent jobs directly attributed to operations and the associated $5.5 million annual payroll, these expenditures would support additional jobs and related income benefits in the region.

Agriculture

Once construction is complete, most agricultural land uses would not be prohibited within the permanent pipeline ROW, and agricultural production would return to near pre-construction levels. However, some agricultural practices, such as forest production and permanent orchards, would not be allowed within the permanent pipeline ROW. Areas that historically were in forest or orchard production would remain fallow or would shift to an alternative agricultural use. In addition, construction and operation of ancillary aboveground facilities on agricultural lands would permanently remove this land from agricultural production. It is estimated that approximately 62 acres of agricultural land would be permanently displaced by aboveground facilities. Accordingly, long-run agricultural production is

expected to decline with implementation of the Keystone Project. As described in Section 3.9, potential adverse economic effects on individual landowners would be compensated by easement acquisition, and no economic impact would be expected to occur at the individual or farm level. However, there could be adverse indirect effects on the related support industries that serve crops that would be prohibited or displaced within the permanent ROW. Given the small amount of land potentially affected relative to the total amount of land dedicated to agricultural production in the region of influence, impacts to the agricultural sector are considered minor.

Because of current legal constraints regarding the publication of site-specific CRP contract information and data, the following analysis was completed based on a "worst-case" scenario approach, as identified below:

- We assumed that all acres affected by the Project within a county would touch, dissect, or cross a portion of a CRP contract(s) within that county.
- Because the exact location is not known of where, if at all, the pipeline would affect a CRP contract, we assumed that all acreage of the CRP contract affected by the pipeline would be removed from the program. Consequently, all annual monetary and environmental benefits would be lost. The worst-case approach was used because of potential disclosure problems under the Freedom of Information Act. In particular, because participation in and compensation paid by FSA to individual farmers are confidential, no information on particular parcels potentially affected by the Keystone Project can be revealed.
- The CRP practices in the counties affected by the pipeline are grasses, wetlands, and trees. For this analysis, the land use types considered for the affected counties included agriculture, cropland, grassland, rangeland, and wetland acres.

The results of this worst-case analysis are shown in Table 3-10.2-2.

Under the worst-case scenario (worst case assumes that all landowner tract acreage is impacted even though only some small percentage of that acreage is actually included in the CRP program, an obviously highly conservative assumption), the pipeline could affect 16,648 acres, 14,714 acres of which are either agricultural, cropland, or wetland acreage in those counties affected by the Mainline Project. Removal of all of the affected CRP acreage in those counties would result in a loss of about $802,000 in annual rental income payments to those participants who remove their land. As shown in Table 3-10.2-2 and as discussed above, all landowner rents were assumed lost on land, regardless of the percentage of that land enrolled in FSA programs. Consequently, for Illinois, Nebraska, and South Dakota, all rents were assumed lost under the worst-case scenario.[3]

[3] Further, in the worst-case situation, producers would be required to pay 25 percent of the annual rental payment, plus federal cost shares received, plus all annual rental payments, plus interest. These data are not included in Table 3.10.2-2.

TABLE 3.10.2-2
Worst-Case Scenario for Conservation Reserve Program Acres and Loss of Program Benefits by State Attributable to the Keystone Project

State	CRP Acres	Continuous CRP Acres [a]	CREP Acres	Annual Rent	Grass Acres (CP 1, 2, 4, and 10)	Wetland Acres (CP 9 and 23)	Wildlife Habitat Acres (CP 4, 12, and 25)	Tree Acres (CP 3, 11)
Illinois	335.5	79.4	0.0	$30,088	250.3	7.7	12.6	1.3
Kansas	3,516.8	251.8	0.0	$198,935	2647.7	0.0	617.3	0.0
Missouri	7,643.5	182.2	5.2	$516,789	7307.3	66.3	143.2	9.8
Nebraska	3,027.3	145.6	63.7	$230,527	2723.1	20.1	340.3	9.0
North Dakota	11,407.2	241.2	0.0	$493,203	7781.4	3,378.3	3,496.7	0.0
South Dakota	2,066.1	232.5	0.0	$102,235	1338.5	465.9	198.4	7.5
Total	**27,996.4**	**1,132.7**	**68.9**	**$1,571,776**	**22,048.3**	**3,938.3**	**4,808.5**	**27.6**

	Acres Affected during Construction [b]	Acres Affected by Permanent Right-of-Way [b]	CRP Acres	Worst-Case Percent of Affected CRP Acres during Construction	Worst-Case Percent of Affected CRP Acres from Permanent Right-of-Way	Agriculture, Cropland, Grassland Rangeland, and Wetland Acres Affected during Construction [b]	Worst-Case Percent of Affected CRP Acres Based on Land Use Type	Annual Rent	Loss of Annual Rent Based on % Change
Illinois	826	357	335.5	100.0	100.0	618	100.0	$30,088	$30,088
Kansas	1,497	603	3,516.8	42.6	17.1	1,667	47.4	$198,935	$94,297
Missouri	4,211	1,668	7,643.5	55.1	21.8	3,213	42.0	$516,789	$217,236
Nebraska	3,262	1,306	3,027.3	100.0	43.1	3,230	100.0	$230,527	$230,527
North Dakota	3,353	1,325	11,407.2	29.4	11.6	2,951	25.9	$493,203	$127,590
South Dakota	3,499	1,336	2,066.1	100.0	64.7	3,038	100.0	$102,235	$102,235
Total	**16,648**	**6,595**	**27,996.4**	**59.5**	**23.6**	**14,717**	**52.6**	**$1,571,776**	**$801,973**

TABLE 3.10.2-2
Continued

Notes:

CP = Conservation Practice. Numbers refer to specific practices. For example, CP1 is the new introduction of grasses and legumes. See Farm Service Agency. 2007. Conservation Reserve Program, Summary and Enrollment Statistics, FY 2006. Washington, DC. May.
CREP = Conservation Reserve Enhancement Program.
CRP = Conservation Reserve Program.

[a] Includes CREP acres.
[b] Data from preliminary draft EIS for the Keystone Pipeline Project.

The worst-case scenario is not probable, and the impact on FSA program participants, like those enrolled in the CRP and FWP programs, is expected to be minimal, temporary, and localized. Mitigation is recommended in Section 3.9 to prevent any adverse economic or environmental impact to FSA program participants (see Section 3.9.3.1).

Tax Revenue and Fiscal Resources

Once the Keystone Project is constructed, it would generate property tax revenues for the states and counties traversed by the pipeline, in accordance with applicable tax structures. Keystone has developed estimates of property taxes by state based on the value and/or length of pipe in the ground and quantity of aboveground facilities (see Table 3.10.2-3). Overall, an estimated $46.7 million in annual property tax revenues would be generated by the Keystone Project in the region of influence. Most of these revenues, about $30.2 million, are attributed to the Mainline Project. The Cushing Extension would generate the remaining $16.5 million. The incremental property tax revenues for the Mainline Project would be 0.24 percent of total current property taxes among all affected counties. The corresponding percent for the Cushing Extension would be 7.66 percent because of the lower current property taxes in the affected counties. Jurisdictions in Kansas would realize the greatest annual property tax benefits ($18.1 million). No property tax revenues would be generated in Illinois, where property taxes are not levied. Local counties would be the primary beneficiaries of estimated property tax benefits listed in Table 3.10.2-3. Based on the size of the existing tax base of affected jurisdictions, which varies substantially within the region of influence, these revenues may represent a minor to major fiscal benefit of the Keystone Project that would be realized over the long term.

Public Services

During operation, the approximate 26 permanent employees serving the Keystone Project and their associated family members would represent a long-term, yet minor, increase in the demand for the provision of public services. No decline in public service levels or need for facility expansions are anticipated. Further, any increase in demand for public services would be offset by increases in government revenues from property tax payments, which are often used to fund these services.

Transportation and Traffic

The proposed pipeline would be located underground and the aboveground ancillary facilities would be unmanned; consequently, pipeline operations would not affect local transportation systems. A negligible increase in vehicle trips would be associated with operations staff commuting to Keystone Project facilities.

As a part of its permanent aboveground facilities, Keystone would construct short, permanent access roads from public roads to the proposed pump stations, delivery facilities, and MLVs. The miles of new permanent access roads are included in the discussions of above ground facilities for the Mainline Project and the Cushing Extension (Section 2.1.1.3 and 2.1.2.3, respectively). Prior to construction, Keystone would finalize the location of permanent access roads, along with any additional temporary access roads. Impacts of the presence of the access roads on cultural, biological, and physical resources—and the required permits and approvals—are discussed in the respective resource sections. Future maintenance of newly created access roads would be the responsibility of Keystone.

TABLE 3.10.2-3
Property Tax Revenue Generated by the Keystone Project

State/County	Current Total Ad Valorem Property Taxes (Unless Noted) ($)	Property Tax Revenue (Project) ($)	Percent of Existing Revenue (%)
MAINLINE PROJECT			
North Dakota			
Pembina	10,212,016	713,843	6.99
Cavalier	6,295,726	19,457	0.31
Walsh	12,382,781	620,070	5.01
Nelson	4,364,556	936,951	21.47
Steele	3,814,357	690,742	18.11
Barnes	13,006,449	1,019,881	7.84
Ransom	6,607,588	649,205	9.83
Sargent	6,040,508	646,274	10.70
North Dakota subtotal	*62,723,981*	*5,296,423*	*8.44*
South Dakota			
Marshall	1,574,320	719,444	39.82
Day	2,070,614	905,346	26.70
Clark	1,871,952	1,081,954	35.90
Beadle	3,506,097	466,616	6.49
Kingsbury	1,459,097	462,898	24.06
Miner	1,887,182	738,034	25.61
Hanson	1,168,129	405,268	22.42
McCook	2,242,276	338,343	12.70
Hutchinson	2,550,459	708,283	20.45
Yankton	18,725,119	671,109	2.39
South Dakota subtotal	*37,055,245*	*6,497,295*	*11.55*
Nebraska (Taxes Levied)			
Cedar	14,373,607	848,105	5.90
Wayne	12,999,096	461,839	3.55
Stanton	10,581,066	594,587	5.62
Platte	93,424,920	68,326	0.07
Colfax	14,080,472	542,448	3.85
Butler	15,539,120	548,347	3.53
Seward	23,915,026	596,017	2.49
Saline	19,624,429	651,342	3.32
Jefferson	13,079,964	692,043	5.29
Gage	27,964,647	203,148	0.73
Nebraska subtotal	*245,582,347*	*5,206,202*	*2.12*

TABLE 3.10.2-3
Continued

State/County	Current Total Ad Valorem Property Taxes (Unless Noted)	Property Tax Revenue (Project)	Percent of Existing Revenue (%)
MAINLINE PROJECT (CONTINUED)			
Kansas			
Marshall	11,772,795	1,395,178	11.85
Nemaha	9,482,614	1,149,747	12.12
Brown	10,209,742	1,143,945	11.20
Doniphan	7,299,226	798,217	10.94
Kansas subtotal	*38,764,377*	*4,487,087*	*11.58*
Missouri			
Buchanan	1,061,552,284	628,976	0.06
Clinton	227,936,441	688,689	0.30
Caldwell	94,313,724	786,220	0.83
Carroll	133,562,042	843,943	0.63
Chariton	115,832,051	1,015,120	0.88
Randolph	304,867,379	704,612	0.23
Audrain	271,818,136	1,232,077	0.45
Montgomery	168,475,439	674,756	0.40
Lincoln	558,363,794	871,809	0.16
St. Charles	6,609,549,616	1,289,799	0.02
Missouri subtotal	*9,546,270,906*	*8,736,001*	*0.09*
Illinois			
Madison	2,404,500,000	0	0.00
Bond	108,000,000	0	0.00
Fayette	133,000,000	0	0.00
Marion	217,700,000	0	0.00
Illinois subtotal	*2,863,200,000*	*0*	*0.00*
CUSHING EXTENSION			
Nebraska (Taxes Levied)			
Jefferson	13,079,964	72,594	0.56
Kansas			
Washington	8,435,597	2,096,285	24.85
Clay	9,014,595	2,060,555	22.86
Dickinson	16,579,757	2,073,703	12.51
Marion	13,669,639	2,219,216	16.23

TABLE 3.10.2-3 Continued			
State/County	Current Total Ad Valorem Property Taxes (Unless Noted)	Property Tax Revenue (Project)	Percent of Existing Revenue (%)
CUSHING EXTENSION (CONTINUED)			
Kansas (continued)			
Butler	65,397,029	2,808,048	4.29
Cowley	31,923,989	2,342,500	7.34
Kansas subtotal	*145,020,606*	*13,600,307*	*9.38*
Oklahoma			
Kay	23,853,655	1,014,883	4.25
Noble	8,943,669	878,126	9.82
Payne	32,315,508	926,111	2.87
Oklahoma subtotal	*65,112,832*	*2,819,120*	*4.33*
Mainline Project subtotal	***12,793,596,856***	***30,223,013***	***0.24***
Cushing Extension subtotal	***223,213,402***	***16,492,019***	***7.66***
Keystone Project total	**13,016,810,258**	**46,715,032**	**0.36**

Sources: TransCanada 2007b, c.

Property Damages and Values

Potential adverse impacts on property values would be based on the encumbrances associated with a pipeline easement, responsibility for property taxes, effects on landowner insurance premiums, and lost economic uses of land. The impact of an oil pipeline project on the value of any land parcel depends on many factors, including the size, current value, and use of the parcel, and the value of other nearby properties. To the extent that the proposed Keystone Project would alter any of these factors, particularly changes in the economically viable land uses, property values may decline. As part of the ROW procurement process, Keystone would negotiate with the affected landowners to obtain an easement within the permanent pipeline ROW, compensating for any losses, including potential decreases in property values, which would be reflected in the easement purchase price. (Refer to Section 3.9 for a discussion of easement acquisition.)

Property value effects at the community or regional scale likely would be negligible for two principal reasons. First, land uses on parcels adjacent to the pipeline would not be affected, and land could continue to be used in its highest and best use. Second, the proposed pipeline would be underground and therefore would not adversely affect the regional amenity values that contribute to property values. For these reasons, the proposed Keystone Project is not expected to adversely affect property values.

Environmental Justice

As described in Section 3.10-1.7 and shown in Table 3.10.1-8, minority and low-income populations in a number of communities within the region of influence are meaningfully higher than in the surrounding region. In addition, several Native American tribes are proximate to the pipeline route. The Keystone

Project could generate substantial adverse environmental or economic or environmental justice effects in these communities. However, as described below, the Keystone Project and its associated mitigation measures are not expected to result in adverse impacts that would fall disproportionately on minority or low-income populations located along the pipeline route.

As described throughout this EIS, construction and operation of the proposed Keystone Project may generate a range of environmental impacts, but these would be minimized or mitigated, as applicable, based on mitigation proposed by Keystone and additional DOS-recommended mitigation measures. More pertinent to the environmental justice analysis are the related health and safety concerns based on the risk associated with a pipeline failure. Section 3.13 and Appendix L addresses the risks and associated impacts to public health and safety that would result from a pipeline failure; they also describe how applicable safety regulations and standards would minimize the potential for these risks. Further, the proposed pipeline route travels through rural and sparsely populated areas, and bypasses densely populated residential areas, thereby minimizing the number of persons who would be at risk of injury due to a pipeline failure. There is no evidence that such risks would be disproportionately borne by any minority or low-income populations identified within potentially affected communities in proximity to the Keystone Project.

The proposed Keystone Project would result in negligible to minor and temporary adverse effects on certain socioeconomic resources in the region, such as housing availability and public services. Conversely, Project-related spending and tax revenues would result in substantial socioeconomic benefits in the region of influence, which may in turn positively affect low-income and minority populations and Native American tribes through increased employment opportunities (and income benefits) and improved public service levels.

It also should be noted that an extensive public outreach program has been implemented in conjunction with the Keystone Project to ensure that public input is received, including any potentially affected minority or low-income population and tribal interests. The public review and comment process that DOS has implemented in association with the environmental review under NEPA has provided an additional opportunity for public input. Further, Keystone has communicated directly with the property owners who would be affected by the proposed Keystone Project, irrespective of minority or income status, regarding the proposed route and the results of archaeological and environmental surveys of their property. Therefore, all groups have been provided appropriate opportunities to participate in the EIS process.

In summary, the Keystone Project is not expected to result in any adverse environmental justice impacts to minority or low-income populations or Native American Tribes in the region of influence. These populations may benefit from the positive socioeconomic effects that the project is expected to generate.

3.10.2.2 Connected Action – Wood River Refinery Upgrade

Based on the anticipated investment and expansion of the Wood River Refinery, the region and the nation are expected to experience a range of socioeconomic impacts from this connected action. (Only limited economic effects are expected to be generated at other refineries because no substantial changes in capital investment or operations are anticipated.) Expansion of the Wood River Refinery is estimated to cost approximately $1 billion, which likely would include expenditures on capital equipment, other goods and materials, services, and labor. To the extent that these expenditures are made in the local region, for example Madison County, and industries are present to meet project demands, the project likely would result in substantial regional economic benefits. Within an input-output model framework, these benefits would include increases in direct, indirect, and induced economic output; value added (i.e., labor income,

other property income, and indirect business taxes); and employment in the region that result from spending rippling through the economy via inter-industry linkages. This is referred to as the "multiplier" effect. During project implementation, most of these benefits likely would be concentrated directly in the construction sector, including a significant increase in construction jobs. In addition, construction-support businesses and local retailers serving the construction workforce would realize economic benefits. Although the proportion of total project-generated spending that would occur at the regional level is not known, regional economic benefits could be substantial based on the total value of the project. These construction-related benefits would be temporary, lasting through the construction period.

Based on the specialized nature of capital equipment and labor that likely would be required to construct the project, it is probable that a substantial proportion of project spending would occur outside the immediate region. The need to import goods and services to implement the project represents leakage from the regional economy to the national economy, thereby resulting in economic benefits in other parts of the country in the form of increases in output, value added/income, and jobs. Similarly, these are short-term benefits coinciding with the construction period.

In the long term, expansion of the Wood River Refinery would result in greater refining capacity and increased production/output in the refined petroleum industry. Based on an estimated 340,000 bpd in increased crude oil shipments and an approximate crude oil contract price of $60 per barrel,[4] the estimated value of refinery inputs is $20.4 million per day, or $744.6 million annually. Depending on the refined product and associated value added at the refinery, the estimated value of refinery production resulting from oil delivered by the Keystone pipeline would be even higher. This would contribute to increases in gross domestic product at the local, state, and national levels. Such an expansion likely would generate an increase in operational expenditures for items such as industrial supplies and maintenance services, and would require a larger operations workforce. Similar to construction, if these operational expenditures and workers are based in the region, future operation of the Wood River Refinery would result in regional economic benefits, including higher levels of income and employment.

Other socioeconomic parameters that could be affected by expansion of the Wood River Refinery include increases in fiscal revenues and increased demands for public services and other local resources. The fiscal benefits of the project would be attributed to increased tax revenues, including sales, property, and income taxes that would be realized at the local, state, and national level. Conversely, potentially adverse socioeconomic effects could occur—particularly during construction—as a result of increased demand for a range of public services, including law enforcement, fire protection, and medical aid. This could disproportionately affect lower income areas. Depending on the characteristics of the construction workforce, demands may increase for short-term housing in the region, such as hotels/motels and rental units, driving rents up and affecting lower income or minority populations. Other environmental justice concerns, such as disproportionate air and water quality impacts to communities, would not be expected. As described in Sections 3.3 and 3.12, the refinery expansion would be required to obtain and follow all standards and requirements of permits necessary under the CAA and CWA.

In summary, expansion of the Wood River Refinery in response to increased crude oil deliveries from the Keystone pipeline is expected to generate both positive and adverse socioeconomic effects. Because of limited information, the magnitude of these effects has not been quantified at this time; however, the estimated value of the project (approximately $1 billion) suggests that these effects could be substantial.

[4] Energy Information Administration. 2007. Current prices reported in *This Week in Petroleum* on the internet. Available at: <http://tonto.eia.doe.gov/oog/info/twip/twip_crude.html>. Accessed May 17, 2007.

3.10.3 References

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3.11 CULTURAL RESOURCES

Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended, requires the lead federal agency with jurisdiction over a federal undertaking (i.e., a project, activity, or program that is funded by a federal agency or that requires a federal permit, license, or approval) must consider impacts to historic properties before that undertaking occurs. A historic property is defined as any district, archeological site, building, structure, or object that is either listed, or eligible for listing, in the National Register of Historic Places (NRHP). Under this definition, other cultural resources may be present within a project's Area of Potential Effect (APE) but would not be considered historic properties if they do not meet the eligibility requirements for listing in the NRHP. To be considered eligible for the NRHP, a property must be greater than 50 years of age, although there are provisions for listing cultural resources of more recent origin if they are of "exceptional" importance. The intent of Section 106 is for federal agencies to take into account adverse effects on any historic properties situated within the APE of the proposed undertaking; and to afford the Advisory Council on Historic Preservation (ACHP), State Historic Preservation Officers (SHPOs), tribal groups, applicants for federal assistance, local governments, and any other interested parties an opportunity to comment on the proposed action within a reasonable period.

The implementing regulation of Section 106 is 36 CFR Part 800. This regulation establishes a process of identifying NRHP-eligible or listed historic properties that may be affected by the proposed undertaking; assessing the undertaking's effects on those resources; and engaging in consultation that seeks ways to avoid, reduce, or mitigate any adverse effects on NRHP-listed or -eligible properties. Adverse effects include, but are not limited to, destruction or alteration of all or part of a property; isolation from or alteration of its surrounding environment; introduction of visual, audible, or atmospheric elements that are out of character with the property or that alter its setting; transfer or sale of a federally owned property without adequate conditions or restrictions regarding preservation, maintenance, or use; and neglect of a property resulting in its deterioration or destruction (36 CFR 800.5).

36 CFR Part 800 further specifies that certain parties must be consulted during the process. These parties include each SHPO whose state would physically include any portion of the APE. The SHPO is appointed by each state to protect the interests of its citizens with respect to issues of cultural heritage. Section 101(b)(3) of the NHPA provides each SHPO a primary role in advising the responsible federal agencies and ACHP in their efforts to carry out Section 106 requirements. The SHPO, as well as the federal agencies, have an obligation to work with state and local governments, private organizations, and individuals during the initial planning and development of the Section 106 process. Federal agencies usually consult with the SHPO when developing methodologies related to cultural resource investigations but are required to notify SHPO when making findings related to the establishment of an APE, NRHP-eligibility of historic resources, project effects, and resolution of adverse effects. On non-Tribal lands, the SHPO in consultation with the lead federal agency assesses the need for cultural resources investigations in the project APE, generates and approves methodologies for undertaking such investigations within the state, and evaluates the preliminary NRHP status of any cultural resources located within the APE. The SHPO also provides the ACHP an assessment of the level of projected impacts on historic properties and works with the project applicant, lead federal agency, ACHP, and Native American tribes (amongst others) to mitigate any negative impacts that could occur to NRHP-eligible or -listed properties.

In addition to the SHPO, Section 106 recognizes the importance of consulting with tribes for federal undertakings that are proposed within Native American ancestral territories. Specifically, 36 CFR 800.2(c)(2)(ii) notes "Section 101(d)(6)(B) of the NHPA requires the agency official to consult with any Indian tribe or Native Hawaiian organization that attaches religious and cultural significance to historic properties that may be affected by an undertaking. This requirement applies regardless of the location of

the historic property." In addition, sub-part (B) of the same statute says the "Federal Government has a unique legal relationship with Indian tribes set forth in the Constitution of the United States, treaties, statutes, and court decisions. Consultation with Indian tribes should be conducted in a sensitive manner respectful of tribal sovereignty. Nothing in this part alters, amends, repeals, interprets or modifies tribal sovereignty, any treaty rights, or other rights of an Indian tribe, or preempts, modifies or limits the exercise of any such rights."

With respect to undertakings on federally recognized Native American tribal lands, the Section 106 responsibilities described above can be assumed by a Tribal Historic Preservation Officer (THPO) under Section 101(d)(2) of the NHPA. In this event, all consultations regarding the project and its potential effect on historic properties within the relevant tribal lands are through the THPO. The state SHPO still must be consulted relative to non-tribal lands. In the event that the tribe has not assumed the SHPO functions on its lands, the lead federal agency is required to consult with both the SHPO and the tribe's designated representative for any potential adverse effects on historic properties on their lands.

Section 106 regulations state that each SHPO (or THPO, if they have assumed the SHPO's role) generally is required to respond within 30 days of receiving a request to review a proposed action, or a request to make a finding or determination regarding historic properties located within the project APE. In the event that the SHPO/THPO does not respond within this time frame, 36 CFR 800.3(c)(4) states that the lead agency can decide to (1) proceed to the next step in the application process based on any earlier findings or determinations that have been made up to that point; or (2) consult directly with the ACHP in lieu of the SHPO/THPO. If, after this step is followed, the SHPO or THPO decides to re-enter the Section 106 process, 36 CFR 800.3(c)(4) further states that the lead agency official may continue the consultation proceeding without being required to reconsider previous findings or determinations.

DOS has elected to primarily follow the assessment criteria for pipeline projects that have been developed by FERC. For cultural resources, the relevant assessment schema is found in the "Guidelines for Reporting on Cultural Resources Investigations for Pipeline Projects," published by the FERC Office of Energy Projects in 2002. Unless otherwise stated, the statements made in this document to assess Section 106 compliance for the Keystone Project have used those guidelines in their determination. Keystone provided information, analyses, and recommendations to assist DOS in complying with Section 106, in accordance with NHPA regulations.

Cultural resources are locations of human activity, occupation, or usage that contain materials, structures, or landscapes that were used, built, or modified before or after the presence of Euro-Americans. As a category, it includes spatially circumscribed areas of human activity such as Pre-contact Native American archeological sites, Euro-American farmsteads or a National Register district of historic buildings. It also includes traditional cultural properties (TCPs), which do not necessarily have evidence of human activity. Bulletin #38 of the National Register defines TCPs as locations that embody the "beliefs, customs, and practices of a living community of people that have been passed down through the generations, usually orally or through practice. The traditional cultural significance of a historic property, then, is significance derived from the role the property plays in a community's historically rooted beliefs, customs, and practices."

For this analysis, reported cultural resources were divided into four main groups: Pre-contact, historic, multi-component, and traditional. Pre-contact resources are sites that contain material evidence of Native American activities before Europeans entered the project area. Examples of Pre-contact sites include rock art; camp or village sites; rock shelters; and scatters of stone, bone, or ceramic tool-making debris. Historic resources can include recent Native American activity locations but generally reflect Euro-American activities of the last 250 years. These can include residential, government, or commercial structures; farmsteads; mining sites; roads or railways; and ceramic, metal, and glass artifact scatters.

Multi-component resources are locations where both historic and Pre-contact cultural remains are present. Finally, traditional resources are TCPs defined through consultation with federally recognized Native American tribes and through public meetings with local community members. Although none have been identified during the Keystone Section 106 process to date, TCPs can be a historic property under Section 106 (c.f. 36 CFR 800.2(c)(2)(B)(ii) et seq.) and will be taken into account by DOS during the EIS consultation process and through any Programmatic Agreement (PA) that is developed during this Project (see Section 3.11.3).

3.11.1 Environmental Setting

The proposed Keystone Project includes the Mainline Project that crosses six states (North Dakota, South Dakota, Nebraska, Kansas, Missouri, and Illinois) and the proposed Cushing Extension that lies within three states (Nebraska, Kansas, and Oklahoma). The legislation enacted for Section 106 of the NHPA declares for projects crossing state boundaries that the relevant SHPO (and THPO, if they have assumed SHPO duties) offices may choose to designate one of their number as having Lead SHPO authority. This provision, 36 CFR 800.3(c)(2), would allow the Lead SHPO to take all actions necessary to conclude the Section 106 application process. The proposed Keystone pipeline does not traverse Native American tribal lands. No THPO assumed the lead on Section 106 duties, and the relevant SHPO offices did not elect to exercise the Lead SHPO option. The cultural resources sections of the EIS, therefore, summarize the cultural resources aspects of the Keystone Project in relation to each individual state.

The APE for this project varies from state to state, but in general the project corridor ranges between 200 and 300 feet wide and is centered on the Project centerline. Where the Keystone Pipeline Project is collocated with an existing pipeline, the APE is adjusted from 40 to 60 feet on the collocated side and from 160 to 240 feet on the non-collocated side. The APE for this Project also includes Project access roads, additional temporary workspace, pipeline reroutes, and appurtenant facilities. Figures 2.1-10 to 2.1-17 provide the routes of the pipeline through the affected states. Table 3.11.1-1 also illustrates the APEs for each respective state.

3.11.1.1 North Dakota

The Keystone pipeline would enter North Dakota from Canada and would extend through the state for approximately 216.9 miles. The counties crossed include Cavalier, Pembina, Walsh, Nelson, Steele, Barnes, Ransom, Sargent, and Dickey. Metcalf Archaeological Consultants (Metcalf) was contracted on behalf of Keystone to perform the required cultural resources assessments within the state. Their draft survey report was submitted to the North Dakota SHPO in January 2007 (Meier et al. 2006a).

Metcalf undertook a Class I literature and file search of the proposed pipeline route in January 2006; this research was revised in September 2006 to incorporate projected changes to the preferred route. The searches collected cultural site and survey data that were housed at the State Historical Society of North Dakota. The information was reviewed in relation to a corridor that extended for the length of the proposed pipeline route and that was 1 mile wide, centered on the route's proposed centerline. The records search identified 119 cultural resources within this region. The resources included 18 Pre-contact sites, four historic sites, eight sites with both historic and Pre-contact cultural components, 26 locations represented by architectural remains, and nine locations limited to isolated cultural finds. The specific locations of these resources generally could be plotted in relation to the planned survey corridor. In contrast, most of the remaining 54 cultural resources could not be plotted on the Project maps, as precise geographic data were not available for these site "leads." The background research indicated that only one known cultural resource, a church structure, was located within the projected corridor.

TABLE 3.11.1-1. Area of Potential Effect for the Keystone Project by State		
State	**Counties**	**Corridor Area of Potential Effect**
North Dakota	Cavalier, Pembina, Walsh, Nelson, Steele, Barnes, Ransom, Sargent, Dickey	300-foot-wide corridor, centered on Project centerline
South Dakota	Brown, Marshall, Day, Clark, Beadle, Kingsbury, Miner, Hanson, McCook, Hutchinson, Yankton	300-foot-wide corridor, centered on Project centerline
Nebraska	Cedar, Wayne, Stanton, Platte, Colfax, Butler, Seward, Saline, Jefferson, Gage	300-foot-wide corridor centered on Project centerline; for collocated pipeline, 60 feet on collocated side and 240 feet on non-collocated side
Kansas	Marshall, Nemaha, Brown, Doniphan, (Washington, Clay, Dickinson, Marion, Butler, and Cowley)	200-foot-wide corridor centered on Project centerline (300-foot-wide corridor for Cushing Extension)
Missouri	Buchanan, Clinton, Caldwell, Carroll, Chariton, Randolph, Audrain, Montgomery, Lincoln, and St. Charles	200-foot-wide corridor centered on centerline used for Rockies Express Western Phase Project survey
Illinois	Madison, Bond, Fayette, Marion	200-foot-wide corridor; for areas with collocated pipeline, 40 feet on collocated side and 160 feet on non-collocated side; 300-foot-wide corridor centered on centerline in greenfield areas
Oklahoma	Kaye, Noble, Payne	300-foot-wide corridor centered on Project centerline

Metcalf submitted its research design for cultural resources field studies to the North Dakota SHPO in January 2006. The research design was developed in part through discussions with the North Dakota SHPO. It proposed that a cultural resources pedestrian field effort (Class III survey) be conducted along 49.5 miles of the proposed pipeline, using a 300-foot-wide survey corridor that was centered on the proposed Project centerline. The excavation of shovel probes was proposed at high-potential landforms with low surface visibility. The sampling strategy focused on landform types that were derived from the known site database and the results of previous surveys. The pedestrian survey was to use survey transects spaced no more than 65.6 feet (20 meters) apart and to use 15.7-inch- (40-centimeter-) diameter shovel probes at locations with poor surface visibility or where cultural materials within 3.3 feet (1 meter) of the ground surface were suspected. The research design further proposed Class II vehicular reconnaissance of the entire pipeline route by geomorphologists to ascertain locations where deeply buried cultural deposits were possible and at 41 miles of the route for archaeologists to field-assess additional Class III survey locations. The SHPO accepted the proposed research plan in a letter dated February 23, 2006.

Metcalf conducted the initial cultural resources field survey of the proposed Keystone pipeline route between May and August 2006. Route adjustments were surveyed between October and November 2006; geomorphological testing also was conducted during this period (Bleier et al. 2006a). The surveys

examined a 300-foot-wide corridor that extended for 67.4 miles; it included 47.7 miles of the original planned route and 19.7 miles of proposed reroutes. While no federally owned land is bisected within the North Dakota corridor, the areas inspected included easements that were assessed at the request of USFWS. Access was denied to Metcalf along 2.9 miles of the planned survey areas (Table 3.11.1-2); therefore, the cultural resources inventory of the proposed 30-inch-diameter Keystone pipeline is incomplete at this time. The North Dakota SHPO sent a letter on January 24, 2007, to Metcalf that agreed with the findings of the field survey that were contained in the Bleier et al. 2006a report. The cultural resources surveys for Project access roads, additional temporary workspace, pipeline reroutes, and appurtenant facilities are ongoing. Keystone anticipates that an addendum report will be filed with the SHPO for these aspects of the Project in September 2007.

TABLE 3.11.1-2
Cultural Resources Survey Status of the Keystone Mainline Project in North Dakota as of July 2007 (excluding reroutes)

Milepost		Miles	Survey Status
Start	End		
0.0	4.7	4.7	Not selected for survey in sampling strategy
4.7	6.9	2.2	Survey completed
6.9	7.2	0.3	Not surveyed (land access denial)
7.2	9.2	2.0	Survey completed
9.2	15.2	6.0	Not selected for survey in sampling strategy
15.2	17.3	2.1	Survey completed
17.3	17.8	0.5	Not surveyed (land access denial)
17.8	18.3	0.5	Survey completed
18.3	20.0	1.7	Not surveyed (land access denial)
20.0	25.3	5.3	Survey completed
25.3	29.3	4.0	Not selected for survey in sampling strategy
29.3	29.6	0.3	Survey completed
29.6	30.7	1.1	Not selected for survey in sampling strategy
30.7	32.3	1.6	Survey completed
32.3	33.1	0.8	Not selected for survey in sampling strategy
33.1	33.3	0.2	Survey completed
33.3	33.4	0.1	Survey completed
33.4	33.5	0.1	Not surveyed (land access denial)
33.5	35.1	1.6	Not selected for survey in sampling strategy
35.1	35.4	0.3	Survey completed
35.4	36.2	0.8	Not selected for survey in sampling strategy
36.2	37.3	1.1	Survey completed
37.3	37.9	0.6	Not selected for survey in sampling strategy
37.9	38.3	0.4	Survey completed
38.3	40.7	2.4	Not selected for survey in sampling strategy
40.7	43.4	2.7	Survey completed
43.4	45.8	2.4	Not selected for survey in sampling strategy
45.8	46.4	0.6	Survey completed

TABLE 3.11.1-2
(Continued)

Milepost		Miles	Survey Status
Start	End		
46.4	48.8	2.4	Not selected for survey in sampling strategy
48.8	49.3	0.5	Survey completed
49.3	53.5	4.2	Not selected for survey in sampling strategy
53.5	54.7	1.2	Survey completed
54.7	56.6	1.9	Not selected for survey in sampling strategy
56.6	58.6	2.0	Survey completed
58.6	74.5	15.9	Not selected for survey in sampling strategy
74.5	75.0	0.5	Survey completed at request of U.S. Fish and Wildlife Service (USFWS)
75.0	76.0	1.0	Not selected for survey in sampling strategy
76.0	76.3	0.3	Survey completed at request of USFWS
76.3	77.0	0.7	Survey completed at request of USFWS and State Historic Preservation Officer (SHPO)
77.0	78.1	1.1	Survey completed
78.1	79.1	1.0	Not selected for survey in sampling strategy
79.1	79.5	0.4	Survey completed at request of USFWS
79.5	80.1	0.6	Not selected for survey in sampling strategy
80.1	82.3	2.2	Survey completed at request of USFWS
82.3	85.8	3.5	Not selected for survey in sampling strategy
85.8	86.5	0.7	Survey completed at request of USFWS
86.5	87.0	0.5	Not selected for survey in sampling strategy
87.0	88.0	1.0	Survey completed at request of USFWS
88.0	97.7	9.7	Not selected for survey in sampling strategy
97.7	98.3	0.6	Survey completed at request of USFWS
98.3	108.4	10.1	Not selected for survey in sampling strategy
108.4	108.5	0.1	Survey completed at request of USFWS
108.5	109.6	1.1	Not selected for survey in sampling strategy
109.6	110.1	0.5	Survey completed at request of USFWS
110.1	110.6	0.5	Not selected for survey in sampling strategy
110.6	111.1	0.5	Survey completed at request of USFWS
111.1	112.7	1.6	Not selected for survey in sampling strategy
112.7	113.2	0.5	Survey completed at request of USFWS
113.2	118.9	5.7	Not selected for survey in sampling strategy
118.9	119.2	0.3	Survey completed at request of USFWS
119.2	127.6	8.4	Not selected for survey in sampling strategy
127.6	127.8	0.2	Survey completed at request of USFWS
127.8	128.0	0.2	Not selected for survey in sampling strategy
128.0	128.7	0.7	Survey completed at request of USFWS
128.7	132.2	3.5	Not selected for survey in sampling strategy
132.2	133.2	1.0	Survey completed
133.2	136.2	3.0	Not selected for survey in sampling strategy

TABLE 3.11.1-2
(Continued)

Milepost		Miles	Survey Status
Start	End		
136.2	137.4	1.2	Survey completed
137.4	138.4	1.0	Survey completed at request of USFWS
138.4	138.9	0.5	Not selected for survey in sampling strategy
138.9	139.4	0.5	Survey completed at request of USFWS
139.4	160.6	21.2	Not selected for survey in sampling strategy
160.6	165.7	5.1	Survey completed
165.7	167.7	2.0	Survey completed at request of USFWS and SHPO
167.7	169.3	1.6	Not selected for survey in sampling strategy
169.3	170.8	1.5	Survey completed at request of USFWS and SHPO
170.8	173.9	3.1	Survey completed
173.9	175.5	1.6	Not selected for survey in sampling strategy
175.5	176.0	0.5	Survey completed at request of USFWS
176.0	176.6	0.6	Not selected for survey in sampling strategy
176.6	177.0	0.4	Survey completed at request of USFWS
177.0	177.5	0.5	Not selected for survey in sampling strategy
177.5	178.6	1.1	Survey completed at request of USFWS
178.6	178.8	0.2	Not surveyed (land access denial)
178.8	179.1	0.3	Survey completed at request of USFWS
179.1	180.1	1.0	Not selected for survey in sampling strategy
180.1	180.7	0.6	Survey completed at request of USFWS and SHPO
180.7	181.1	0.4	Survey completed at request of USFWS and SHPO
181.1	183.4	2.3	Survey completed at request of USFWS and SHPO
183.4	186.6	3.2	Not selected for survey in sampling strategy
186.6	187.2	0.6	Survey completed at request of USFWS
187.2	187.7	0.5	Not selected for survey in sampling strategy
187.7	188.9	1.2	Survey completed at request of USFWS
188.9	189.3	0.4	Survey completed at request of USFWS and SHPO
189.3	189.4	0.1	Survey completed
189.4	194.3	4.9	Not selected for survey in sampling strategy
194.3	196.3	2.0	Survey completed
196.3	200.2	3.9	Not selected for survey in sampling strategy
200.2	204.8	4.6	Survey completed
204.8	204.9	0.1	Not surveyed (land access denial)
204.9	205.8	0.9	Survey completed
205.8	210.8	5.0	Not selected for survey in sampling strategy
210.8	211.8	1.0	Survey completed
211.8	216.9	5.1	Not selected for survey in sampling strategy

TABLE 3.11.1-2 (Continued)	
Miles	**Survey Status**
65.2	Total miles surveyed
148.8	Miles outside sampling strategy
2.9	Total miles remaining to be surveyed

3.11.1.2 South Dakota

The Keystone pipeline would enter South Dakota from Dickey County in North Dakota and would extend through the state for approximately 218.9 miles. The counties crossed include Brown, Marshall, Day, Clark, Beadle, Kingsbury, Miner, Hanson, McCook, Hutchinson, and Yankton. Metcalf was contracted on behalf of Keystone to perform the required cultural resources assessments within the state. Their draft survey report was submitted to the South Dakota SHPO in January 2007 (Meier et al. 2006b).

Metcalf undertook a literature review and file search (Level I study) of the proposed pipeline route in January 2006; this research was revised in September 2006 to incorporate projected changes to the preferred route. The cultural site and survey data collected were located at the South Dakota Archeological Research Center and the South Dakota State Historic Preservation Office. The information was reviewed in relation to a corridor that extended for the length of the proposed pipeline route and was 2 miles wide, centered on the route's proposed centerline. The records search identified 30 cultural resources within this region. These resources included 10 Pre-contact sites and 17 historic sites. The specific locations of these resources generally could be plotted in relation to the planned survey corridor. In contrast, the remaining three cultural resources could not be plotted on the Project maps, as precise geographic data were not available for these site leads. A total of 243 historic structures and buildings also was plotted within the confines of the 2-mile-wide evaluation zone. The data collected indicated that several historic railway lines were the only known cultural resources that would be crossed by the proposed pipeline Project.

Metcalf submitted its research design for cultural resources field studies to the South Dakota SHPO in February 2006. The research design was developed in part through discussions with the South Dakota SHPO. It proposed that a cultural resources pedestrian survey (Level II study) be conducted along 38.5 miles of the proposed pipeline, using a 300-foot-wide survey corridor that was centered on the proposed centerline. The sampling strategy focused on landform types that were derived from the known site database and the results of previous surveys. The pedestrian survey was to use survey transects spaced no more than 65.6 feet (20 meters) apart and to use 15.7-inch- (40-centimeter-) diameter shovel probes at locations with poor surface visibility or where cultural materials within 3.3 feet (1 meter) of the ground surface were suspected. The research design further proposed vehicular reconnaissance of the entire pipeline route by geomorphologists to ascertain locations where deeply buried cultural deposits were possible and along 52 miles of the route for archaeologists to field-assess additional Level II survey locations. The SHPO accepted the proposed research plan in a letter dated March 28, 2006.

Metcalf conducted the cultural resources field survey of the proposed Keystone pipeline between May and August 2006. Route adjustments to the line were surveyed between October and November 2006; geomorphological testing was also conducted during this period (Bleier et al. 2006b). The survey

examined a 300-foot-wide corridor that extended for 49.4 miles; it included 39.5 miles of the original planned route and 9.9 miles of proposed reroutes. While no federally owned land is bisected within the South Dakota project corridor, the areas inspected included easements that were assessed at the request of USFWS. Access was denied to Metcalf along 2.0 miles of the planned survey areas (Table 3.11.1-3); therefore, the cultural resources inventory of the proposed 30-inch-diameter Keystone pipeline is incomplete. The South Dakota SHPO sent letters to DOS on March 23 and April 24, 2007, which did not concur with some findings of the initial Metcalf field survey. Metcalf met with the South Dakota SHPO on June 15 to discuss the SHPO comments and has agreed to provide additional information to the SHPO and DOS in a filing that is expected in July 2007. Cultural resources surveys for Project access roads, additional temporary workspace, pipeline reroutes, and appurtenant facilities also are ongoing. Keystone anticipates that completed reports will be filed for these aspects of the Project by September 2007.

TABLE 3.11.1-3
Cultural Resources Survey Status of the Keystone Mainline Project in South Dakota as of July 2007 (excluding reroutes)

Milepost			
Start	End	Miles	Survey Status
216.9	237.9	21.0	Not selected for survey in sampling strategy
237.9	238.9	1.0	Survey completed
238.9	239.9	1.0	Not surveyed (seasonal water inundation)
239.9	240.9	1.0	Not selected for survey in sampling strategy
240.9	241.9	1.0	Survey completed
241.9	254.1	12.2	Not selected for survey in sampling strategy
254.1	255.6	1.5	Survey completed
255.6	256.1	0.5	Not surveyed (land access denial)
256.1	260.1	4.0	Not selected for survey in sampling strategy
260.1	260.7	0.6	Survey completed
260.7	261.6	0.9	Survey completed at request of U.S. Fish and Wildlife Service (USFWS) and State Historic Preservation Officer (SHPO)
261.6	268.1	6.5	Survey completed
268.1	293.2	25.1	Not selected for survey in sampling strategy
293.2	295.2	2.0	Survey completed
295.2	305.2	10.0	Not selected for survey in sampling strategy
305.2	306.2	1.0	Survey completed
306.2	309.4	3.2	Not selected for survey in sampling strategy
309.4	310.4	1.0	Survey completed
310.4	310.6	0.2	Not selected for survey in sampling strategy
310.6	311.0	0.4	Survey completed at request of USFWS
311.0	311.4	0.4	Not selected for survey in sampling strategy
311.4	312.6	1.2	Survey completed
312.6	313.7	1.1	Not selected for survey in sampling strategy
313.7	316.4	2.7	Survey completed
316.4	316.7	0.3	Survey completed at request of USFWS and SHPO

TABLE 3.11.1-3
(Continued)

Milepost			
Start	End	Miles	Survey Status
316.7	316.9	0.2	Survey completed
316.9	321.7	4.8	Not selected for survey in sampling strategy
321.7	321.9	0.2	Survey completed
321.9	322.3	0.4	Survey completed at request of USFWS and SHPO
322.3	322.9	0.6	Survey completed
322.9	324.5	1.6	Not selected for survey in sampling strategy
324.5	324.6	0.1	Survey completed at request of USFWS
324.6	324.9	0.3	Survey completed at request of USFWS
324.9	325.5	0.6	Not selected for survey in sampling strategy
325.5	325.6	0.1	Survey completed at request of USFWS
325.6	332.3	6.7	Not selected for survey in sampling strategy
332.3	332.7	0.4	Survey completed at request of USFWS
332.7	333.8	1.1	Not selected for survey in sampling strategy
333.8	335.2	1.4	Survey completed at request of USFWS
335.2	339.0	3.8	Not selected for survey in sampling strategy
339.0	339.9	0.9	Survey completed at request of USFWS
339.9	349.4	9.5	Not selected for survey in sampling strategy
349.4	349.8	0.4	Survey completed at request of USFWS
349.8	355.6	5.8	Not selected for survey in sampling strategy
355.6	356.0	0.4	Survey completed at request of USFWS
356.0	358.9	2.9	Not selected for survey in sampling strategy
358.9	359.9	1.0	Survey completed
359.9	360.2	0.3	Not selected for survey in sampling strategy
360.2	361.6	1.4	Survey completed at request of USFWS
361.6	363.5	1.9	Not selected for survey in sampling strategy
363.5	364.6	1.1	Survey completed at request of USFWS
364.6	369.5	4.9	Not selected for survey in sampling strategy
369.5	371.5	2.0	Survey completed
371.5	376.6	5.1	Not selected for survey in sampling strategy
376.6	377.7	1.1	Survey completed
377.7	383.5	5.8	Not selected for survey in sampling strategy
383.5	384.5	1.0	Survey completed
384.5	385.7	1.2	Not selected for survey in sampling strategy
385.7	386.0	0.3	Survey completed
386.0	388.5	2.5	Survey completed
388.5	390.2	1.7	Not selected for survey in sampling strategy
390.2	390.7	0.5	Survey completed
390.7	394.4	3.7	Not selected for survey in sampling strategy

TABLE 3.11.1-3
(Continued)

Milepost			
Start	End	Miles	Survey Status
394.4	394.9	0.5	Survey completed
394.9	401.4	6.5	Not selected for survey in sampling strategy
401.4	403.4	2.0	Survey completed
403.4	413.7	10.3	Not selected for survey in sampling strategy
413.7	418.7	5.0	Survey completed
418.7	421.3	2.6	Not selected for survey in sampling strategy
421.3	422.9	1.6	Survey completed
422.9	426.7	3.8	Not selected for survey in sampling strategy
426.7	427.7	1.0	Survey completed
427.7	428.2	0.5	Not surveyed (land access denial)
428.2	430.7	2.5	Not selected for survey in sampling strategy
430.7	431.9	1.2	Survey completed
431.9	435.8	3.9	Not selected for survey in sampling strategy
		47.7	Total miles surveyed
		169.2	Miles outside sampling strategy
		2.0	Total miles remaining to be surveyed

3.11.1.3 Nebraska

Mainline Project

The Mainline Project would enter Nebraska from Yankton County, South Dakota and would extend through the state for approximately 213.8 miles. The counties crossed include Cedar, Wayne, Stanton, Platte, Colfax, Butler, Seward, Saline, Jefferson, and Gage. American Resources Group, Ltd. (ARG) and SWCA Environmental Consultants (SWCA) were contracted on behalf of Keystone to perform the required cultural resources background research and field assessments in the state. Keystone also entered into an agreement with Kinder Morgan and Rockies Express Pipeline LLC to purchase the results of cultural resource studies that were conducted in 2005/2006 for the proposed Rockies Express (REX) Natural Gas Pipeline Project. Keystone submitted the REX reports (Schwegman et al. 2006, Schwegman 2006, Rieken 2007, Anderson and Aberle 2007, Shah Lomas 2007c) as evidence of existing survey coverage at potential Keystone Project ancillary facilities, access roads, and 12.3 miles of collocated corridor in Jefferson and Gage Counties. The potential environmental impacts of the REX pipeline were assessed as part of FERC's evaluation of FERC Docket CP06-354-000. Portions of the following discussion are derived from the EIS that was produced during that evaluation.

Prior to the Keystone fieldwork, SWCA performed a records review (Class I files search) of the proposed pipeline route in January 2006 (Burnett and Slessman 2006a); this research was revised in March 2006 to take into account projected changes to the preferred route (Burnett and Slessman 2006b). The cultural site and survey data were located at the State Historical Preservation Office in Nebraska and the online records of the Nebraska General Land Office (GLO). The information from the State Historic Preservation Office was reviewed in relation to a corridor that extended for the length of the proposed

pipeline route and was 2 miles wide, centered on the proposed centerline. The records search identified 40 cultural resources in this area. The resources included 27 historic sites, 10 Pre-contact sites, one site with both Pre-contact and historic artifact assemblages, and one proto-historic (European contact-era) site. The potential age and type of one site could not be determined based on the information presented on the site form. The data indicated that four known cultural resources were plotted within 150 feet of the proposed pipeline centerline. These included two Pre-contact village or burial sites (25BU3 and 25CD21) and two historic cabin or trail sites (25CX7 and 25PT108). The review of GLO records examined land parcels situated within 150 feet of the proposed pipeline centerline. This search identified 14 properties, including roads between Fort Leavenworth and Laramie, Fort Kearney and Nebraska City, Fort Kearney and Omaha, and Omaha and Fort Sterling. A Union Pacific & Burlington system railroad crossing was noted.

Keystone, through its cultural resource contractor, submitted its initial and revised research designs for cultural resources field studies to the Nebraska SHPO in February and March 2006. An email dated March 8, 2006, also was sent to the SHPO that summarized the research design. The research design was developed in part through discussions with the Nebraska SHPO. It proposed that a cultural resources field survey be conducted along the entire proposed pipeline, using a 300-foot-wide survey corridor. Where collocated with another pipeline, the survey would cover 60 feet to the collocated side and 240 feet to the non-collocated side. At greenfield sections, the survey corridor would be centered on the proposed centerline. The pedestrian survey was to use survey transects spaced no more than 98.4 feet (30 meters) apart and to use shovel tests at locations where surface visibility was less than 10 percent. These shovel tests also would be spaced 98.4 feet (30 meters) apart. The research design further proposed that the Phase I survey results would be used to determine potential geomorphological studies, at locations where deeply buried cultural deposits may be possible. The SHPO accepted the proposed research plan in a letter dated March 8, 2006. No federally owned or managed land that requires review by a federal agency is present within the Nebraska Project corridor.

ARG conducted the cultural resources and geoarchaeological field surveys of the proposed Mainline Project route from May to June and October to November 2006; the area surveyed did not include the collocated REX pipeline section in Jefferson and Gage Counties (discussed separately below). ARG examined a 300-foot-wide corridor that extended for 214 miles of the planned pipeline route and included 24.8 miles of additional survey that resulted from route design changes (Ensor et al. 2007). Consistent with the approved research design, the field-inspected locations were examined through pedestrian survey and shovel testing. Access to 5.5 miles of the planned survey area was denied to ARG (Table 3.11.1-4); therefore, the cultural resources inventory of the proposed 30-inch-diameter Keystone pipeline is incomplete at this time. Cultural resources surveys for Project access roads, additional temporary workspace, pipeline reroutes, and appurtenant facilities are ongoing. Keystone anticipates that completed reports will be filed for these aspects of the Project by September 2007. An addendum report that details the results of additional geomorphological testing that is scheduled to occur within the APE will be filed in January 2008.

Keystone submitted five REX reports to document previous survey coverage of the proposed Mainline Project corridor and potential ancillary facilities (Schwegman et al. 2006, Schwegman 2006, Anderson and Aberle 2007, Rieken 2007, Shah Lomas 2007c). The portion of the Keystone pipeline that is collocated within the REX survey corridor is situated in Jefferson and Gage Counties between MP 637.3 and 649.6. A research design for the Nebraska segment of the REX Project was submitted to the SHPO in December 2005 (Schwegman et al. 2006). The FERC EIS for the REX Project states that on January 6, 2006, the Nebraska SHPO indicated that the entire pipeline route in Nebraska should be surveyed. This would include the portion of the REX pipeline that is collocated with the Mainline Project. The research design in the submitted report (Schwegman et al. 2006) indicates that the pipeline corridor was examined

through a combination of shovel testing and pedestrian survey, identical to the methodology utilized for the Keystone survey.

TABLE 3.11.1-4
Cultural Resources Survey Status of the Keystone Mainline Project in Nebraska as of July 2007 (excluding reroutes)

Milepost		Miles	Survey Status
Start	End		
435.8	438.1	2.3	Survey completed
438.1	438.2	0.1	Not surveyed (land access denial)
438.2	478.3	40.1	Survey completed
478.3	478.7	0.4	Not surveyed (land access denial)
478.7	520.0	41.3	Survey completed
520.0	520.3	0.3	Not surveyed (land access denial)
520.3	533.6	13.3	Survey completed
533.6	534.1	0.5	Not surveyed (land access denial)
534.1	546.7	12.6	Survey completed
546.7	546.8	0.1	Not surveyed (land access denial)
546.8	586.7	39.9	Survey completed
586.7	587.5	0.8	Not surveyed (land access denial)
587.5	601.0	13.5	Survey completed
601.0	601.7	0.7	Not surveyed (land access denial)
601.7	602.6	0.9	Survey completed
602.6	603.1	0.5	Not surveyed (land access denial)
603.1	603.7	0.6	Survey completed
603.7	604.6	0.9	Not surveyed (land access denial)
604.6	604.6	0.0	Survey completed
604.6	605.3	0.7	Not surveyed (land access denial)
605.3	616.1	10.8	Survey completed
616.1	616.6	0.5	Not surveyed (land access denial)
616.6	637.3	20.7	Survey completed
637.3	649.6	12.3	Surveyed for Rockies Express Western Phase Pipeline Project
		208.3	Total miles surveyed
		0.0	Total miles where survey was not required
		5.5	Total miles remaining to be surveyed

In comparison to the 300-foot-wide corridor used for the Keystone Project, ARG surveyed a 200-foot-wide corridor for the REX Project. This corridor was itself collocated with an existing pipeline ROW for the entire length of the portion that is relevant to the Keystone Project. According to the documents filed by Keystone, all 12.3 miles of the collocated REX pipeline in Jefferson and Gage Counties was surveyed for cultural resources. ARG also inspected six locations along this 12.3-mile-long section where temporary extra workspace areas would lie outside of the 200-foot-wide survey corridor (Schwegman et al. 2006).

ARG also conducted geomorphological investigations at 60 stream-valley locations along the REX corridor, of which five were associated with the section collocated with the Mainline Project. Their report (Schwegman et al. 2006) recommended that 35 stream crossing locations should be further investigated using backhoe trenching, including one of the locations relevant to Keystone. The results of this additional fieldwork were presented in a separate report (Anderson and Aberle 2007). A total of 62 backhoe trenches were excavated to assess the 35 locations recommended from the earlier field effort. Only one of the locations within the Keystone Project APE was found to have a buried Pre-contact archeological site (25JF41; see Table 3.11.2-3).

In their primary document for the cultural resources field survey (Schwegman et al. 2006), ARG reported that a 40-acre area was inventoried to cover the proposed Steele City Compressor Station location (REX MP 431.5 in Gage County). In addition, ARG inspected the location for a proposed Natural Gas Pipeline Company of America Meter Station (REX MP 423.1 in Jefferson County). An addendum report (Schwegman 2006) that was prepared for the REX Project indicated that cultural resources studies had been completed at a 17.7-acre compressor station location in Phelps County (REX MP 286.9) and at a proposed 1.2-acre site for a proposed meter station in Jefferson County (REX MP 286.9). A separate addendum report (Shah Lomas 2007c) discussed the evaluation of 12 additional temporary workspaces for the REX Project totaling 7.8 acres. The latter report noted the finding of a single cultural resource, a multi-component site that was not recommended as being eligible for listing in the NRHP (Site 25GA128; see Table 3.11.2-3).

The ARG primary report (Schwegman et al. 2006) for the REX Project was submitted to the SHPO on May 15, 2006. In a letter dated June 6, 2006, the Nebraska SHPO agreed with the recommendations in that report. Keystone, through ARG, also submitted a letter to the Nebraska SHPO on November 18, 2006, requesting that survey results for the REX Project be applied to Keystone. Keystone provided maps of the Mainline Project corridor to the SHPO for this analysis. The SHPO responded on November 28, 2006, that this was acceptable. The SHPO also sent two letters on June 4, 2007, to ARG that concurred with the field findings for submitted addenda reports (Anderson and Aberle 2007, Shah Lomas 2007).

Cushing Extension

Only 2.4 miles of the proposed Cushing Extension pipeline is situated within the state of Nebraska (Table 3.11.1-5). This segment is in the southeastern portion of Jefferson County and extends due south into Washington County, Kansas. The entire length of the proposed corridor was examined for cultural resources by Geo-Marine, Inc. in February 2007. The survey involved examination of a 300-foot-wide linear corridor through pedestrian survey transects spaced approximately 100 feet apart. Keystone has filed a March 14, 2007 letter with DOS. It was sent by ARG to the Nebraska SHPO and indicated that no cultural resource concerns were identified during the field assessment. ARG, which replaced Geo-Marine as the cultural resource contractor after fieldwork was completed by Geo-Marine, anticipates that the draft report for the Cushing Extension fieldwork in Nebraska will be submitted to DOS in July 2007. As the entire corridor was surveyed for cultural resource concerns, the inventory of the proposed Cushing Extension pipeline is complete at this time (barring future route adjustments). Cultural resources surveys for Project access roads, additional temporary workspace, pipeline reroutes, and appurtenant facilities are ongoing. Keystone anticipates that a completed report will be filed for these surveys in autumn 2007.

TABLE 3.11.1-5
Cultural Resources Survey Status of the Keystone Cushing Extension in Nebraska as of July 2007 (excluding reroutes)

Milepost			
Start	End	Miles	Survey Status
0.0	2.4	2.4	Survey completed
		2.4	Total miles surveyed
		0.0	Total miles where survey was not required
		0.0	Total miles remaining to be surveyed

Prior to commencing fieldwork, in November 2005, ARG undertook a literature and file search of the proposed REX pipeline route. The searches collected online cultural site and survey data that were located at the Kansas State Historical Society. The information was reviewed in relation to a corridor that extended for the length of the proposed pipeline route and was 2 miles wide, centered on the proposed centerline. The records search identified 29 cultural resources within this zone, including 24 Pre-contact sites, two historic sites, and three sites with both historic and Pre-contact cultural components. The data indicated that none of these known cultural resources lies within the projected REX pipeline (and, by extension, the Keystone) APE.

ARG submitted its research design for the REX cultural resources field studies to the Kansas SHPO in November 2005. It proposed that a cultural resources field survey be conducted along 36.7 miles of the proposed pipeline, using a 200-foot-wide survey corridor. The sampling strategy used to select the survey segments focused on landform types that were derived from the known site database and the results of previous surveys. Pedestrian survey using transects spaced no more than 49.2 feet (15 meters) apart was to be employed at landforms with existing land disturbance, on landforms with slopes greater than 20 percent, and at areas demonstrating greater than 40-percent surface visibility. The survey was to use 13.8- to 17.7-inch- (35- to 45-centimeter-) diameter shovel tests spaced 49.2 feet (15 meters) apart at survey locations where surface visibility decreased below the 40-percent threshold. The research design further proposed geomorphological testing at 25 locations where deeply buried cultural deposits were considered possible. The Kansas SHPO accepted the proposed research plan in a letter dated December 14, 2005.

ARG conducted their initial cultural resources field survey of the proposed REX pipeline route in 2006 (Myers et al. 2006a). The surveys examined a 200-foot-wide corridor that measured 40 feet toward the existing pipeline and 160 feet to the side opposite the existing pipeline (Table 3.11.1-5). A total of 48 separate segments in Marshall, Nemaha, Brown, and Doniphan Counties were field examined. This sample comprised 36.4 miles of the entire pipeline route. ARG also examined 31 locations where temporary extra workspaces would lie outside of the 200-foot-wide survey corridor. According to the documents filed by Keystone, all of the collocated REX pipeline that was selected for survey in Kansas has been examined for cultural resources. The inventory of the proposed Keystone pipeline is therefore also complete at this time (barring future route adjustments).

As part of the REX Project, ARG surveyed a proposed meter station location and access road (REX MP 497.8). No cultural resources concerns were found (Myers et al. 2006). ARG also received permission to examine a 0.14-mile section of the REX corridor for which land access had been denied, 10 additional temporary workspaces that lay outside the original corridor, and two pipeline reroutes (Shah Lomas 2007a). A single historic cultural resource (Site 14MH164) was located at one of the latter

reroutes (Table 3.11.2-5). Additional cultural resources surveys for Project access roads, additional temporary workspace, pipeline reroutes, and appurtenant facilities are ongoing. Keystone anticipates that an addendum report will be filed for these aspects of the Project in September 2007.

ARG conducted geomorphological investigations at 25 stream-valley locations and recommended that 12 of these stream crossing locations receive further investigation, using backhoe trenching (Myers et al. 2006a). The results of this additional fieldwork were presented in a separate report (Anderson and Schwegman 2007). A total of 22 backhoe trenches were excavated and resulted in identification of a single buried Pre-contact archeological site (14NH112; see Table 3.11.2-6). Geoarcheological studies for the Kansas portion of the REX Project are now considered complete. The Kansas SHPO sent a letter to ARG on April 17, 2007, that accepted both the level of effort and findings of the geoarcheological report.

TABLE 3.11.1-6
Cultural Resources Survey Status of the Keystone Mainline Project in Kansas as of July 2007 (excludes reroutes)

Milepost		Miles	Survey Status
Start	End		
649.6	652.5	2.9	Not selected for survey in Rockies Express Western Phase Pipeline Project (REX Project) sampling strategy
652.5	652.6	0.1	Survey completed for REX Project
652.6	652.9	0.3	Not selected for survey in REX Project sampling strategy
652.9	653.1	0.2	Survey completed for REX Project
653.1	656.0	2.9	Not selected for survey in REX Project sampling strategy
656.0	656.4	0.4	Survey completed for REX Project
656.4	656.5	0.1	Not selected for survey in REX Project sampling strategy
656.5	656.6	0.1	Survey completed for REX Project
656.6	657.0	0.4	Not selected for survey in REX Project sampling strategy
657.0	657.1	0.1	Survey completed for REX Project
657.1	658.1	1.0	Not selected for survey in REX Project sampling strategy
658.1	658.6	0.5	Survey completed for REX Project
658.6	658.6	0.0	Not selected for survey in REX Project sampling strategy
658.6	660.2	1.6	Survey completed for REX Project
660.2	660.9	0.7	Not selected for survey in REX Project sampling strategy
660.9	661.0	0.1	Survey completed for REX Project
661.0	662.0	1.0	Not selected for survey in REX Project sampling strategy
662.0	662.5	0.5	Survey completed for REX Project
662.5	664.5	2.0	Not selected for survey in REX Project sampling strategy
664.5	664.6	0.1	Survey completed for REX Project
664.6	665.9	1.3	Not selected for survey in REX Project sampling strategy
665.9	666.0	0.1	Survey completed for REX Project
666.0	670.5	4.5	Not selected for survey in REX Project sampling strategy
670.5	671.2	0.7	Survey completed for REX Project
671.2	671.4	0.2	Not selected for survey in REX Project sampling strategy
671.4	671.8	0.4	Survey completed for REX Project
671.8	673.0	1.2	Not selected for survey in REX Project sampling strategy

TABLE 3.11.1-6
(Continued)

Milepost		Miles	Survey Status
Start	End		
673.0	674.2	1.2	Survey completed for REX Project
674.2	676.2	2.0	Not selected for survey in REX Project sampling strategy
676.2	676.7	0.5	Survey completed for REX Project
676.7	677.9	1.2	Not selected for survey in REX Project sampling strategy
677.9	678.0	0.1	Survey completed for REX Project
678.0	680.9	2.9	Not selected for survey in REX Project sampling strategy
680.9	681.2	0.3	Survey completed for REX Project
681.2	681.7	0.5	Not selected for survey in REX Project sampling strategy
681.7	681.8	0.1	Survey completed for REX Project
681.8	684.0	2.2	Not selected for survey in REX Project sampling strategy
684.0	686.1	2.1	Survey completed for REX Project
686.1	688.3	2.2	Not selected for survey in REX Project sampling strategy
688.3	690.5	2.2	Survey completed for REX Project
690.5	690.8	0.3	Not selected for survey in REX Project sampling strategy
690.8	691.4	0.6	Survey completed for REX Project
691.4	693.7	2.3	Not selected for survey in REX Project sampling strategy
693.7	695.4	1.7	Survey completed for REX Project
695.4	698.3	2.9	Not selected for survey in REX Project sampling strategy
698.3	698.6	0.3	Survey completed for REX Project
698.6	699.2	0.6	Not selected for survey in REX Project sampling strategy
699.2	699.3	0.1	Survey completed for REX Project
699.3	699.9	0.6	Not selected for survey in REX Project sampling strategy
699.9	700.9	1.0	Survey completed for REX Project
700.9	702.6	1.7	Not selected for survey in REX Project sampling strategy
702.6	702.8	0.2	Survey completed for REX Project
702.8	704.2	1.4	Not selected for survey in REX Project sampling strategy
704.2	707.5	3.3	Survey completed for REX Project
707.5	708.0	0.5	Not selected for survey in REX Project sampling strategy
708.0	708.3	0.3	Survey completed for REX Project
708.3	708.9	0.6	Not selected for survey in REX Project sampling strategy
708.9	709.1	0.2	Survey completed for REX Project
709.1	709.3	0.2	Not selected for survey in REX Project sampling strategy
709.3	709.3	0.0	Survey completed for REX Project
709.3	709.7	0.4	Not selected for survey in REX Project sampling strategy
709.7	711.0	1.3	Survey completed for REX Project
711.0	712.8	1.8	Not selected for survey in REX Project sampling strategy
712.8	713.0	0.2	Survey completed for REX Project
713.0	713.3	0.3	Not selected for survey in REX Project sampling strategy
713.3	713.4	0.1	Survey completed for REX Project
713.4	713.8	0.4	Not selected for survey in REX Project sampling strategy

TABLE 3.11.1-6
(Continued)

Milepost			
Start	End	Miles	Survey Status
713.8	714.0	0.2	Survey completed for REX Project
714.0	714.7	0.7	Not selected for survey in REX Project sampling strategy
714.7	714.8	0.1	Survey completed for REX Project
714.8	716.0	1.2	Not selected for survey in REX Project sampling strategy
716.0	718.0	2.0	Survey completed for REX Project
718.0	718.5	0.5	Not selected for survey in REX Project sampling strategy
718.5	719.0	0.5	Survey completed for REX Project
719.0	720.0	1.0	Not selected for survey in REX Project sampling strategy
720.0	721.0	1.0	Survey completed for REX Project
721.0	722.0	1.0	Not selected for survey in REX Project sampling strategy
722.0	723.0	1.0	Survey completed for REX Project
723.0	723.2	0.2	Not selected for survey in REX Project sampling strategy
723.2	723.3	0.1	Survey completed for REX Project
723.3	724.6	1.3	Not selected for survey in REX Project sampling strategy
724.6	725.4	0.8	Survey completed for REX Project
725.4	727.4	2.0	Not selected for survey in REX Project sampling strategy
727.4	727.6	0.2	Survey completed for REX Project
727.6	727.6	0.0	Not selected for survey in REX Project sampling strategy
727.6	728.6	1.0	Survey completed for REX Project
728.6	729.6	1.0	Not selected for survey in REX Project sampling strategy
729.6	730.0	0.4	Survey completed for REX Project
730.0	732.8	2.8	Not selected for survey in REX Project sampling strategy
732.8	733.1	0.3	Survey completed for REX Project
733.1	734.8	1.7	Not selected for survey in REX Project sampling strategy
734.8	735.0	0.2	Survey completed for REX Project
735.0	737.7	2.7	Not selected for survey in REX Project sampling strategy
737.7	738.2	0.5	Survey completed for REX Project
738.2	738.8	0.6	Not selected for survey in REX Project sampling strategy
738.8	738.9	0.1	Survey completed for REX Project
738.9	738.9	0.0	Not selected for survey in REX Project sampling strategy
738.9	740.9	2.0	Survey completed for REX Project
740.9	741.5	0.6	Not selected for survey in REX Project sampling strategy
741.5	741.7	0.2	Survey completed for REX Project
741.7	743.0	1.3	Not selected for survey in REX Project sampling strategy
743.0	744.7	1.7	Survey completed for REX Project
744.7	744.9	0.2	Not selected for survey in REX Project sampling strategy
744.9	748.4	3.5	Survey completed for REX Project
		36.4	Total miles surveyed
		62.3	Miles outside sampling strategy
		0.0	Total miles remaining to be surveyed

Cushing Extension

The Cushing Extension lateral pipeline would enter Kansas from Jefferson County, Nebraska and would extend through the state for approximately 210.1 miles. The counties crossed include Washington, Clay, Dickinson, Marion, Butler, and Cowley. Geo-Marine, Inc.and ARG were the companies contracted by Keystone to perform the required cultural resources background investigations and assessments within the state. Prior to commencing fieldwork, in March 2006, ARG submitted a research design to the SHPO that included a records review and plan to conduct field surveys for the Cushing Extension pipeline route in Kansas. The SHPO responded in a letter dated March 17, 2006, agreeing with the essential components of the plan but requesting several clarifications and alterations to the sampling strategy. Keystone subsequently retained Geo-Marine, which filed with the Kansas SHPO a revised research plan for the Cushing Extension in December 2006.

The Geo-Marine research plan included a record review of previously identified cultural resources and surveys. The records used online cultural site and survey data that were housed at the Kansas State Historical Society. The information was reviewed in relation to a corridor that extended for the length of the proposed pipeline route and was 2 miles wide, centered on the proposed centerline. The records search identified 129 cultural resources within this zone, including 104 Pre-contact sites, three historic sites, six sites with both historic and Pre-contact cultural components, and 16 sites for which temporal information was unavailable. The data indicated that eight known cultural resources lay within the projected Cushing Extension APE. Seven of these sites were listed as being of Pre-contact age (14BU337, 14BU1304, 14CO414, 14CY407, 14MN358, 14MN359, and 14WH318), and one site (14BU383) included both historic and Pre-contact assemblages. None of these eight sites had been assessed previously for their potential eligibility for listing in the NRHP. The research design also noted that five listed NRHP properties are located within 1 mile of the proposed Project. They include two historic bridges; a frame farm house; a historic lodge dating to the early 1900s; and the Marion Archeological District, which comprises 26 archaeological sites that mainly date 300 – 500 years ago and are associated with the Great Bend Aspect cultural period.

The Geo-Marine research design proposed a cultural resources field survey along 40 pipeline segments that total 104.5 miles of the proposed lateral route, using a 300-foot-wide survey corridor. The sampling strategy used to select the survey segments focused on landform types that were derived from the known site database and the results of previous surveys. A pedestrian survey using transects spaced no more than 49.2 feet (15 meters) apart generally was to be used at landforms with greater than 40-percent surface visibility. The field methods specified the use of 13.8-inch- (35-centimeter-) diameter shovel tests spaced 98.4 feet (30 meters) apart at survey locations where surface visibility decreased below the 40-percent threshold and at locations based on the judgment of the field director. The research design further proposed geomorphological testing at 59 locations where deeply buried cultural deposits were considered possible. This research design, developed in part through discussions with the Kansas SHPO, was accepted by the SHPO in a letter dated January 9, 2006; the letter was misdated, because the letter was actually sent in 2007.

Geo-Marine initiated cultural resource field studies within the Cushing Extension corridor in January 2007. In February, ARG replaced Geo-Marine as the cultural resources contractor and completed the field investigation. ARG contacted the SHPO to discuss the change and revised the research design to increase the level of survey by 5.1 miles, to an approximate total of 109.6 miles of the proposed lateral route. These survey areas were primarily added because of the presence of historic trails.

ARG has provided interim survey findings that indicate 89.9 miles of the proposed Cushing Extension pipeline has been surveyed for cultural resources. Land permission was denied within 19.8 miles of the planned survey areas (Table 3.11.1-7); therefore, the cultural resources inventory of the proposed Cushing

Extension pipeline is incomplete at this time. Cultural resources surveys for Project access roads, additional temporary workspace, pipeline reroutes, and appurtenant facilities are ongoing. Draft technical reports that provide details of the cultural resources surveys and any NRHP site evaluation testing are scheduled to be filed by Keystone in September and November 2007. An addendum report that details the results of additional geomorphological testing that is scheduled to occur within the APE will be filed in March 2008. Keystone also has filed notice that it intends to meet with COE to discuss the survey of land near Milford Lake, an area managed by that agency. If survey permission is granted, Keystone anticipates that a separate cultural resources survey report will be filed with DOS for that area in September 2007.

TABLE 3.11.1-7
Cultural Resources Survey Status of the Keystone Cushing Extension in Kansas as of July 2007 (excluding reroutes)

Milepost		Miles	Survey Status
Start	End		
2.4	4.5	2.1	Survey complete
4.5	4.8	0.3	Survey complete
4.8	6.5	1.7	Not selected for survey in sampling strategy
6.5	7.1	0.6	Survey complete
7.1	7.8	0.7	Not selected for survey in sampling strategy
7.8	9.0	1.2	Survey complete
9.0	9.6	0.6	Not surveyed (land access denial)
9.6	15.1	5.5	Survey complete
15.1	15.5	0.4	Not selected for survey in sampling strategy
15.5	16.0	0.5	Survey complete
16.0	17.0	1.0	Not selected for survey in sampling strategy
17.0	18.1	1.1	Survey complete
18.1	19.6	1.5	Not selected for survey in sampling strategy
19.6	20.6	1.0	Survey complete
20.6	21.1	0.5	Not selected for survey in sampling strategy
21.1	22.9	1.8	Survey complete
22.9	23.6	0.7	Not selected for survey in sampling strategy
23.6	24.4	0.8	Survey complete
24.4	25.6	1.2	Not selected for survey in sampling strategy
25.6	26.4	0.8	Survey complete
26.4	28.4	2.0	Not selected for survey in sampling strategy
28.4	30.0	1.6	Survey complete
30.0	32.8	2.8	Not selected for survey in sampling strategy
32.8	34.0	1.2	Survey complete
34.0	34.2	0.2	Not selected for survey in sampling strategy
34.2	35.7	1.5	Survey complete
35.7	36.0	0.3	Not selected for survey in sampling strategy
36.0	36.6	0.6	Survey complete
36.6	37.6	1.0	Survey complete

TABLE 3.11.1-7
(Continued)

Milepost		Miles	Survey Status
Start	End		
37.6	38.7	1.1	Not selected for survey in sampling strategy
38.7	38.9	0.2	Survey complete
38.9	40.5	1.6	Not selected for survey in sampling strategy
40.5	41.2	0.7	Survey complete
41.2	42.7	1.5	Not selected for survey in sampling strategy
42.7	43.7	1.0	Not surveyed (land access denial)
43.7	44.5	0.8	Survey complete
44.5	49.3	4.8	Not selected for survey in sampling strategy
49.3	50.0	0.7	Survey complete
50.0	50.5	0.5	Not surveyed (land access denial)
50.5	51.5	1.0	Not selected for survey in sampling strategy
51.5	51.8	0.3	Not surveyed (land access denial)
51.8	52.1	0.3	Survey complete
52.1	52.4	0.3	Not surveyed (land access denial)
52.4	53.2	0.8	Survey complete
53.2	53.3	0.1	Not surveyed (land access denial)
53.3	53.6	0.3	Survey complete
53.6	54.6	1.0	Not surveyed (land access denial)
54.6	55.4	0.8	Survey complete
55.4	57.4	2.0	Not selected for survey in sampling strategy
57.4	58.4	1.0	Survey complete
58.4	59.8	1.4	Not selected for survey in sampling strategy
59.8	60.4	0.6	Survey complete
60.4	60.6	0.2	Not selected for survey in sampling strategy
60.6	61.2	0.6	Survey complete
61.2	61.9	0.7	Not selected for survey in sampling strategy
61.9	62.4	0.5	Survey complete
62.4	65.8	3.4	Not selected for survey in sampling strategy
65.8	66.0	0.2	Survey complete
66.0	68.0	2.0	Not selected for survey in sampling strategy
68.0	68.2	0.2	Survey complete
68.2	68.7	0.5	Not surveyed (land access denial)
68.7	72.0	3.3	Survey complete
72.0	72.5	0.5	Not surveyed (land access denial)
72.5	73.8	1.3	Not selected for survey in sampling strategy
73.8	76.1	2.3	Survey complete
76.1	76.8	0.7	Not surveyed (land access denial)
76.8	77.4	0.6	Survey complete
77.4	79.1	1.7	Not selected for survey in sampling strategy

TABLE 3.11.1-7
(Continued)

Milepost		Miles	Survey Status
Start	End		
79.1	79.8	0.7	Survey complete
79.8	80.7	0.9	Survey complete
80.7	83.3	2.6	Not selected for survey in sampling strategy
83.3	83.9	0.6	Survey complete
83.9	84.9	1.0	Not selected for survey in sampling strategy
84.9	85.5	0.6	Survey complete
85.5	85.9	0.4	Not selected for survey in sampling strategy
85.9	86.2	0.3	Not surveyed (land access denial)
86.2	88.3	2.1	Survey complete
88.3	90.8	2.5	Not selected for survey in sampling strategy
90.8	92.5	1.7	Survey complete
92.5	93.4	0.9	Not selected for survey in sampling strategy
93.4	94.0	0.6	Not surveyed (land access denial)
94.0	94.6	0.6	Survey complete
94.6	94.9	0.3	Not selected for survey in sampling strategy
94.9	95.4	0.5	Survey complete
95.4	96.3	0.9	Not selected for survey in sampling strategy
96.3	97.4	1.1	Survey complete
97.4	98.1	0.7	Not selected for survey in sampling strategy
98.1	98.3	0.2	Not surveyed (land access denial)
98.3	99.1	0.8	Survey complete
99.1	99.7	0.6	Not selected for survey in sampling strategy
99.7	100.4	0.7	Survey complete
100.4	101.1	0.7	Not selected for survey in sampling strategy
101.1	102.0	0.9	Survey complete
102.0	102.5	0.5	Not selected for survey in sampling strategy
102.5	103.7	1.2	Survey complete
103.7	105.9	2.2	Not selected for survey in sampling strategy
105.9	106.7	0.8	Survey complete
106.7	107.9	1.2	Not selected for survey in sampling strategy
107.9	109.2	1.3	Survey complete
109.2	111.2	2.0	Not selected for survey in sampling strategy
111.2	116.0	4.8	Survey complete
116.0	116.5	0.5	Not surveyed (land access denial)
116.5	116.9	0.4	Survey complete
116.9	118.0	1.1	Not surveyed (land access denial)
118.0	119.5	1.5	Survey complete
119.5	120.5	1.0	Not selected for survey in sampling strategy
120.5	121.2	0.7	Survey complete
121.2	123.0	1.8	Not selected for survey in sampling strategy

TABLE 3.11.1-7
(Continued)

Milepost			
Start	End	Miles	Survey Status
123.0	123.3	0.3	Survey complete
123.3	124.5	1.2	Not selected for survey in sampling strategy
124.5	124.6	0.1	Survey complete
124.6	127.1	2.5	Not selected for survey in sampling strategy
127.1	130.8	3.7	Survey complete
130.8	132.7	1.9	Not selected for survey in sampling strategy
132.7	133.7	1.0	Survey complete
133.7	134.1	0.4	Not selected for survey in sampling strategy
134.1	134.8	0.7	Survey complete
134.8	135.7	0.9	Not selected for survey in sampling strategy
135.7	135.8	0.1	Survey complete
135.8	136.8	1.0	Survey complete
136.8	137.3	0.5	Not surveyed (land access denial)
137.3	137.7	0.4	Survey complete
137.7	139.1	1.4	Not selected for survey in sampling strategy
139.1	141.8	2.7	Survey complete
141.8	142.8	1.0	Not surveyed (land access denial)
142.8	143.1	0.3	Survey complete
143.1	144.5	1.4	Not selected for survey in sampling strategy
144.5	145.3	0.8	Survey complete
145.3	146.8	1.5	Not selected for survey in sampling strategy
146.8	147.3	0.5	Survey complete
147.3	148.3	1.0	Not selected for survey in sampling strategy
148.3	149.2	0.9	Survey complete
149.2	150.5	1.3	Not selected for survey in sampling strategy
150.5	151.3	0.8	Survey complete
151.3	152.9	1.6	Not selected for survey in sampling strategy
152.9	154.4	1.5	Survey complete
154.4	154.6	0.2	Not selected for survey in sampling strategy
154.6	155.8	1.2	Survey complete
155.8	156.2	0.4	Not surveyed (land access denial)
156.2	158.0	1.8	Survey complete
158.0	158.2	0.2	Not surveyed (land access denial)
158.2	159.2	1.0	Survey complete
159.2	159.8	0.6	Not surveyed (land access denial)
159.8	161.6	1.8	Survey complete
161.6	161.7	0.1	Not surveyed (land access denial)
161.7	162.4	0.7	Survey complete
162.4	163.5	1.1	Not surveyed (land access denial)
163.5	164.3	0.8	Survey complete

TABLE 3.11.1-7
(Continued)

Milepost		Miles	Survey Status
Start	End		
164.3	165.5	1.2	Not selected for survey in sampling strategy
165.5	165.8	0.3	Survey complete
165.8	167.4	1.6	Not selected for survey in sampling strategy
167.4	167.8	0.4	Not surveyed (land access denial)
167.8	168.0	0.2	Survey complete
168.0	168.6	0.6	Not surveyed (land access denial)
168.6	174.0	5.4	Not selected for survey in sampling strategy
174.0	176.5	2.5	Survey complete
176.5	179.2	2.7	Not selected for survey in sampling strategy
179.2	179.6	0.4	Survey complete
179.6	180.5	0.9	Not selected for survey in sampling strategy
180.5	181.3	0.8	Survey complete
181.3	184.4	3.1	Not selected for survey in sampling strategy
184.4	184.9	0.5	Survey complete
184.9	185.9	1.0	Not surveyed (land access denial)
185.9	187.4	1.5	Survey complete
187.4	188.0	0.6	Not surveyed (land access denial)
188.0	188.5	0.5	Survey complete
188.5	190.5	2.0	Not surveyed (land access denial)
190.5	191.5	1.0	Survey complete
191.5	192.1	0.6	Not surveyed (land access denial)
192.1	192.5	0.4	Not selected for survey in sampling strategy
192.5	193.0	0.5	Survey complete
193.0	197.5	4.5	Not selected for survey in sampling strategy
197.5	198.5	1.0	Survey complete
198.5	204.4	5.9	Not selected for survey in sampling strategy
204.4	204.6	0.2	Survey complete
204.6	205.3	0.7	Not surveyed (land access denial)
205.3	205.5	0.2	Survey complete
205.5	205.8	0.3	Not selected for survey in sampling strategy
205.8	206.3	0.5	Not surveyed (land access denial)
206.3	206.5	0.2	Survey complete
206.5	206.6	0.1	Not surveyed (land access denial)
206.6	207.6	1.0	Not selected for survey in sampling strategy
207.6	208.0	0.4	Survey complete
208.0	209.0	1.0	Not surveyed (land access denial)
209.0	210.9	1.9	Not selected for survey in sampling strategy
210.9	211.1	0.2	Not surveyed (land access denial)
211.1	212.3	1.2	Not selected for survey in sampling strategy
212.3	212.5	0.2	Survey complete

TABLE 3.11.1-7 (Continued)	
Miles	**Survey Status**
89.9	Total miles surveyed
100.4	Miles outside sampling strategy
19.8	Total miles remaining to be surveyed

3.11.1.4 Missouri

The Keystone pipeline would enter Missouri from Doniphan County, Kansas and would extend through the state for approximately 273.1 miles. The counties crossed include Buchanan, Clinton, Caldwell, Carroll, Chariton, Randolph, Audrain, Montgomery, Lincoln, and St. Charles. ARG was contracted on behalf of Keystone to perform the required cultural resources field assessments in the state. Keystone also entered into an agreement with Kinder Morgan and Rockies Express Pipeline LLC to purchase the results of cultural resource studies that were conducted in 2005/2006 for the proposed REX Natural Gas Pipeline Project. Keystone submitted several REX Project reports (Myers et al. 2006b, Aberle 2007, Rieken 2007b, Myers et al. 2007, Shah Lomas 2007b) as evidence of existing survey coverage at potential Keystone Project ancillary facilities, access roads, and 173.2 miles of collocated corridor within Buchanan, Clinton, Caldwell, Carroll, Chariton, Randolph, and Audrain Counties. The potential environmental impacts of the REX pipeline were assessed as part of the evaluation of FERC Docket CP06-354-000. Portions of the following discussion are derived from the EIS that was produced during that evaluation.

Prior to the Keystone fieldwork commencing, ARG undertook a files search of the proposed pipeline route in January and February 2006. The searches collected cultural site and survey data that were housed at the Archeological Survey of Missouri. The information was reviewed in relation to a corridor that extended for the length of the proposed pipeline route and was 2 miles wide, centered on the proposed centerline. The record searches identified 72 cultural resources that generally could be associated with the Project region. These resources included 12 historic sites, 47 Pre-contact sites, seven sites with both Pre-contact and historic artifact assemblages, and three sites where the information did not provide specific information on the age of the cultural resource. The data indicated that 17 known cultural resources (23BN8, 23BN38, 23CH1, 23CH73, 23MT74, 23LN11, 23LN13, 23LN14, 23LN24, 23LN48, 23LN57, 23LN192, 23LN202, 23SC5, 23SC29, 23SC670, and 23SC776) were located within the proposed survey corridor. These cultural resources included 10 of the Pre-contact sites, three of the multi-component historic/Pre-contact sites, two historic sites, and two of the sites with unknown cultural remains. The eligibility for listing in the NRHP of all but two of these 17 cultural resources had not previously been established. Pre-contact site 23BN38 was recommended as ineligible for listing in the NRHP during a 1991 study; site 23LN11 was recommended as being potentially eligible for listing in the NRHP based on information collected during the 1930s, 1950s, and in 1996 (Titus 2006a). The review of archival records identified 169 potential historic structures and features within or in proximity to the Project corridor. These included 155 residential structures, six schools, three cemeteries, two railroad stations, one church, one barn, and one post office (Titus 2006a).

Keystone, through ARG (Titus 2006a), submitted its research design for cultural resources field studies to the Missouri SHPO in March 2006. It proposed a cultural resources field survey for 153.8 miles of the proposed pipeline corridor; the research design was accepted by the Missouri SHPO in a letter dated

March 15, 2006. Keystone subsequently decided to submit the REX Project field survey results for the 173.2 miles of collocated ROW in Missouri. Consequently, the number of miles selected for a cultural resources survey as part of the Keystone Project was reduced to 78.0 miles. The sampling strategy used to select the survey segments focused on landform types that were derived from the known site database and the results of previous surveys. The pedestrian survey was to use survey transects spaced 49.2 to 65.6 feet (15 to 20 meters) apart. Shovel tests were to be used on un-eroded landforms with slopes under 20 percent and where surface visibility was less than 25 percent. These shovel tests would be spaced 49.2 feet (15 meters) apart, with a diameter of 11.8 to 15.7 inches (30 to 40 centimeters), and would be excavated to 19.7 inches (50 centimeters) below ground surface.

ARG has provided interim survey findings indicating that 62.3 miles of the proposed Mainline Project has been surveyed for cultural resources (Table 3.11.1-8). Land permission was denied along 18.5 miles of the planned survey areas; therefore, the cultural resources inventory of the proposed Keystone pipeline is incomplete at this time. Cultural resources surveys for Project access roads, additional temporary workspace, pipeline reroutes, and appurtenant facilities are ongoing. Draft technical reports that provide details of the cultural resources surveys and any NRHP site evaluation testing are scheduled to be filed by Keystone in September and November 2007. An addendum report that details the results of deep soil testing (in addition to the REX Project testing described below) that is scheduled to occur within the APE will be filed in February 2008. Keystone also has indicated that it will be filing a report with DOS and COE to report on cultural resources surveys at Confluence Park, an area managed by COE.

Keystone submitted a separate report (Myers et al. 2006b) that documents existing cultural resources survey coverage where the Keystone pipeline would be collocated with the proposed REX pipeline corridor (Table 3.11.1-7). The Keystone pipeline lies parallel to the REX pipeline between MP 748.3 and 921.5 in Buchanan, Clinton, Caldwell, Carroll, Chariton, Randolph, and Audrain Counties. A research design for the Missouri segment of the REX Project was submitted to the SHPO by ARG in November 2005. The research design presented in the submitted report (Myers et al. 2006) states that the pipeline corridor was examined through a combination of shovel testing and pedestrian survey, identical to the methodology used for the Keystone survey. Approximately 71 miles of the 175.6 miles of ROW situated in Missouri was expected to be inventoried for cultural resource concerns. The research design also proposed geomorphological testing at 37 locations where deeply buried cultural deposits were considered possible. The Missouri SHPO accepted the proposed testing strategy in a letter dated December 6, 2005.

ARG surveyed a 200-foot-wide corridor for the REX Project (Myers et al. 2006b), that investigated 71.8 miles of the ROW at 92 separate segments along the proposed route in Buchanan, Clinton, Caldwell, Carroll, Chariton, Randolph, and Audrain Counties. Seven additional miles at 19 properties that had been selected for field assessment were not surveyed because land access was denied by the owners (see Table 3.11.1-7). ARG also examined 37 additional temporary extra workspaces that lay outside the 200-foot-wide survey corridor (Myers et al. 2006b). Two separate REX Project supplemental reports have been filed that detail the cultural resources surveys conducted at 7.1 miles of lands where survey permission had previously been denied, six pipeline reroutes, 26 access roads, and over 50 additional temporary workspaces (Rieken 2007b; Shah Lomas 2007b). A total of 12 archeological sites were identified during these studies, which are addressed in Section 3.11.2 and in Table 3.11.2-7. Letters agreeing with the survey methodologies were received by ARG on May 30 and June 15, 2007.

Several ancillary facilities also were assessed during the REX cultural resources investigation. The submitted report (Myers et al. 2006b) states that surveys were completed at a 56-acre compressor station site (REX MP 572.7 in Clinton County) and at a 50-acre parcel surveyed for a proposed meter station (REX MP 712.7 in Audrain County). No cultural resource concerns were identified at these locations. A letter from the Missouri SHPO that concurred with the level of effort and findings was sent to ARG on May 31, 2006.

TABLE 3.11.1-8
Cultural Resources Survey Status of the Keystone Mainline Project in Missouri as of July 2007

Milepost			
Start	End	Miles	Survey Status
748.4	748.5	0.1	Not selected for survey in Rockies Express Western Phase Pipeline Project (REX Project) sampling strategy
748.5	749.1	0.6	Survey completed for REX Project
749.1	750.0	0.9	Not selected for survey in REX Project sampling strategy
750.0	752.7	2.7	Survey completed for REX Project
752.7	756.0	3.3	Survey completed for REX Project
756.0	756.1	0.1	Survey completed for REX Project
756.1	756.4	0.3	Not selected for survey in REX Project sampling strategy
756.4	756.6	0.2	Survey completed for REX Project
756.6	757.4	0.8	Not selected for survey in REX Project sampling strategy
757.4	757.5	0.1	Survey completed for REX Project
757.5	757.7	0.2	Not selected for survey in REX Project sampling strategy
757.7	758.2	0.5	Survey completed for REX Project
758.2	758.7	0.5	Not selected for survey in REX Project sampling strategy
758.7	761.6	2.9	Survey completed for REX Project
761.6	762.2	0.6	Survey completed for REX Project
762.2	766.6	4.4	Not selected for survey in REX Project sampling strategy
766.6	767.1	0.5	Survey completed for REX Project
767.1	767.6	0.5	Not selected for survey in REX Project sampling strategy
767.6	767.7	0.1	Survey completed for REX Project
767.7	768.5	0.8	Not selected for survey in REX Project sampling strategy
768.5	768.8	0.3	Survey completed for REX Project
768.8	769.3	0.5	Survey completed for REX Project
769.3	772.4	3.1	Not selected for survey in REX Project sampling strategy
772.4	774.1	1.7	Survey completed for REX Project
774.1	774.4	0.3	Survey completed for REX Project
774.4	775.3	0.9	Not selected for survey in REX Project sampling strategy
775.3	775.5	0.2	Survey completed for REX Project
775.5	776.9	1.4	Not selected for survey in REX Project sampling strategy
776.9	779.1	2.2	Survey completed for REX Project
779.1	779.7	0.6	Not selected for survey in REX Project sampling strategy
779.7	779.9	0.2	Survey completed for REX Project
779.9	780.4	0.5	Not selected for survey in REX Project sampling strategy
780.4	780.5	0.1	Survey completed for REX Project
780.5	781.0	0.5	Survey completed for REX Project
781.0	781.6	0.6	Not selected for survey in REX Project sampling strategy
781.6	782.0	0.4	Survey completed for REX Project
782.0	783.1	1.1	Not selected for survey in REX Project sampling strategy
783.1	783.2	0.1	Survey completed for REX Project

TABLE 3.11.1-8
(Continued)

Milepost			
Start	End	Miles	Survey Status
783.2	784.1	0.9	Not selected for survey in REX Project sampling strategy
784.1	784.1	0.0	Survey completed for REX Project
784.1	784.8	0.7	Not selected for survey in REX Project sampling strategy
784.8	785.0	0.2	Survey completed for REX Project
785.0	785.3	0.3	Not selected for survey in REX Project sampling strategy
785.3	786.4	1.1	Survey completed for REX Project
786.4	787.0	0.6	Not selected for survey in REX Project sampling strategy
787.0	787.2	0.2	Survey completed for REX Project
787.2	787.5	0.3	Not selected for survey in REX Project sampling strategy
787.5	787.7	0.2	Survey completed for REX Project
787.7	787.8	0.1	Not selected for survey in REX Project sampling strategy
787.8	787.9	0.1	Survey completed for REX Project
787.9	788.4	0.5	Survey completed for REX Project
788.4	789.0	0.6	Not selected for survey in REX Project sampling strategy
789.0	789.2	0.2	Survey completed for REX Project
789.2	789.8	0.6	Survey completed for REX Project
789.8	790.4	0.6	Not selected for survey in REX Project sampling strategy
790.4	790.6	0.2	Survey completed for REX Project
790.6	790.9	0.3	Not selected for survey in REX Project sampling strategy
790.9	791.1	0.2	Survey completed for REX Project
791.1	793.2	2.1	Not selected for survey in REX Project sampling strategy
793.2	793.9	0.7	Survey completed for REX Project
793.9	795.5	1.6	Survey completed for REX Project
795.5	795.6	0.1	Not selected for survey in REX Project sampling strategy
795.6	795.8	0.2	Survey completed for REX Project
795.8	796.0	0.2	Not selected for survey in REX Project sampling strategy
796.0	796.2	0.2	Survey completed for REX Project
796.2	796.4	0.2	Survey completed for REX Project
796.4	796.7	0.3	Not selected for survey in REX Project sampling strategy
796.7	797.0	0.3	Survey completed for REX Project
797.0	797.2	0.2	Survey completed for REX Project
797.2	799.3	2.1	Survey completed for REX Project
799.3	800.9	1.6	Not selected for survey in REX Project sampling strategy
800.9	801.4	0.5	Survey completed for REX Project
801.4	803.2	1.8	Not selected for survey in REX Project sampling strategy
803.2	803.3	0.1	Survey completed for REX Project
803.3	804.1	0.8	Not selected for survey in REX Project sampling strategy
804.1	804.9	0.8	Survey completed for REX Project
804.9	806.3	1.4	Not selected for survey in REX Project sampling strategy
806.3	806.5	0.2	Survey completed for REX Project

TABLE 3.11.1-8
(Continued)

Milepost			
Start	End	Miles	Survey Status
806.5	807.2	0.7	Not selected for survey in REX Project sampling strategy
807.2	808.4	1.2	Survey completed for REX Project
808.4	808.9	0.5	Survey completed for REX Project
808.9	809.8	0.9	Not selected for survey in REX Project sampling strategy
809.8	810.1	0.3	Survey completed for REX Project
810.1	810.7	0.6	Not selected for survey in REX Project sampling strategy
810.7	811.4	0.7	Survey completed for REX Project
811.4	813.0	1.6	Survey completed for REX Project
813.0	813.3	0.3	Not selected for survey in REX Project sampling strategy
813.3	813.5	0.2	Survey completed for REX Project
813.5	813.9	0.4	Not selected for survey in REX Project sampling strategy
813.9	814.4	0.5	Survey completed for REX Project
814.4	814.9	0.5	Not selected for survey in REX Project sampling strategy
814.9	815.0	0.1	Survey completed for REX Project
815.0	816.4	1.4	Not selected for survey in REX Project sampling strategy
816.4	816.5	0.1	Survey completed for REX Project
816.5	818.4	1.9	Not selected for survey in REX Project sampling strategy
818.4	819.0	0.6	Survey completed for REX Project
819.0	819.5	0.5	Not selected for survey in REX Project sampling strategy
819.5	819.6	0.1	Survey completed for REX Project
819.6	820.4	0.8	Not selected for survey in REX Project sampling strategy
820.4	820.5	0.1	Survey completed for REX Project
820.5	821.3	0.8	Not selected for survey in REX Project sampling strategy
821.3	821.6	0.3	Survey completed for REX Project
821.6	822.8	1.2	Survey completed for REX Project
822.8	825.7	2.9	Not selected for survey in REX Project sampling strategy
825.7	825.8	0.1	Survey completed for REX Project
825.8	827.7	1.9	Not selected for survey in REX Project sampling strategy
827.7	827.8	0.1	Survey completed for REX Project
827.8	828.2	0.4	Not selected for survey in REX Project sampling strategy
828.2	828.3	0.1	Survey completed for REX Project
828.3	828.5	0.2	Not selected for survey in REX Project sampling strategy
828.5	829.3	0.8	Survey completed for REX Project
829.3	829.3	0.0	Not selected for survey in REX Project sampling strategy
829.3	829.8	0.5	Survey completed for REX Project
829.8	830.3	0.5	Survey completed for REX Project
830.3	830.7	0.4	Not selected for survey in REX Project sampling strategy
830.7	830.8	0.1	Survey completed for REX Project
830.8	831.4	0.6	Not selected for survey in REX Project sampling strategy

TABLE 3.11.1-8
(Continued)

Milepost			
Start	End	Miles	Survey Status
831.4	832.2	0.8	Survey completed for REX Project
832.2	833.1	0.9	Not selected for survey in REX Project sampling strategy
833.1	833.4	0.3	Survey completed for REX Project
833.4	838.7	5.3	Not selected for survey in REX Project sampling strategy
838.7	838.8	0.1	Survey completed for REX Project
838.8	840.2	1.4	Not selected for survey in REX Project sampling strategy
840.2	843.5	3.3	Survey completed for REX Project
843.5	844.3	0.8	Survey completed for REX Project
844.3	846.8	2.5	Survey completed for REX Project
846.8	848.2	1.4	Not selected for survey in REX Project sampling strategy
848.2	849.1	0.9	Survey completed for REX Project
849.1	849.1	0.0	Not selected for survey in REX Project sampling strategy
849.1	849.3	0.2	Survey completed for REX Project
849.3	849.4	0.1	Survey completed for REX Project
849.4	850.6	1.2	Not selected for survey in REX Project sampling strategy
850.6	851.0	0.4	Survey completed for REX Project
851.0	852.3	1.3	Survey completed for REX Project
852.3	852.9	0.6	Not selected for survey in REX Project sampling strategy
852.9	853.1	0.2	Survey completed for REX Project
853.1	853.6	0.5	Not selected for survey in REX Project sampling strategy
853.6	853.7	0.1	Survey completed for REX Project
853.7	854.0	0.3	Not selected for survey in REX Project sampling strategy
854.0	854.4	0.4	Survey completed for REX Project
854.4	854.9	0.5	Not selected for survey in REX Project sampling strategy
854.9	855.4	0.5	Survey completed for REX Project
855.4	855.6	0.2	Not selected for survey in REX Project sampling strategy
855.6	856.1	0.5	Survey completed for REX Project
856.1	856.6	0.5	Not selected for survey in REX Project sampling strategy
856.6	858.6	2.0	Survey completed for REX Project
858.6	859.4	0.8	Not selected for survey in REX Project sampling strategy
859.4	859.5	0.1	Survey completed for REX Project
859.5	860.6	1.1	Not selected for survey in REX Project sampling strategy
860.6	865.6	5.0	Survey completed for REX Project
865.6	866.1	0.5	Not selected for survey in REX Project sampling strategy
866.1	866.7	0.6	Survey completed for REX Project
866.7	867.7	1.0	Not selected for survey in REX Project sampling strategy
867.7	869.0	1.3	Survey completed for REX Project
869.0	871.2	2.2	Not selected for survey in REX Project sampling strategy
871.2	873.5	2.3	Survey completed for REX Project

TABLE 3.11.1-8
(Continued)

Milepost		Miles	Survey Status
Start	End		
873.5	873.8	0.3	Not selected for survey in REX Project sampling strategy
873.8	873.9	0.1	Survey completed for REX Project
873.9	875.6	1.7	Not selected for survey in REX Project sampling strategy
875.6	875.8	0.2	Survey completed for REX Project
875.8	879.6	3.8	Not selected for survey in REX Project sampling strategy
879.6	880.7	1.1	Survey completed for REX Project
880.7	882.8	2.1	Not selected for survey in REX Project sampling strategy
882.8	883.4	0.6	Survey completed for REX Project
883.4	888.5	5.1	Not selected for survey in REX Project sampling strategy
888.5	888.7	0.2	Survey completed for REX Project
888.7	889.4	0.7	Not selected for survey in REX Project sampling strategy
889.4	889.5	0.1	Survey completed for REX Project
889.5	893.1	3.6	Not selected for survey in REX Project sampling strategy
893.1	894.7	1.6	Survey completed for REX Project
894.7	896.9	2.2	Not selected for survey in REX Project sampling strategy
896.9	897.9	1.0	Survey completed for REX Project
897.9	900.6	2.7	Not selected for survey in REX Project sampling strategy
900.6	901.1	0.5	Survey completed for REX Project
901.1	903.7	2.6	Not selected for survey in REX Project sampling strategy
903.7	904.3	0.6	Survey completed for REX Project
904.3	904.5	0.2	Not selected for survey in REX Project sampling strategy
904.5	904.6	0.1	Survey completed for REX Project
904.6	905.3	0.7	Not selected for survey in REX Project sampling strategy
905.3	905.6	0.3	Survey completed for REX Project
905.6	907.2	1.6	Not selected for survey in REX Project sampling strategy
907.2	907.3	0.1	Survey completed for REX Project
907.3	908.0	0.7	Not selected for survey in REX Project sampling strategy
908.0	908.7	0.7	Survey completed for REX Project
908.7	911.6	2.9	Not selected for survey in REX Project sampling strategy
911.6	911.7	0.1	Survey completed for REX Project
911.7	912.1	0.4	Not selected for survey in REX Project sampling strategy
912.1	912.2	0.1	Survey completed for REX Project
912.2	913.5	1.3	Not selected for survey in REX Project sampling strategy
913.5	913.6	0.1	Survey completed for REX Project
913.6	915.3	1.7	Not selected for survey in REX Project sampling strategy
915.3	915.5	0.2	Survey completed for REX Project
915.5	915.9	0.4	Not selected for survey in REX Project sampling strategy
915.9	916.0	0.1	Survey completed for REX Project
916.0	916.3	0.3	Not selected for survey in REX Project sampling strategy

TABLE 3.11.1-8
(Continued)

Milepost			
Start	End	Miles	Survey Status
916.3	917.1	0.8	Survey completed for REX Project
917.1	918.0	0.9	Not selected for survey in REX Project sampling strategy
918.0	919.0	1.0	Survey completed for REX Project
919.0	919.9	0.9	Not selected for survey in REX Project sampling strategy
919.9	920.0	0.1	Survey completed for REX Project
920.0	921.5	1.5	Not selected for survey in REX Project sampling strategy
921.5	922.8	1.3	Survey completed for Keystone Project
922.8	923.2	0.4	Not selected for survey in Keystone Project sampling strategy
923.2	923.6	0.4	Survey completed for Keystone Project
923.6	925.4	1.8	Not selected for survey in Keystone Project sampling strategy
925.4	926.5	1.1	Survey completed for Keystone Project
926.5	928.3	1.8	Not selected for survey in Keystone Project sampling strategy
928.3	929.1	0.8	Survey completed for Keystone Project
929.1	937.0	7.9	Not selected for survey in Keystone Project sampling strategy
937.0	938.1	1.1	Survey completed for Keystone Project
938.1	938.8	0.7	Not selected for survey in Keystone Project sampling strategy
938.8	938.9	0.1	Not surveyed (land access denial)
938.9	940.6	1.7	Survey completed for Keystone Project
940.6	941.0	0.4	Not surveyed (land access denial)
941.0	941.2	0.2	Not selected for survey in Keystone Project sampling strategy
941.2	941.3	0.1	Survey completed for Keystone Project
941.3	943.6	2.3	Not selected for survey in Keystone Project sampling strategy
943.6	944.4	0.8	Survey completed for Keystone Project
944.4	946.9	2.5	Not selected for survey in Keystone Project sampling strategy
946.9	947.6	0.7	Not surveyed (land access denial)
947.6	949.5	1.9	Survey completed for Keystone Project
949.5	949.7	0.2	Not selected for survey in Keystone Project sampling strategy
949.7	949.8	0.1	Not surveyed (land access denial)
949.8	950.7	0.9	Not selected for survey in Keystone Project sampling strategy
950.7	951.3	0.6	Survey completed for Keystone Project
951.3	951.8	0.5	Not surveyed (land access denial)
951.8	952.1	0.3	Not selected for survey in Keystone Project sampling strategy
952.1	952.7	0.6	Survey completed for Keystone Project
952.7	952.8	0.1	Not selected for survey in Keystone Project sampling strategy
952.8	953.0	0.2	Not surveyed (land access denial)
953.0	956.6	3.6	Not surveyed (land access denial)
956.6	961.3	4.7	Survey completed for Keystone Project
961.3	961.5	0.2	Not surveyed (land access denial)
961.5	961.8	0.3	Survey completed for Keystone Project

TABLE 3.11.1-8
(Continued)

Milepost			
Start	End	Miles	Survey Status
961.8	961.9	0.1	Not surveyed (land access denial)
961.9	963.1	1.2	Survey completed for Keystone Project
963.1	963.7	0.6	Not surveyed (land access denial)
963.7	963.7	0.0	Survey completed for Keystone Project
963.7	972.5	8.8	Not surveyed (land access denial)
972.5	976.7	4.2	Survey completed for Keystone Project
976.7	977.4	0.7	Not surveyed (land access denial)
977.4	980.0	2.6	Survey completed for Keystone Project
980.0	980.6	0.6	Not surveyed (land access denial)
980.6	981.3	0.7	Survey completed for Keystone Project
981.3	981.4	0.1	Not surveyed (land access denial)
981.4	997.3	15.9	Survey completed for Keystone Project
997.3	998.3	1.0	Not surveyed (land access denial)
998.3	999.0	0.7	Survey completed for Keystone Project
999.0	999.5	0.5	Not surveyed (land access denial)
999.5	1017.3	17.8	Survey completed for Keystone Project
1017.3	1017.5	0.2	Not surveyed (land access denial)
1017.5	1019.5	2.0	Survey completed for Keystone Project
1019.5	1019.6	0.1	Not surveyed (land access denial)
1019.6	1021.4	1.8	Survey completed for Keystone Project
		134.1	Total miles surveyed
		120.4	Miles outside sampling strategy
		18.5	Total miles remaining to be surveyed

ARG also conducted geomorphological investigations at 38 stream-valley locations along the proposed REX corridor. Their report (Myers et al. 2006b) recommended that 18 of the examined stream crossing locations be further investigated using backhoe trenching. The results of this additional fieldwork were presented in a separate report (Anderson et al. 2007). A total of 43 backhoe trenches ultimately were excavated and resulted in identification of three buried Pre-contact archeological sites within the Keystone APE (Sites 23AU1153, 23CH1345, and 23AU1154; see Table 3.11.2-7). Geoarcheological studies for the Missouri portion of the REX Project are now considered complete. The Missouri SHPO sent a letter to ARG on April 17, 2007, that accepted both the level of effort and findings of the geoarcheological report.

3.11.1.5 Illinois

The Keystone pipeline would enter Illinois from St. Charles County, Missouri and would extend through the west-central portion of the state for approximately 56.5 miles. The counties crossed include Madison, Bond, Fayette, and Marion. ARG was contracted on behalf of Keystone to perform the required cultural resources field assessments in the state.

Prior to the Keystone fieldwork commencing, ARG performed a records review of the proposed pipeline route in January 2006. The file searches collected cultural site and survey data that were housed at the Illinois Historic Preservation Agency. The information was reviewed in relation to a corridor that extended for the length of the proposed pipeline route and was 2 miles wide, centered on its proposed centerline. These record searches identified a large number of cultural resources that generally could be associated with the project region, particularly in Madison County. The records review therefore focused on sites within one-quarter mile of the proposed Keystone centerline to develop its literature review (Titus 2006b).

The data indicated that 20 known cultural resources (11MS17, 11MS26, 11MS111, 11MS178, 11MS348, 11MS400, 11MS441, 11MS619, 11MS620, 11MS831, 11MS1143, 11MS1144, 11MS1293, 11MS1292, 11MS1600, 11MS2007, 11MS2018, 11MS2186, 11FY20, and 11FY138) were plotted within the proposed survey corridor. These cultural resources included 17 Pre-contact sites, one historic site, and two sites that were not identified as the site forms were not available. The eligibility for listing in the NRHP of 12 cultural resources had not been previously established. Four of the Pre-contact sites (11MS178, 11MS17, 11MS2018, and 11FY138) were recommended as being potentially eligible for listing, while two Pre-contact sites (11MS1292 and 11MS2007) were declared ineligible based on the results of previous surveys. The review of archival records identified 45 potential historic structures or buildings and features in or in close proximity to the Project corridor. These included 42 residential structures, two schools, one cemetery, and one church (Titus 2006b).

ARG submitted its research design to the Illinois SHPO in March 2006. It proposed a cultural resource field survey along the entire proposed pipeline, using a 200-foot-wide survey corridor. A pedestrian survey using transects spaced no more than 49.2 feet (15 meters) apart was to be conducted at landforms with existing land disturbance and on landforms with slopes greater than 20 percent. On landforms with less than 20 percent slope and with at least 25-percent surface visibility, the pedestrian survey transects were to be spaced 16.4 feet (5 meters) apart. Where surface visibility dropped below 25 percent, these landforms also would be subjected to 11.8- to 12.2-inch- (30- to 40-centimeter-) diameter shovel tests spaced 49.2 feet (15 meters) apart. The research design proposed geomorphological testing at 18 locations where deeply buried cultural deposits were considered possible. The Illinois SHPO accepted the proposed research plan.

ARG has conducted cultural resources surveys in Illinois since May 2006 that are still ongoing. The surveys have examined a 200- to 300-foot-wide corridor. The 200-foot-wide corridor measured 40 feet toward an existing collocated pipeline and 160 feet to the side opposite the existing pipeline. The 300-foot-wide corridor was limited to greenfield sections and was 150 feet to either side of the proposed Keystone centerline. Consistent with the approved research design, the field-inspected locations were examined through pedestrian survey and shovel testing.

A total of 49.9 miles of the pipeline route was surveyed for cultural resources while 6.6 miles of the ROW could not be accessed due to landowner refusals (Table 3.11.1-9). The surveyed total includes approximately 3.0 miles of lands within the Carlyle Lake Wildlife Management Area (WMA) in Fayette County, which is overseen by COE. ARG submitted a separate interim report for the Carlyle Lake WMA in January 2007. COE sent a reply to ARG on March 8, 2007, that agreed with the survey effort but requested additional subsurface testing at one of the three archeological sites found within the area (Site ARG-02; see Table 3.11.2-8). Keystone has indicated that it will submit an updated interim report to DOS and COE for this site in July 2007.

TABLE 3.11.1-9
Cultural Resources Survey Status of the Keystone Mainline Project in Illinois as of July 2007 (excluding reroutes)

Milepost Start	Milepost End	Miles	Survey Status
1021.4	1021.6	0.2	Not surveyed (land access denial)
1021.6	1024.4	2.8	Survey completed
1024.4	1024.6	0.2	Not surveyed (land access denial)
1024.6	1025.6	1.0	Survey completed
1025.6	1028.4	2.8	Not surveyed (land access denial)
1028.4	1030.2	1.8	Survey completed
1030.2	1031.2	1.0	Not surveyed (land access denial)
1031.2	1032.0	0.8	Survey completed
1032.0	1032.6	0.6	Not surveyed (land access denial)
1032.6	1033.1	0.5	Survey completed
1033.1	1034.3	1.2	Not surveyed (land access denial)
1034.3	1051.1	16.8	Survey completed
1051.1	1051.2	0.1	Not surveyed (land access denial)
1051.2	1063.9	12.7	Survey completed
1063.9	1064.2	0.3	Not surveyed (land access denial)
1064.2	1076.1	11.9	Survey completed
1076.1	1076.3	0.2	Not surveyed (land access denial)
1076.3	1077.9	1.6	Survey completed
		49.9	Total miles surveyed
		0.0	Total miles where survey was not required
		6.6	Total miles remaining to be surveyed

Cultural resources surveys for Project access roads, additional temporary workspace, pipeline reroutes, and appurtenant facilities are ongoing. Keystone anticipates that completed reports will be filed for these aspects of the Project by September 2007, with NRHP site evaluation reports to be filed in November 2007. An addendum report that details the results of geomorphological testing that is scheduled to occur within the Keystone APE will be filed in February 2008.

3.11.1.6 Oklahoma (Cushing Extension)

The Cushing Extension lateral pipeline would enter Oklahoma from Cowley County, Kansas and would cross through the northern portion of the state for approximately 79.7 miles. The counties crossed include Kaye, Noble, and Payne. Geo-Marine, Inc. initially was contracted by Keystone to perform the required cultural resources assessments in the state. Prior to commencing fieldwork, in March 2006, Geo-Marine submitted a research design to the SHPO that included a records review and plan to conduct field surveys for the Cushing Extension pipeline route in Kansas.

ARG replaced Geo-Marine as the archeological contractor for the Oklahoma portion of the Cushing Extension and filed a new research design with the SHPO in February 2007. The research plan used the records review previously presented by Geo-Marine (Carrier-Jones and Kuehn 2006). The records used online cultural site and survey data that were housed at the Oklahoma State Historical Preservation Office, the Oklahoma Archaeological Survey, and the online NRHP database. The information was reviewed in relation to a corridor that extended for the length of the proposed pipeline route and was 2 miles wide, centered on the proposed centerline. The records search identified 61 cultural resources in this zone, including 31 Pre-contact sites and 30 historic sites. The data indicated that 16 known cultural

resources lay within the projected Cushing Extension APE (34KA45, 34KA135, 34KA145, 34KA323, 34KA324, 34KA334, 34KA335, 34PY70, 34PY77, 34PY89, 34PY91, 34PY92, 34PY93, 34PY94, 34PY95, and 34PY98). They include seven Pre-contact sites and nine historic sites, of which four have been recommended as ineligible for listing in the NRHP. The remaining 12 sites of this group had not been previously assessed for their eligibility status. The research design also identified six historic properties listed in the NRHP or on the Oklahoma Landmarks Inventory that lie near but outside the Project APE.

The revised ARG research design proposed that cultural resources field surveys be conducted along the entire proposed lateral route, using a 300-foot-wide survey corridor. A pedestrian survey using transects spaced no more than 65.6 feet (20 meters) apart was to be conducted at landforms exceeding 10-percent surface visibility and exhibiting less than 20-percent slope. The field methods also specified the use of shovel tests spaced 65.6 feet (20 meters) apart at level landforms where the ground surface was obscured; this interval was to be reduced to 32.8 ft (10 meter) intervals when cultural materials were encountered. The research design further proposed geomorphological testing at 13 locations where deeply buried cultural deposits were considered possible. The SHPO responded in a letter dated March 1, 2007, that agreed with the essential components of the plan but noted how the SHPO expected historic structures and buildings to be recorded. No federally owned or managed land that requires review by a federal agency is present along the proposed Cushing Extension route in Oklahoma.

ARG has provided DOS with interim survey findings, indicating that 63.8 miles of the proposed Cushing Extension pipeline has been surveyed for cultural resources. Access was denied by property owners along 15.9 miles of the planned survey areas (Table 3.11.1-10); therefore, the cultural resources inventory of the proposed Cushing Extension pipeline is incomplete at this time. Cultural resources surveys for Project access roads, additional temporary workspace, pipeline reroutes, and appurtenant facilities are ongoing. Draft technical reports that provide details of the cultural resources surveys and any NRHP site evaluation testing are scheduled to be filed by Keystone in September and November 2007. An addendum report that details the results of additional geomorphological testing that is scheduled to occur within the APE will be filed in April 2008.

TABLE 3.11.1-10
Cultural Resources Survey Status of the Keystone Cushing Extension in Oklahoma as of July 2007 (excluding reroutes)

Milepost			
Start	End	Miles	Survey Status
212.5	213.3	0.8	Survey complete
213.3	214.0	0.7	Not surveyed (land access denial)
214.0	215.5	1.5	Survey complete
215.5	216.0	0.5	Not surveyed (land access denial)
216.0	217.0	1.0	Survey complete
217.0	218.0	1.0	Not surveyed (land access denial)
218.0	222.8	4.8	Survey complete
222.8	223.0	0.2	Not surveyed (land access denial)
223.0	224.5	1.5	Survey complete
224.5	226.0	1.5	Survey complete
226.0	226.5	0.5	Not surveyed (land access denial)

TABLE 3.11.1-10
(Continued)

Milepost			
Start	End	Miles	Survey Status
226.5	227.1	0.6	Survey complete
227.1	227.4	0.3	Survey complete
227.4	227.9	0.5	Survey complete
227.9	228.5	0.6	Not surveyed (land access denial)
228.5	230.5	2.0	Survey complete
230.5	233.2	2.7	Survey complete
233.2	234.0	0.8	Not surveyed (land access denial)
234.0	236.2	2.2	Survey complete
236.2	236.7	0.5	Not surveyed (land access denial)
236.7	237.2	0.5	Survey complete
237.2	237.8	0.6	Not surveyed (land access denial)
237.8	244.0	6.2	Survey complete
244.0	245.2	1.2	Not surveyed (land access denial)
245.2	246.0	0.8	Survey complete
246.0	247.4	1.4	Not surveyed (land access denial)
247.4	247.9	0.5	Survey complete
247.9	248.5	0.6	Not surveyed (land access denial)
248.5	248.7	0.2	Survey complete
248.7	249.4	0.7	Not surveyed (land access denial)
249.4	249.9	0.5	Survey complete
249.9	250.1	0.2	Not surveyed (land access denial)
250.1	255.3	5.2	Survey complete
255.3	256.1	0.8	Not surveyed (land access denial)
256.1	256.6	0.5	Survey complete
256.6	257.2	0.6	Not surveyed (land access denial)
257.2	259.3	2.1	Survey complete
259.3	260.3	1.0	Not surveyed (land access denial)
260.3	262.2	1.9	Survey complete
262.2	262.9	0.7	Not surveyed (land access denial)
262.9	264.4	1.5	Survey complete
264.4	265.6	1.2	Survey complete
265.6	266.2	0.6	Not surveyed (land access denial)
266.2	267.8	1.6	Survey complete
267.8	268.0	0.2	Not surveyed (land access denial)
268.0	269.6	1.6	Survey complete
269.6	269.8	0.2	Survey complete
269.8	271.4	1.6	Survey complete
271.4	271.7	0.3	Survey complete
271.7	276.2	4.5	Survey complete
276.2	276.4	0.2	Not surveyed (land access denial)

TABLE 3.11.1-10 (Continued)

Milepost			
Start	End	Miles	Survey Status
276.4	276.7	0.3	Survey complete
276.7	277.5	0.8	Not surveyed (land access denial)
277.5	284.8	7.3	Survey complete
284.8	285.2	0.4	Not surveyed (land access denial)
285.2	289.0	3.8	Survey complete
289.0	289.1	0.1	Not surveyed (land access denial)
289.1	289.7	0.6	Survey complete
289.7	289.9	0.2	Not surveyed (land access denial)
289.9	291.4	1.5	Survey complete
291.4	292.2	0.8	Not surveyed (land access denial)
		63.8	Total miles surveyed
		0.0	Miles outside sampling strategy
		15.9	Total miles remaining to be surveyed

3.11.2 Potential Impacts and Mitigation

When considering impacts to cultural resources, Section 106 of the NHPA (as codified in 36 CFR 800.5) requires federal agencies to apply the "Criteria of Adverse Effect" to determine whether a project has the potential to adversely affect cultural resources. Adverse effects are found when an undertaking alters, directly or indirectly, the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that diminishes the historical integrity of the property. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative.

For the Keystone Project, the principal types of adverse effects that could occur include physical destruction of or damage to all or part of the property caused by pipeline trenching or related excavations or boring; introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features by short term pipeline construction or construction of above-ground appurtenant facilities and roads; and change of the character of the property's use or of physical features within the property's setting that contribute to its significance.

To limit impacts to cultural resources, and in line with FERC guidelines, the Keystone Pipeline Project is avoiding all cultural resources that are potentially eligible for listing in the NRHP. Avoidance is achieved by rerouting the pipeline corridor and/or related appurtenances, avoiding construction activities on NRHP-eligible properties, and using boring and HDDs. Short term, construction-related impacts would be mitigated by implementing measures in Keystone's Mitigation Plan (Appendix B). If adverse effects do occur, they would be resolved through consultation with the ACHP as well as any applicable tribal groups and SHPO. A PA also would be drafted to address the protocols for unanticipated discoveries, future cultural resources identification and avoidance commitments and measures, and the process for future consultation.

3.11.2.1 North Dakota

A total of 25 cultural resources were identified within the project APE in North Dakota (Table 3.11.2-1). Twenty were new cultural resources identified during the Class III survey conducted by Metcalf for the Keystone Project and the geoarcheological work conducted by LaRamie Soil Services. These cultural resources were classified as three Pre-contact (i.e., prehistoric) sites, one Pre-contact site lead, eight Pre-contact isolated finds, seven historic sites, and one historic site lead (Bleier et al. 2006a). Each of the 12 Pre-contact resources was noted by the presence of stone tools or stone waste flakes in varying quantities. The eight new historic resources included five railroad crossings, two locations with historic depression features or foundations, and one farmstead. The survey also revisited and updated information on six previously identified historic sites—all railways that would be crossed by the pipeline.

Based on the results of the Metcalf examination, 11 cultural resources were assessed as being ineligible for listing in the NRHP. This included all eight Pre-contact isolated find locations, one historic site (32SA81), one Pre-contact site (32RM160), and the single Pre-contact site lead (32RMx89). The latter two cultural resources were subjected to additional evaluative subsurface testing prior to being assessed as ineligible for listing in the NRHP (Bleier and Stine 2007). No additional investigations at these 11 resources were recommended (Bleier et al. 2006a, Bleier and Stine 2007).

The NRHP eligibility of four cultural resources was not evaluated by Metcalf. At two of these (Pre-contact sites 32BA170 and 32PB202), Keystone elected to follow Metcalf's recommendation and will avoid the site areas by rerouting the pipeline. Metcalf stated that the NRHP eligibility of historic site 32BA170 and historic site lead 32NEx99 could not be assessed as they were large farmsteads that primarily extended outside of the surveyed 300-foot-wide Project corridor. However, Metcalf evaluated the historic features and standing structures that are located within the Project APE at both locations as being non-contributing elements to the farmstead complexes. Rerouting the pipeline to avoid these site elements was originally not recommended (Bleier et al. 2006a). Based on a request by DOS, Keystone subsequently stated that it would reroute the pipeline around 32BA170 and 32NEx99 to avoid adverse effects to these cultural resources.

Ten historic sites in North Dakota were recommended as being potentially eligible for listing in the NRHP (i.e., possible historic properties under Section 106). These historic resources are all railroads bisected by the pipeline corridor; the railway listed as site 32BA148 would be intersected twice. Metcalf stated that adverse effects on all 11 railway crossings would be avoided by boring underneath the rail beds (Bleier et al. 2006a). The North Dakota SHPO concurred with the Metcalf study level of effort and methodology letters dated January 24 and February 14, 2007. DOS is in the process of consulting with the SHPO to make final determinations of eligibility for the cultural resources identified within the Keystone APE.

The cultural resources surveys for Project access roads, additional temporary workspace, pipeline reroutes, and appurtenant facilities in North Dakota are ongoing. Keystone anticipates that an addendum report will be filed for these aspects of the Project in September 2007.

TABLE 3.11.2-1
Cultural Resources Identified within the Keystone Mainline Project
Area of Potential Effect in North Dakota as of July 2007

Project Item	Site Identifier	Site Type	Initial NRHP Recommendation by Applicant	Mitigation Measure	Revised NRHP Evaluation from Testing	Avoidance Plans Filed?
Mainline Project	32BA170	Pre-contact scatter	Not assessed	Avoid (reroute)	N/A	No
Mainline Project	32NEx99	Historic farmstead	Not assessed	Avoid (reroute)	N/A	Yes
Mainline Project	32PB202	Pre-contact scatter	Not assessed	Avoid (reroute)	N/A	No
Mainline Project	32WA247	Historic farmstead (depression)	Not assessed (non-contributing)	No further work		
Mainline Project	32BA148	Historic railroad	Potentially eligible	Avoid (bore)	N/A	Typical
Mainline Project	32BA171	Historic railroad	Potentially eligible	Avoid (bore)	N/A	Typical
Mainline Project	32NE70	Historic railroad	Potentially eligible	Avoid (bore)	N/A	Typical
Mainline Project	32NE72	Historic railroad	Potentially eligible	Avoid (bore)	N/A	Typical
Mainline Project	32RM155	Historic railroad	Potentially eligible	Avoid (bore)	N/A	Typical
Mainline Project	32RM160	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended ineligible	
Mainline Project	32RMx89	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended ineligible	
Mainline Project	32SA47	Historic railroad	Potentially eligible	Avoid (bore)	N/A	Typical
Mainline Project	32SA80	Historic railroad	Potentially eligible	Avoid (bore)	N/A	Typical
Mainline Project	32ST171	Historic railroad	Potentially eligible	Avoid (bore)	N/A	Typical
Mainline Project	32WA244	Historic railroad	Potentially eligible	Avoid (bore)	N/A	Typical
Mainline Project	32WA246	Historic railroad	Potentially eligible	Avoid (bore)	N/A	Typical
Mainline Project	32BAx107	Pre-contact isolate	Recommended ineligible	No further work		
Mainline Project	32BAx108	Pre-contact isolate	Recommended ineligible	No further work		
Mainline Project	32BAx109	Pre-contact isolate	Recommended ineligible	No further work		
Mainline Project	32BAx110	Pre-contact isolate	Recommended ineligible	No further work		
Mainline Project	32BAx111	Pre-contact isolate	Recommended ineligible	No further work		
Mainline Project	32BAx112	Pre-contact isolate	Recommended ineligible	No further work		
Mainline Project	32PBx176	Pre-contact isolate	Recommended ineligible	No further work		
Mainline Project	32SA81	Historic foundation	Recommended ineligible	No further work		
Mainline Project	32WAx211	Pre-contact isolate	Recommended ineligible	No further work		

NRHP = National Register of Historic Places.
N/A = Not applicable.

3.11.2.2 South Dakota

Twelve previously unidentified cultural resource locations were identified during the Level II field survey conducted by Metcalf in South Dakota (Table 3.11.2-2). These were classified as three Pre-contact sites, two Pre-contact isolated find spots, three historic sites without extant structures, two historic sites with buildings and structures, and two historic structures (Bleier et al. 2006b). Two of the five Pre-contact cultural resources were identified by the presence of rock cairns. The remaining Pre-contact site and the two Pre-contact isolated finds were noted by the presence of artifacts such as bone/stone tools or stone waste flakes in varying quantities. All of the previously unidentified historic resources were interpreted as the remains of farmsteads with standings structures or foundation features. The survey also revisited and updated information on five previously identified historic railways that would be crossed by the pipeline.

Based on the field survey results, Metcalf assessed three cultural resources as being ineligible for listing in the NRHP. This included the two Pre-contact isolated find locations and one historic site represented by a single farm structure (KB-000-00462). No additional investigations at these three resources were recommended (Bleier et al. 2006b).

The NRHP significance rankings of six historic cultural resources located in the field were not evaluated in the Metcalf report. At one of these, farmstead site 39HT134 (associated with structures HT-002-00001 and 2), Keystone elected to follow Metcalf's recommendation and avoid the features by rerouting the pipeline due to the reported presence of human remains. The NRHP significance of historic sites 39CK50, 39DA70 (and associated structure DA-000-00950), structure DA-000-00951, 39HT133, and 39YK78 could not be assessed by Metcalf as they represent large farmsteads that primarily extend outside of the surveyed 300-foot-wide Project corridor. However, Metcalf evaluated the historic features and standing structures that are located within the Project APE at these five locations as being non-contributing elements to the farmstead complexes. Rerouting the pipeline to avoid these site elements originally was not recommended (Bleier et al. 2006b). Based on a request by DOS, Keystone subsequently stated that it would reroute the pipeline around 39CK50, 39DA70 (and associated structure DA-000-00950), structure DA-000-00951, 39HT133, and 39YK78 to avoid adverse effects to these cultural resources.

The remaining eight sites were recommended as being eligible for listing in the NRHP. These sites include the two Pre-contact cairns sites (39DA71 and 39YK77), the bone artifact scatter at site 39YK79, and the five historic railway crossings. Metcalf recommended avoidance of the three Pre-contact sites through pipeline reroutes, which Keystone has accepted. Metcalf stated that adverse effects on the five historic rail sites would be avoided by boring beneath the railway beds (Bleier et al. 2006b). Concurrence with this determination of effect will need to be completed by DOS and the South Dakota SHPO.

In a March 23, 2007 letter to DOS, the South Dakota SHPO raised several concerns with the findings of the South Dakota field study draft report. They requested additional information on the methodology and sampling strategy used, noted a concern with some of the background data, and requested an adjustment to the filed Unanticipated Discoveries Plan. DOS concurred with the comments raised by the SHPO and forwarded them to Keystone in May 2007. Metcalf met with the South Dakota SHPO on June 15, and the two parties agreed that Metcalf would provide additional data to the SHPO and DOS in a supplemental report that is scheduled to be filed in July 2007.

TABLE 3.11.2-2
Cultural Resources Identified within the Keystone Mainline Project
Area of Potential Effect in South Dakota as of July 2007

Project Item	Site Identifier	Site Type	Initial NRHP Recommendation by Applicant	Mitigation Measure	Revised NRHP Evaluation from Testing	Avoidance Plans Filed?
Mainline Project	39CK50	Historic farmstead	Not assessed	Avoid (reroute)	N/A	No
Mainline Project	39DA070	Historic farmstead	Not assessed	Avoid (reroute)	N/A	Yes
Mainline Project	39HT133	Historic farmstead	Not assessed	Avoid (reroute)	N/A	No
Mainline Project	39HT134	Historic farmstead	Not assessed	Avoid (reroute)	N/A	No
Mainline Project	39YK78	Historic farmstead	Not assessed	Avoid (reroute)	N/A	No
Mainline Project	DA-000-00951	Historic farmstead	Not assessed	Avoid (reroute)	N/A	No
Mainline Project	KB-000-00462	Historic farmstead	Not assessed	Avoid (reroute)	N/A	No
Mainline Project	39BE2072	Historic railroad	Potentially eligible	Avoid (bore)	N/A	Typical
Mainline Project	39DA071	Pre-contact cairn	Potentially eligible	Avoid (reroute)	N/A	Yes
Mainline Project	39DA2000	Historic railroad	Potentially eligible	Avoid (bore)	N/A	Typical
Mainline Project	39KB2003	Historic railroad	Potentially eligible	Avoid (bore)	N/A	Typical
Mainline Project	39ML2000	Historic railroad	Potentially eligible	Avoid (bore)	N/A	Typical
Mainline Project	39YK2003	Historic railroad	Potentially eligible	Avoid (bore)	N/A	Typical
Mainline Project	39YK77	Pre-contact cairn	Potentially eligible	Avoid (reroute)	N/A	No
Mainline Project	39YK79	Pre-contact cairn	Potentially eligible	Avoid (reroute)	N/A	No
Mainline Project	39YK75	Pre-contact isolate	Recommended ineligible	No further work		
Mainline Project	39YK76	Pre-contact isolate	Recommended ineligible	No further work		

NRHP = National Register of Historic Places.
N/A = Not applicable.

Additional cultural resources surveys for Project access roads, additional temporary workspace, pipeline reroutes, and appurtenant facilities in South Dakota are ongoing. Keystone anticipates that an addendum report will be filed for these aspects of the Project in September 2007. DOS is in the process of consulting with the SHPO to make final determinations of eligibility for the cultural resources that have been identified to date within the Keystone APE.

3.11.2.3 Nebraska

Mainline Project

ARG's cultural resources survey of the Mainline Project in Nebraska identified 23 new cultural resource locations and revisited two previously identified sites and one historic cemetery (Table 3.11.2-3). The newly identified sites included seven Pre-contact resources, 15 historic resources, and one multi-component resource (Ensor et al. 2007). Four of the Pre-contact resources could not be assigned to a particular period; the other three were associated with the Late Plains Woodland or Central Plains Traditions. Most (13) of the new historic sites were interpreted as being late 19th- to 20th-century farmsteads; the others included a school structure, a farmstead associated with a trash disposal area, and a historic cemetery (Pleasant Hill). The remaining previously unidentified site was a multi-component resource that dated from an unknown Pre-contact period and a late 19th- to 20th-century farmstead. The ARG survey also revisited and updated information on two previously identified sites—one was the site of a historic cabin (25CX7), and the other was a Pre-contact Central Plains Tradition camp and burial site (25CD21). The Pleasant Hill cemetery is a well defined burial location that was used by a local community to present times (19th- to 20th-century).

Based on the results of the field examination, 20 cultural resources were assessed by ARG as being ineligible for listing in the NRHP. This total included six of the Pre-contact sites, 13 of the historic sites, and the single multi-component site. No additional investigations at these 20 resources were recommended (Ensor et al. 2007).

The NRHP eligibility of two historic resources was not assessed. One of these cultural resources is a mid-19th-century cabin (25CX7) that was identified by an earlier field survey. ARG did not find the remains of the structure during their field investigation but found an artifact, suggesting that the site may lie within the project APE. ARG recommended further archival data research and avoidance of the location until an evaluation for NRHP eligibility can be made (Ensor et al. 2007). The other cultural resource not assessed for NRHP eligibility is the Pleasant Hill cemetery (Ensor et al. 2007). ARG recommended that Keystone avoid disturbing the burials at this location through a reroute, which Keystone has accepted and will implement.

The remaining four sites were recommended as being potentially eligible for listing in the NRHP. These sites include two new Pre-contact camp sites that date to the Late Plains Woodland and Central Plains Traditions (25SW53 and 25SW54), the previously identified Central Plains Tradition camp and burial site (25CD21), and a scatter of artifacts that is believed to be associated with a mid- to late-19th-century farmstead (25SA79). Keystone accepted ARG's recommendations to avoid all four sites through pipeline reroutes. These reroutes were assessed by ARG and were not found to contain cultural resource concerns (Ensor et al. 2007).

TABLE 3.11.2-3
Cultural Resources identified within the Keystone Mainline Project
Area of Potential Effect in Nebraska as of July 2007

Project Item	Site Identifier	Site Type	Initial NRHP Recommendation by Applicant	Mitigation Measure	Revised NRHP Evaluation from Testing	Avoidance Plans Filed?
Mainline Project	25CX07	Historic structure	Not assessed	Avoid (reroute)	N/A	No
Mainline Project	Pleasant Hill Cemetery	Historic cemetery	Not assessed	Avoid (reroute)	N/A	No
Mainline Project	25CD21	Pre-contact burial	Potentially eligible	Avoid (reroute)	N/A	Yes
Mainline Project	25SA79	Historic scatter	Potentially eligible	Avoid (reroute)	N/A	Yes
Mainline Project	25SW53	Pre-contact scatter	Potentially eligible	Avoid (reroute)	N/A	Yes
Mainline Project	25SW54	Pre-contact scatter	Potentially eligible	Avoid (reroute)	N/A	Yes
Mainline Project	25BU59	Historic scatter	Recommended ineligible	No further work		
Mainline Project	25BU60	Historic scatter	Recommended ineligible	No further work		
Mainline Project	25BU61	Pre-contact scatter	Recommended ineligible	No further work		
Mainline Project	25JF37	Pre-contact isolate	Recommended ineligible	No further work		
Mainline Project	25JF38	Pre-contact scatter	Recommended ineligible	No further work		
Mainline Project	25JF39	Pre-contact isolate	Recommended ineligible	No further work		
Mainline Project	25JF40	Historic farmstead	Recommended ineligible	No further work		
Mainline Project	25SA77	Historic scatter	Recommended ineligible	No further work		
Mainline Project	25SA78	Historic scatter	Recommended ineligible	No further work		
Mainline Project	25SA80	Historic scatter	Recommended ineligible	No further work		
Mainline Project	25SA81	Historic farmstead	Recommended ineligible	No further work		
Mainline Project	25ST39	Historic school	Recommended ineligible	No further work		
Mainline Project	25ST40	Historic farmstead	Recommended ineligible	No further work		
Mainline Project	25ST41	Historic scatter	Recommended ineligible	No further work		
Mainline Project	25SW51	Pre-contact / historic scatter	Recommended ineligible	No further work		
Mainline Project	25SW52	Pre-contact scatter	Recommended ineligible	No further work		
Mainline Project	25SW55	Historic scatter	Recommended ineligible	No further work		
Mainline Project	25SW56	Historic scatter	Recommended ineligible	No further work		
Mainline Project	25SW57	Historic farmstead	Recommended ineligible	No further work		

TABLE 3.11.2-3
(Continued)

Project Item	Site Identifier	Site Type	Initial NRHP Recommendation by Applicant	Mitigation Measure	Revised NRHP Evaluation from Testing	Avoidance Plans Filed?
Mainline Project	25SW58	Historic scatter	Recommended ineligible	No further work		
REX pipeline	25GA126	Historic scatter	Recommended ineligible	No further work		
REX pipeline	25GA127	Pre-contact scatter	Recommended ineligible	No further work		
REX ATWS	25GA128	Pre-contact / historic scatter	Recommended ineligible	No further work		

NRHP = National Register of Historic Places.
N/A = Not applicable.
REX = Rockies Express Western Phase Project.
ATWS = Additional Temporary Workspace

Two separate ARG survey reports (Schwegman et al. 2006, Shah Lomas 2007c) identified three archaeological sites along the portion of the REX pipeline that is collocated with the Keystone Mainline Project (Table 3.11.2-3). These included a historic artifact scatter potentially associated with a late-19th to early-20th-century school (25GA126), a sparse lithic scatter of undetermined Pre-contact age (25GA127) and a low-density scatter of both mid-19th to 20th-century historic artifacts and stone tool debris from an unspecified Pre-contact period. All three sites were recommended as being ineligible for listing in the NRHP, and no further work was required. The SHPO and FERC have previously concurred with the report recommendations for these two sites. DOS is in the process of consulting with the SHPO to make final determinations of eligibility for cultural resources that have been identified to date within both the Keystone and REX Project areas.

Additional cultural resources surveys for Project access roads, additional temporary workspace, pipeline reroutes, and appurtenant facilities in Nebraska are ongoing. Keystone anticipates that an addendum report will be filed for these aspects of the Project in September 2007. Keystone also has indicated that further deep testing of buried soils will be performed in autumn 2007, and the results will be filed in January 2008.

Cushing Extension

As noted in Section 3.11.1.3, no cultural resources were identified within the 2.4-mile corridor that was surveyed in Nebraska for the Cushing Extension pipeline (Table 3.11.2-4). Keystone anticipates that the complete report for this aspect of the Project will be submitted to DOS and the Nebraska SHPO in July 2007.

3.11.2.4 Kansas

Mainline Project

ARG identified 24 cultural resources within the areas surveyed in Kansas for the REX Project that also are collocated with the Keystone Mainline Project (Table 3.11.2-5). These were classified as 12 Pre-contact sites, nine historic sites, and three multi-component sites. One of the Pre-contact resources was thought to represent a Late Woodland Period occupation while the other 11 Pre-contact sites could not be assigned to a particular period. Six of the identified historic sites were classified as late 19th- to 20th-century farmsteads; the others included two early 20th-century refuse sites and a single rock wall feature that may date to the late 19th century. The three multi-component sites were both mid-19th- to 20th-century farmsteads that also had evidence of Pre-contact period occupations.

ARG determined through its survey results that 20 of the REX Project cultural resources did not meet the eligibility requirements for listing in the NRHP. This total included all of the historic sites, eight of the Pre-contact sites, and the three sites that contained both historic and Pre-contact components. No additional investigations at these 20 resources were recommended (Myers et al. 2006, Shah Lomas 2007a). The Kansas SHPO concurred with the report findings in letters dated June 12, 2006, and June 12, 2007.

ARG determined that four of the REX Project sites (14MH160 [initially labeled ARG-3], 14NH107 and 14NH112 [ARG-10], and 14NH110 [ARG-12]) were potentially eligible for listing in the NRHP. Each of these sites consists of moderate to dense scatters of Pre-contact artifacts. Geoarcheological testing indicated that Site 14NH112 also exhibited the potential for intact deeply buried artifacts (Anderson and Schwegman 2007). ARG recommended that the four sites be avoided or archaeologically tested (Myers et al. 2006).

TABLE 3.11.2-4
Cultural Resources Identified within the Keystone Cushing Extension Area of Potential Effect in Nebraska as of July 2007

Project Item	Site Identifier	Site Type	Initial NRHP Recommendation by Applicant	Mitigation Measure	Revised NRHP Evaluation from Testing	Avoidance Plans Filed?
No cultural resources identified to date						

TABLE 3.11.2-5
Cultural Resources Identified within the Keystone Mainline Project Area of Potential Effect in Kansas as of July 2007

Project Item	Site Identifier	Site Type	Initial NRHP Recommendation by Applicant	Mitigation Measure	Revised NRHP Evaluation from Testing	Avoidance Plans Filed?
REX pipeline	ARG-03 (14MH160)	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended ineligible	N/A
REX pipeline	ARG-10 (14NH107 & 14NH112)	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended ineligible	N/A
REX pipeline	ARG-12 (14NH110)	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended ineligible	N/A
REX reroute	14MH164	Historic and Pre-contact scatter	Recommended ineligible	No further work		
REX pipeline	ARG-01	Pre-contact scatter	Recommended ineligible	No further work		
REX pipeline	ARG-02	Pre-contact scatter	Recommended ineligible	No further work		
REX pipeline	ARG-04	Pre-contact scatter	Recommended ineligible	No further work		
REX pipeline	ARG-05	Historic farmstead	Recommended ineligible	No further work		
REX pipeline	ARG-06	Pre-contact scatter	Recommended ineligible	No further work		
REX pipeline	ARG-07	Historic farmstead	Recommended ineligible	No further work		
REX pipeline	ARG-08	Pre-contact scatter	Recommended ineligible	No further work		
REX pipeline	ARG-09	Historic scatter	Recommended ineligible	No further work		
REX pipeline	ARG-11	Pre-contact scatter	Recommended ineligible	No further work		
REX pipeline	ARG-13	Pre-contact scatter	Recommended ineligible	No further work		
REX pipeline	ARG-14	Pre-contact scatter	Recommended ineligible	No further work		
REX pipeline	ARG-15	Pre-contact scatter	Recommended ineligible	No further work		
REX pipeline	ARG-16	Historic farmstead	Recommended ineligible	No further work		

TABLE 3.11.2-5
(Continued)

Project Item	Site Identifier	Site Type	Initial NRHP Recommendation by Applicant	Mitigation Measure	Revised NRHP Evaluation from Testing	Avoidance Plans Filed?
REX pipeline	ARG-17	Historic farmstead	Recommended ineligible	No further work		
REX pipeline	ARG-18	Pre-contact scatter / historic farmstead	Recommended ineligible	No further work		
REX pipeline	ARG-19	Historic farmstead	Recommended ineligible	No further work		
REX pipeline	ARG-20	Historic scatter	Recommended ineligible	No further work		
REX pipeline	ARG-21	Historic fence	Recommended ineligible	No further work		
REX pipeline	ARG-22	Historic farmstead	Recommended ineligible	No further work		
REX pipeline	ARG-23	Pre-contact scatter / historic farmstead	Recommended ineligible	No further work		

N/A = Not applicable.
REX = Rockies Express Western Phase Project.

Keystone elected to conduct testing for NRHP eligibility at each site, which was performed by ARG and reported to DOS and the Kansas SHPO (Schwegman et al. 2007). Based on the additional field work, ARG determined that the portions of all four sites situated within the project APE are heavily disturbed or do not contain substantial numbers of artifacts. The report states that the sites are not historic properties as defined by the NRHP and did not recommend further work in advance of pipeline construction. The results of the report were accepted by the Kansas SHPO in a letter dated March 8, 2007.

The field survey report for the REX Project was submitted to the Kansas SHPO on May 15, 2006. The Kansas SHPO provided comments in a letter dated June 12, 2006. The SHPO agreed with the recommendations for NRHP eligibility but found several areas where additional information was needed. The SHPO requested that ARG provide permanent Smithsonian trinomial numbers for all of the identified sites. The SHPO also noted that additional data were needed if the REX survey had recorded and evaluated historic standing structures within the Project APE, as details of these features were not contained within the submitted report. Based on data submitted by Keystone, historic structures are not located within the Project APE. DOS is in the process of consulting with the Kansas SHPO to make final determinations of eligibility for cultural resources that have been identified to date within the overlapping Keystone and REX Project areas.

Keystone has not indicated any substantive additions or alterations to the Project plans that have been filed to date for the Kansas portion of the Keystone Mainline Project. Any additional cultural resources surveys for Project access roads, additional temporary workspace, pipeline reroutes, and appurtenant facilities in Kansas will be filed with DOS as they become necessary.

Cushing Extension

Thirty-seven previously unidentified sites and a single known cultural resource have been recorded to date by ARG within the Cushing Extension corridor in Kansas (Table 3.11.2-6). In the interim reports filed with DOS, these sites were classified as 13 historic farmsteads (one of which may instead be associated with a fort), five historic structures or structural remnants, three historic artifact scatters or isolates, two historic roads / trails, one historic cemetery, 10 Pre-contact artifact scatters or isolates, and four multi-component sites with both historic and Pre-contact aspects.

Based on the field survey results, ARG assessed 33 cultural resources as being ineligible for listing in the NRHP. No additional investigations were recommended for 31 of these archeological sites. ARG recommended that Keystone reroute the pipeline to avoid two of the cultural resources due to the presence of demonstrated or potential human burials. This included the Brethren in Christ cemetery and a historic farmstead where a burial was reported present (Table 3.11.2-6).

The remaining five sites were recorded by ARG as being potentially eligible for listing in the NRHP. These sites include a single Pre-contact artifact scatter site (temporary site number KS-KEY-CX-609); the Pre-contact aspect of a previously known site that contained both historic and prehistoric components (14WH318)' a potential historic fort (KS-KEY-CX-614); and two historic transportation routes, including a crossing of the Santa Fe Trail (KS-KEY-CX-615 and -616). ARG has recommended that Keystone either avoid these cultural resources through alterations to the Project plans or that NRHP evaluation testing be conducted. DOS is in the process of consulting with the Kansas SHPO to make final determinations of eligibility for cultural resources that have been identified to date within the Cushing Extension Project area.

TABLE 3.11.2-6
Cultural Resources Identified within the Keystone Cushing Extension Area of Potential Effect in Kansas as of July 2007

Project Item	Site Identifier	Site Type	Initial NRHP Recommendation by Applicant	Mitigation Measure	Revised NRHP Evaluation from Testing	Avoidance Plans Filed?
Cushing Extension	KS-KEY-CX-609	Pre-contact scatter	Potentially eligible	Avoid or NRHP testing		No
Cushing Extension	KS-KEY-CX-614	Historic farmstead or fort	Potentially eligible	Avoid or NRHP testing		No
Cushing Extension	KS-KEY-CX-615	Historic road	Potentially eligible	Avoid or NRHP testing		No
Cushing Extension	KS-KEY-CX-616	Historic Trail (Santa Fe)	Potentially eligible	Avoid or NRHP testing		No
Cushing Extension	14WH318	Pre-contact scatter / Historic farmstead	Potentially eligible (Pre-contact)	Avoid or NRHP testing		No
Cushing Extension	Brethren in Christ Cemetery	Historic cemetery	Recommended ineligible	Avoid (reroute)	N/A	No
Cushing Extension	KS-KEY-CX-207	Historic farmstead (reported burial)	Recommended ineligible	Avoid (reroute)	N/A	No
Cushing Extension	IF-01	Pre-contact isolate	Recommended ineligible	No further work		
Cushing Extension	IF-02	Pre-contact isolate	Recommended ineligible	No further work		
Cushing Extension	IF-03	Historic isolate	Recommended ineligible	No further work		
Cushing Extension	IF-0A	Pre-contact isolate	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-101	Historic farmstead	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-102	Historic farmstead	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-103	Pre-contact scatter	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-105 (LH-1)	Historic scatter	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-105 (LH-3) (GEO1)	Pre-contact scatter / historic farmstead	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-201	Pre-contact scatter	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-202	Pre-contact scatter	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-203	Historic structure	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-204	Historic farmstead	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-205	Historic farmstead	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-206	Historic farmstead	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-208	Historic farmstead	Recommended ineligible	No further work		

TABLE 3.11.2-6
(Continued)

Project Item	Site Identifier	Site Type	Initial NRHP Recommendation by Applicant	Mitigation Measure	Revised NRHP Evaluation from Testing	Avoidance Plans Filed?
Cushing Extension	KS-KEY-CX-209	Historic farmstead	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-210	Pre-contact scatter	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-212	Historic farmstead	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-601	Historic structure	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-602	Historic foundation	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-603	Historic foundation	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-604	Historic farmstead	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-605	Pre-contact scatter	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-606	Pre-contact scatter	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-607	Historic farmstead	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-608	Historic farmstead	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-610	Pre-contact scatter / historic farmstead	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-611	Historic structure	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-612	Historic scatter	Recommended ineligible	No further work		
Cushing Extension	KS-KEY-CX-613	Pre-contact / historic scatter	Recommended ineligible	No further work		

N/A = Not applicable.

Additional cultural resource studies for Cushing Extension site evaluation testing and the survey of access roads, additional temporary workspace, pipeline reroutes, and appurtenant facilities in Kansas are ongoing. Keystone anticipates that reports will be filed for these aspects of the Project in September and November 2007. Keystone also has indicated that geomorphological testing results will be filed with the DOS in March 2008.

3.11.2.5 Missouri

Interim cultural resources survey results for the Mainline Project have been submitted by ARG to the Missouri SHPO and DOS. The report identified 35 new cultural resource locations that included 27 Pre-contact sites, seven historic sites, and two multi-component resource sites (Table 3.11.2-7). Eighteen of the Pre-contact resources could not be assigned to a particular period, five were considered to comprise material deposited during the Late Woodland period, three were associated with the Archaic period, and components of one Pre-contact site ranged from the Paleo-Indian to Late Woodland times. All seven of the historic resources were associated with the late-19th- to 20th-century, with features that indicated their use as a farmstead, industrial site, school, water well, or refuse deposit area. The historic assemblages of both multi-component sites were assessed as being late-19th-century refuse dumps, with their Pre-contact components being classified as originating from the Late Archaic times (ARGM031) or from an unknown Pre-contact period (ARGMO30). One known Pre-contact Late Woodland mound and burial site (23LN57) also was revisited during the course of the Keystone field investigations.

Based on the initial survey results, 24 cultural resources within the Keystone APE were assessed by ARG as being ineligible for listing in the NRHP. This included all seven historic sites, both multi-component sites, and 15 of the identified Pre-contact sites. One previously identified Pre-contact mound site (23LN57) that was assessed as potentially eligible for listing in the NRHP also was found to lie outside of the Project ROW. No additional investigations at these 25 sites were recommended.

The remaining 12 sites were recommended as being potentially eligible for listing in the NRHP. These sites included all four Late Woodland camp sites (23SC1054, 23SC1055, 23SC1056, and ARG-MO-26) and seven artifact scatters of unknown Pre-contact age (23MT420, 23LN298, 23LN299, 23LN300, 23LN301, 23LN303, 23LN307, and 23LN308). ARG recommended that Keystone either avoid these 12 resources through pipeline reroutes or that they conduct additional testing within the sites to evaluate their NRHP eligibility. ARG completed additional testing at nine of the 12 listed cultural resources. Sites 23SC1055, 23LN299, and 23LN308 were assessed as being ineligible for listing in the NRHP after ARG conducted additional Phase I shovel testing and surface evaluations of these locations. ARG performed trenching, shovel testing, and unit excavations at seven sites to evaluate their significance (23MT420, 23LN298, 23LN300, 23LN301, 23LN307, 23LN303, and 23SC1056) and stated that all seven cultural resources are believed to be ineligible for listing in the NRHP. One site (23SC1054) was not subjected to additional testing as the landowner refused re-entry to the property, and no work has been performed to date at ARG-MO-26. The NRHP eligibility of these two sites has not been fully assessed.

Separate cultural resource inventory reports were filed for the portion of the Keystone pipeline that is located within the REX Project corridor in Missouri (Myers et al. 2006b, Anderson et al. 2007, Rieken 2007, Shah Lomas 2007b). ARG identified 41 cultural resources along the examined portions of the REX pipeline and two access roads; an additional six sites are discussed in the submitted reports but were found to lie outside of the Project APE (Table 3.11.2-7). The 41 identified resources were classified as 16 historic farmsteads, four sites with historic structural remnants or artifact scatters, a single historic road, one historic cemetery, 15 Pre-contact artifact scatters or isolated artifacts, and four multi-component sites with both historic and Pre-contact aspects. One of the archaeological cultural resources (23AU137) was thought to represent an early Dalton occupation, one site (23CH0343) contained Late Archaic material,

TABLE 3.11.2-7
Cultural Resources Identified within the Keystone Mainline Project
Area of Potential Effect in Missouri as of July 2007

Project Item	Site Identifier	Site Type	Initial NRHP Recommendation by Applicant	Mitigation Measure	Revised NRHP Evaluation from Testing	Avoidance Plans Filed?
Mainline Project	23LN298	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended ineligible	N/A
Mainline Project	23LN299	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended ineligible	N/A
Mainline Project	23LN300	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended ineligible	N/A
Mainline Project	23LN301	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended ineligible	N/A
Mainline Project	23LN303	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended ineligible	N/A
Mainline Project	23LN307	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended ineligible	N/A
Mainline Project	23LN308	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended ineligible	N/A
Mainline Project	23MT420	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended ineligible	N/A
Mainline Project	23SC1054	Pre-contact scatter	Potentially eligible	Avoid (reroute)		No
Mainline Project	23SC1055	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended ineligible	N/A
Mainline Project	23SC1056	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended ineligible	N/A
Mainline Project	ARG-MO-26	Pre-contact scatter	Potentially eligible	Avoid (reroute)		No
Mainline Project	23AU142	Pre-contact scatter	Recommended ineligible	No further work		
Mainline Project	23AU143	Historic farmstead	Recommended ineligible	No further work		
Mainline Project	23LN302	Pre-contact scatter	Recommended ineligible	No further work		
Mainline Project	23LN304	Pre-contact scatter	Recommended ineligible	No further work		
Mainline Project	23LN305	Pre-contact scatter	Recommended ineligible	No further work		
Mainline Project	23LN306	Pre-contact scatter	Recommended ineligible	No further work		
Mainline Project	23MT074	Pre-contact scatter	Recommended ineligible	No further work		
Mainline Project	23MT419	Pre-contact scatter	Recommended ineligible	No further work		

TABLE 3.11.2-7
(Continued)

Project Item	Site Identifier	Site Type	Initial NRHP Recommendation by Applicant	Mitigation Measure	Revised NRHP Evaluation from Testing	Avoidance Plans Filed?
Mainline Project	23SC0776	Historic farmstead	Recommended ineligible	No further work		
Mainline Project	23SC1057	Historic farmstead	Recommended ineligible	No further work		
Mainline Project	ARG-MO-25	Historic industrial	Recommended ineligible	No further work		
Mainline Project	ARG-MO-27	Historic farmstead	Recommended ineligible	No further work		
Mainline Project	ARG-MO-28	Historic scatter	Recommended ineligible	No further work		
Mainline Project	ARG-MO-30	Pre-contact / Historic scatter	Recommended ineligible	No further work		
Mainline Project	ARG-MO-31	Pre-contact / Historic scatter	Recommended ineligible	No further work		
Mainline Project	ARG-MO-32	Pre-contact scatter	Recommended ineligible	No further work		
Mainline Project	ARG-MO-40	Pre-contact scatter	Recommended ineligible	No further work		
Mainline Project	ARG-MO-41	Pre-contact isolate	Recommended ineligible	No further work		
Mainline Project	ARG-MO-42	Pre-contact scatter	Recommended ineligible	No further work		
Mainline Project	ARG-MO-43	Pre-contact scatter	Recommended ineligible	No further work		
Mainline Project	ARG-MO-44	Pre-contact scatter	Recommended ineligible	No further work		
Mainline Project	ARG-MO-45	Pre-contact scatter	Recommended ineligible	No further work		
Mainline Project	ARG-MO-46	Historic well	Recommended ineligible	No further work		
REX access road	23CW1040	Historic farmstead	Potentially eligible	Use existing road only		No
REX access road	23CH1347	Historic farmstead	Recommended ineligible	No further work		
REX pipeline	23BN03	Pre-contact scatter	Not found in APE	No further work		
REX pipeline	23BN08	Pre-contact scatter	Not found in APE	No further work		
REX pipeline	23BN38	Pre-contact scatter	Not found in APE	No further work		
REX pipeline	23BN59	Pre-contact scatter	Not found in APE	No further work		
REX pipeline	23CH073	Pre-contact scatter / Historic farmstead	Not found in APE	No further work		
REX pipeline	23CI0011	Pre-contact scatter	Not found in APE	No further work		
REX pipeline	23AU137	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended ineligible	N/A
REX pipeline	23CH1345	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended ineligible	N/A

TABLE 3.11.2-7
(Continued)

Project Item	Site Identifier	Site Type	Initial NRHP Recommendation by Applicant	Mitigation Measure	Revised NRHP Evaluation from Testing	Avoidance Plans Filed?
REX pipeline	23CH343	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended ineligible	N/A
REX pipeline	23CH344	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended ineligible	N/A
REX pipeline	23CH348	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended Eligible	Yes
REX pipeline	23CI0088	Historic farmstead	Potentially eligible	NRHP testing	Recommended Eligible	No
REX pipeline	23AU1153	Pre-contact scatter	Recommended ineligible	No further work		
REX pipeline	23AU1154	Pre-contact scatter	Recommended ineligible	No further work		
REX pipeline	23AU138	Historic farmstead	Recommended ineligible	No further work		
REX pipeline	23AU139	Historic Cemetery (Barnett)	Recommended ineligible	Avoid		No
REX pipeline	23AU140	Historic farmstead	Recommended ineligible	No further work		
REX pipeline	23AU141	Pre-contact scatter / Historic farmstead	Recommended ineligible	No further work		
REX pipeline	23BN40	Pre-contact scatter	Recommended ineligible	No further work		
REX pipeline	23BN72	Historic road	Recommended ineligible	No further work		
REX pipeline	23BN73	Pre-contact scatter	Recommended ineligible	No further work		
REX pipeline	23CA158	Historic farmstead	Recommended ineligible	No further work		
REX pipeline	23CH1346	Historic farmstead / Pre-contact isolate	Recommended ineligible	No further work		
REX pipeline	23CH338	Historic farmstead	Recommended ineligible	No further work		
REX pipeline	23CH339	Historic farmstead	Recommended ineligible	No further work		
REX pipeline	23CH340	Historic hunting camp	Recommended ineligible	No further work		
REX pipeline	23CH341	Pre-contact scatter	Recommended ineligible	No further work		
REX pipeline	23CH342	Historic farmstead	Recommended ineligible	No further work		
REX pipeline	23CH345	Historic scatter	Recommended ineligible	No further work		
REX pipeline	23CH346	Historic farmstead	Recommended ineligible	No further work		
REX pipeline	23CH347	Pre-contact scatter	Recommended ineligible	No further work		

TABLE 3.11.2-7
(Continued)

Project Item	Site Identifier	Site Type	Initial NRHP Recommendation by Applicant	Mitigation Measure	Revised NRHP Evaluation from Testing	Avoidance Plans Filed?
REX pipeline	23CI0087	Historic farmstead	Recommended ineligible	No further work		
REX pipeline	23CI0089	Pre-contact scatter / historic farmstead	Recommended ineligible	No further work		
REX pipeline	23CI1088	Pre-contact scatter	Recommended ineligible	No further work		
REX pipeline	23CW0053	Historic well	Recommended ineligible	No further work		
REX pipeline	23CW0054	Historic farmstead	Recommended ineligible	No further work		
REX pipeline	23CW0055	Historic wells	Recommended ineligible	No further work		
REX pipeline	23CW0056	Pre-contact isolate	Recommended ineligible	No further work		
REX pipeline	23CW0057	Pre-contact isolate	Recommended ineligible	No further work		
REX pipeline	23CW0058	Historic farmstead	Recommended ineligible	No further work		
REX pipeline	23CW0059	Pre-contact scatter	Recommended ineligible	No further work		
REX pipeline	23CW0060	Historic farmstead	Recommended ineligible	No further work		
REX pipeline	23CW0061	Historic farmstead	Recommended ineligible	No further work		
REX reroute	23CH1348	Historic farmstead	Recommended ineligible	No further work		
REX reroute	23CH1349	Historic farmstead / Pre-contact scatter	Recommended ineligible	No further work		

N/A = Not applicable.
NRHP = National Register of Historic Places.
REX = Rockies Express Western Phase Project.

four sites (23BN73, 23CH0348, 23CH0344 and 23CH1345) contained Middle to Late Woodland assemblages, and the other Pre-contact sites could not be assigned to a particular period. Twenty of the 22 historic sites were classified as 19th- to 20th-century farmsteads; the others comprised a historic roadway (23BN72) and a family cemetery that dated to the 19th century (23AU139).

ARG concluded that 33 of the REX Project cultural resource sites did not meet the eligibility requirements for listing in the NRHP. This total included both of the sites with Pre-contact and historic components; all of the historic sites, including the family cemetery (23AU139); and six of the Pre-contact sites. ARG did not recommend mitigation measures for 25 of these 26 resources but did recommend that Keystone avoid the historic cemetery through a pipeline route adjustment (Myers et al. 2006b).

Five of the Pre-contact artifact scatter sites (23CH0343, 23CH0348, 23CH0344, 23CH1345, and 23AU137) and two historic farmstead sites (23CI088 and 23CW1040) were evaluated as potentially eligible for listing in the NRHP. ARG conducted testing at six of the seven sites (Aberle 2007a, 2007b) and determined that four sites did not meet the eligibility requirements for the NRHP (Pre-contact sites 23AU137, 23CH343, 23CH344, and 23CH1345). A single Woodland Period Pre-contact site (23CH348) and one historic farmstead (site 23CI088) were assessed by ARG as eligible for listing in the NRHP under Criterion D (potential to significantly advance knowledge in history or prehistory). The remaining site assessed as being a potential historic property (Site 23CW1040) was found immediately adjacent to a Project access road (Shah Lomas 2007b). ARG has recommended that adverse effects to the site can be avoided if Keystone limits its construction impacts to use of the existing road but recommends avoidance or further testing to determine eligibility for the NRHP if this cannot be achieved. DOS is in the process of consulting with the Missouri SHPO and COE to make final determinations of eligibility for all cultural resources that have been identified to date within the Keystone and REX Project areas.

Additional cultural resources surveys for Project access roads, additional temporary workspace, pipeline reroutes, and appurtenant facilities in Missouri are ongoing. Keystone anticipates that completed reports will be filed with the SHPO and DOS for these aspects of the Project in September and November 2007. Keystone also intends to submit a report in July 2007 to DOS and COE for COE-managed lands at Confluence Park. Keystone has indicated that further deep testing of buried soils will be performed in autumn 2007, and the results will be filed in February 2008.

3.11.2.6 Illinois

Interim inventory results for the cultural resources field surveys conducted to date in Illinois have been submitted to the Illinois SHPO and DOS. The surveys have identified 37 cultural resource locations within the Project APE that included 19 Pre-contact sites, 10 historic sites, and seven sites with both historic and Pre-contact components (Table 3.11.2-8). One of the historic sites (JM-14) also contained standing structures. Fourteen of the Pre-contact site components could not be assigned to a particular period, five were assessed in age to the Middle or Late Woodland periods, two were associated with the Archaic period, and components of one ranged from the Archaic to Mississippian times. All of the 12 historic site components were classified as being associated with late 19th- to 20th-century farmsteads or refuse deposit areas. The filed interim survey findings also identify three cultural resources that are located outside of the surveyed Project corridor (sites 11MS1292 and 11MS1293 and Wanda Cemetery) and a single previously recorded Pre-contact site location (11MS0178) that has not been evaluated due to a landowner refusal.

TABLE 3.11.2-8
Cultural Resources Identified within the Keystone Mainline Project
Area of Potential Effect in Illinois as of July 2007

Project Item	Site Identifier	Site Type	Initial NRHP Recommendation by Applicant	Mitigation Measure	Revised NRHP Evaluation from Testing	Avoidance Plans Filed?
Mainline Project	11MS0178	Pre-contact mound	Not assessed (unsurveyed)	Survey to be completed		
Mainline Project	11FY020	Pre-contact scatter	Potentially eligible	Avoid (HDD)		Typical
Mainline Project	11MS2018	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended ineligible	N/A
Mainline Project	JM-02	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended ineligible	N/A
Mainline Project	JM-03	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended eligible	Bore (typical)
Mainline Project	JM-09	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended ineligible	N/A
Mainline Project	JM-13	Pre-contact scatter	Potentially eligible	Avoid (reroute)		No
Mainline Project	JM-17	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended ineligible	N/A
Mainline Project	JM-19	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended ineligible	N/A
Mainline Project	JM-20	Pre-contact scatter	Potentially eligible	NRHP testing	Recommended ineligible	N/A
Mainline Project	JM-18	Pre-contact scatter / historic farmstead	Potentially eligible (historic)	NRHP testing	Recommended ineligible	N/A
Mainline Project	JM-14	Historic farmstead	Recommended ineligible	Avoid (reroute)		No
Mainline Project	11MS1292	Pre-contact scatter	Not found in APE	No further work		
Mainline Project	11MS1293	Pre-contact scatter	Not found in APE	No further work		
Mainline Project	Wanda Cemetery	Historic cemetery	Not found in APE	No further work		
Mainline Project	11FY197	Historic farmstead	Recommended ineligible	No further work		
Mainline Project	11MS0831	Pre-contact scatter	Recommended ineligible	No further work		
Mainline Project	ARG-02	Pre-contact scatter	Recommended ineligible	No further work		
Mainline Project	ARG-35	Historic farmstead	Recommended ineligible	No further work		
Mainline Project	ARG-36	Historic farmstead	Recommended ineligible	No further work		
Mainline Project	ARG-38	Historic farmstead	Recommended ineligible	No further work		
Mainline Project	ARG-39	Pre-contact / historic scatter	Recommended ineligible	No further work		
Mainline Project	JM-01	Historic scatter	Recommended ineligible	No further work		
Mainline Project	JM-04	Pre-contact / historic scatter	Recommended ineligible	No further work		
Mainline Project	JM-05	Pre-contact scatter / historic farmstead	Recommended ineligible	No further work		

TABLE 3.11.2-8
(Continued)

Project Item	Site Identifier	Site Type	Initial NRHP Recommendation by Applicant	Mitigation Measure	Revised NRHP Evaluation from Testing	Avoidance Plans Filed?
Mainline Project	JM-06	Historic scatter	Recommended ineligible	No further work		
Mainline Project	JM-07	Pre-contact scatter	Recommended ineligible	No further work		
Mainline Project	JM-08	Pre-contact scatter	Recommended ineligible	No further work		
Mainline Project	JM-10	Pre-contact scatter	Recommended ineligible	No further work		
Mainline Project	JM-11	Pre-contact Isolate	Recommended ineligible	No further work		
Mainline Project	JM-12	Pre-contact scatter	Recommended ineligible	No further work		
Mainline Project	JM-15	Historic farmstead	Recommended ineligible	No further work		
Mainline Project	JM-16	Pre-contact / historic scatter	Recommended ineligible	No further work		
Mainline Project	JM-26	Pre-contact scatter	Recommended ineligible	No further work		
Mainline Project	JM-27	Pre-contact scatter	Recommended ineligible	No further work		
Mainline Project	JM-29	Historic farmstead	Recommended ineligible	No further work		
Mainline Project	JM-30	Pre-contact / historic scatter	Recommended ineligible	No further work		
Mainline Project	JM-31	Historic farmstead	Recommended ineligible	No further work		
Mainline Project	JM-33	Pre-contact scatter	Recommended ineligible	No further work		
Mainline Project	JRL-02	Pre-contact scatter / historic farmstead	Recommended ineligible	No further work		
Mainline Project	JRL-03	Pre-contact scatter	Recommended ineligible	No further work		

NA = Not applicable.
NRHP = National Register of Historic Places.

Based on the results of the field examination, ARG concluded that 27 of the cultural resources within the Keystone APE were ineligible for listing in the NRHP. This total included all 10 historic sites, one multi-component site, and 10 of the identified Pre-contact sites. No additional work at 26 of these sites was recommended. Two of these cultural resources, Pre-contact site ARG-2 and multi-component site JRL-2, are situated within federally managed lands of the Carlyle Lake WMA. The single exception was at historic site JM-14, where avoidance of the historic structures was recommended.

The remaining 10 sites were recommended as being potentially eligible for listing in the NRHP. These sites included three Archaic period sites (11MS2018, JM-13, and JM-20), two Woodland camp sites (11FY20 and JM-03), and four artifact scatters of unknown Pre-contact age (JM-2, JM-9, JM-19, and JM-17). Woodland period site 11FY20 is situated within the federally governed lands of the Carlyle Lake WMA. The undetermined Pre-contact component of site JM-18 was declared ineligible for listing in the NRHP, but its historic component was declared potentially eligible for listing. ARG recommended that Keystone either avoid these 10 resources through pipeline reroutes or conduct additional testing to evaluate their significance in terms of the NRHP. Keystone elected to avoid site JM-13 by rerouting the pipeline and to avoid impacts on site 11FY20 by tunneling underneath using an HDD. ARG performed trenching, shovel testing, and unit excavation at eight sites to evaluate their eligibility for listing in the NRHP (11MS2018, JM-02, JM-03, JM-09, JM-13, JM-17, JM-19, and JM-20). Based on the additional testing findings, ARG concluded that seven of these cultural resources would not be eligible for listing in the NRHP, while one site (JM-03) would be eligible for listing in the NRHP under Criterion D (ability to provide a significant contribution to prehistory). Keystone has stated it that it would avoid impacts on JM-3 by reducing the width of the construction corridor along the site boundary. DOS is in the process of consulting with the Illinois SHPO and COE to make final determinations of eligibility for all cultural resources that have been identified to date within the Keystone Project area.

Additional cultural resources surveys for access roads, additional temporary workspace, pipeline reroutes, and appurtenant facilities in Illinois are ongoing. Keystone anticipates that completed reports will be filed with the SHPO and DOS for these aspects of the Project in September and November 2007. Keystone also intends to submit a report in July 2007 to DOS and COE for COE-managed lands at Carlyle Lake WMA. Keystone has indicated that further deep testing of buried soils will be performed in autumn 2007, and that the results will be filed in February 2008.

3.11.2.7 Oklahoma (Cushing Extension)

Ten previously unidentified sites and a single known cultural resource have been recorded to date by Keystone within the Cushing Extension corridor in Oklahoma (Table 3.11.2-9). In the interim reports filed with DOS, these sites were classified as five historic farmsteads, two historic artifact scatters, a single historic structure complex, and two Pre-contact artifact scatters or isolates. Based on the field survey results, ARG has assessed eight cultural resources as being ineligible for listing in the NRHP. No additional investigations have been recommended for these archeological sites.

The remaining two sites recorded by ARG are noted as being potential historic properties. These sites include a single Pre-contact site that includes Late Woodland and Plains Village Period artifacts (temporary site number OK-KEY-CX-601) and a historic farmstead with domestic debris from the 19th to early 20th centuries (OK-KEY-CX-105). ARG has recommended that Keystone either avoid these cultural resources through alterations to the Project plans or that NRHP evaluation testing be conducted. DOS is in the process of consulting with the Oklahoma SHPO to make final determinations of eligibility for cultural resources that have been identified to date within the Cushing Extension Project area.

TABLE 3.11.2-9
Cultural Resources along the Keystone Cushing Extension Route in Oklahoma as of July 2007 (excluding reroutes)

Project Item	Site	Site Type	Initial NRHP Recommendation by Applicant	Mitigation Measure	Revised NRHP Evaluation from Testing	Avoidance Plans Filed?
Cushing Extension	OK-KEY-CX-105	Historic farmstead	Potentially eligible	Unstated		No
Cushing Extension	OK-KEY-CX-601	Pre-contact scatter	Potentially eligible	Unstated		No
Cushing Extension	34PY77	Historic farmstead	Recommended ineligible			
Cushing Extension	OK-KEY-CX-101	Historic scatter	Recommended ineligible			
Cushing Extension	OK-KEY-CX-102	Historic scatter	Recommended ineligible			
Cushing Extension	OK-KEY-CX-103	Historic structure	Recommended ineligible			
Cushing Extension	OK-KEY-CX-104	Pre-contact isolate	Recommended ineligible			
Cushing Extension	OK-KEY-CX-201	Historic farmstead	Recommended ineligible			
Cushing Extension	OK-KEY-CX-602	Historic farmstead	Recommended ineligible			
Cushing Extension	OK-KEY-CX-603	Historic farmstead	Recommended ineligible			

NRHP = National Register of Historic Places.

Additional cultural resources studies for Cushing Extension site evaluation testing and the survey of access roads, additional temporary workspace, pipeline reroutes, and appurtenant facilities in Oklahoma are ongoing. Keystone anticipates that reports will be filed for these aspects of the Project in September and November 2007. Keystone also has indicated that geomorphological testing results will be filed with DOS in April 2008.

3.11.2.8 Connected Action

In modifying or constructing transmission line substations to support the Keystone Project, Western would implement the following mitigation measures for Cultural Resources:

Before construction, Western would perform a Class III (100 percent of surface) cultural survey on all areas to be disturbed. These surveys would be coordinated with the appropriate land owner or land management agency. A product of the survey would be a Cultural Resources Report recording findings and suggesting mitigation measures. These findings would be reviewed with the State Historic Preservation Offices and other appropriate agencies, and specific mitigation measures necessary for each site or resource would be determined.

- Western would avoid cultural resource sites eligible for or included on the National Register of Historic Places.
- Construction activities would be monitored or sites flagged to prevent inadvertent destruction of any cultural resource for which the agreed mitigation was avoidance.
- Western would provide cultural education to all project personnel regarding Culturally Sensitive Areas prior to and during the construction phase.
- Should any cultural resources that were not discovered during the Class III Survey be encountered during construction, ground disturbance activities at that location would be suspended until the provisions of the National Historic Preservation Act and enabling legislation have been carried out.
- Construction crews would be monitored to the extent possible to prevent vandalism or unauthorized removal or disturbance of cultural artifacts or materials from sites where the agreed mitigation was avoidance.

3.11.3 Native American and Agency Consultation

Through its cultural resources contractors, Keystone initially followed protocols used by FERC to conduct Native American and agency consultations. The FERC guidelines generally require the applicant to inform these groups of the project application and to seek their comments on it. In July 2006, DOS informed Keystone that its consultants should no longer directly communicate with the Native American groups. DOS has elected to consult directly with all of the relevant parties. A summary of the communications that were made by DOS to federal agencies and SHPO offices is presented in Table 3.11.3-1. The communications that have occurred between DOS and Native American Tribes and agencies is shown in Table 3.11.3-2.

Under Section 101(d)(2) of the NHPA, federal agency officials are required to consult with a wide variety of consulting parties. This includes SHPOs, Indian tribes, local governments, applicants for federal permits, and the public. For this project, DOS has consulted with seven SHPOs, 87 Native American tribes, numerous federal and state agencies and local governments, and members of the public. The list of

tribes that were notified for this project was derived from lists maintained by SHPOs, state tribal liaisons, THPOs, the Bureau of Indian Affairs, and recommendations from other tribes. Even though the Project does not bisect any Native American reservations, several Native American tribes requested consultation due to the Project's potential to affect tribal cultural resources that are situated on ancestral lands. Consistent with 36 CFR 800.2(c)(2)(ii), DOS is continuing consultation with the tribes who have interests in the Project.

Overall, consultation occurred through a variety of formal and informal mediums, including public meetings conducted as a part of the draft EIS process, face-to-face consultation, direct mailing, tele-conferencing, direct telephone communications, and email. Initially, DOS familiarized interested parties with the Project's APE and what types of impacts to cultural resources could be expected. In compliance with 36 CFR 800.2 and any confidentiality requirements, DOS provided interested tribes with information pertaining to any findings or determinations that were derived from cultural resources reports prepared for portions of the Project's APE. Following an initial round of consultation completed in July 18, 2007, 22 tribes had notified DOS as having no interest either in consulting or objecting to the Project; 13 tribes have yet to respond to requests for consultation. Consultation with the remaining Native American tribes is on-going. A summary of the consultation process is listed in Table 3.11.3-2. Considerable effort and time has been expended contacting individual tribes to determine their level of interest and their willingness to consult with DOS. As part of this consultation outreach, there was a request by several of the tribes for development of a Tribal Advisory Committee (TAC). The TAC has been developed based on the inclusion of tribes who want to participate. DOS will hold monthly conference calls and meetings with the TAC to identify issues and work on the development of a PA.

TABLE 3.11.3-1
State Historic Preservation Offices and Other Government Agencies Contacted by the U.S. Department of State Regarding Cultural Resources (as of July 2007)

SHPO and Agency Contacted	Letter Sent	Phone Contact	Email Sent
Advisory Council on Historic Preservation	8/3/2006		
North Dakota SHPO	8/3/06, 1/17/07	10/5/2006	10/5/06, 2/12/07, 1/16/07
North Dakota Natural Resources Policy	1/17/2007		
South Dakota SHPO	8/3/06, 1/17/07	10/5/2006	10/5/06, 2/12/07, 1/16/07
South Dakota Public Utilities Commission	1/17/2007		
Nebraska SHPO	8/3/06, 1/17/07, 2/1/07	10/5/2006	10/5/06, 2/12/07, 1/16/07
Nebraska Department of Environmental Quality	1/17/2007		
Kansas SHPO	8/3/06, 9/19/06, 1/17/07	10/5/2006	10/5/06, 2/12/07, 1/16/07
Kansas Corp. Commission for Oil and Gas	1/17/2007		
Kansas Department of Health and Environment	1/17/2007		
Missouri SHPO	8/3/06, 1/17/07, 2/1/07	10/5/06, 2/08/07	10/5/06, 2/12/07, 1/16/07
Missouri Natural Resources Department	1/17/2007		
Illinois SHPO	8/3/06, 1/17/07, 2/1/07	10/5/2006	2/12/07, 1/16/07
Illinois Commerce Commission	1/17/2007		
Illinois Environmental Protection Agency, Groundwater Section	1/17/2007		
Illinois Hydrogeology Compliance	1/17/2007		
Oklahoma SHPO	8/3/06, 9/19/06, 1/17/07	10/5/2006	2/112, 2/12/07, 1/16/07
Oklahoma Office of the Secretary of the Environment	1/17/2007		
Oklahoma Office of the Governor	1/17/2007		

SHPO = State Historic Preservation Officer.

TABLE 3.11.3-2
Federally Recognized Native American Tribes Contacted by the U.S. Department of State (as of July 2007)

Native American Nation	Office State	Letters Sent	Telephone Contact	Email Sent	Fax Sent	Meeting Held	No Objection to Project	DOS Consultation Ongoing	No Response from Tribe to Date	Programmatic Agreement Signatory
Absentee Shawnee Tribe of Indians of OK	OK	8/3/06, 2/1/07, 2/9/07, 3/22/07	10/6/06, 2/16/07, 5/15/07(vm), 6/22/07		2/8/07, 2/15/07			√		TBD
Blackfeet Nation	MT	8/3/06, 3/22/07	5/15/07(vm), 5/15/07, 6/22/07, 6/25/07	7/3/07				√		TBD
Caddo Tribe of OK	OK		10/6/06, 2/16/07, 5/15/07(vm), 5/21/07(vm), 6/22/07(lm), 6/25/07, 6/27/07		2/8/07, 2/15/07		√			TBD
Cherokee Nation	OK	8/3/06, 2/1/07	10/5/06, 2/16/07, 5/15/07(vm), 5/15/07(vm), 6/22/07(vm), 6/25/07(vm), 6/26/07	10/5/06, 3/5/07	2/8/07, 2/15/07		√			
Cheyenne - Arapaho Tribe of OK	OK	8/3/06, 9/19/06, 2/1/07	10/6/06, 2/16/07, 5/15/07(nr), 5/18/07(vm), 6/7/07(nr), 6/22/07(vm), 6/25/07(vm), 6/26/07(nr), 6/28/07(nr), 6/29/07	6/29/07	2/8/07, 2/15/07			√		TBD

TABLE 3.11.3-2
(Continued)

Native American Nation	Office State	Letters Sent	Telephone Contact	Email Sent	Fax Sent	Meeting Held	No Objection to Project	DOS Consultation Ongoing	No Response from Tribe to Date	Programmatic Agreement Signatory
Cheyenne River Sioux	SD	8/3/06, 9/19/06, 1/17/07, 2/1/07	10/6/06, 2/16/07, 3/27/06, 5/15/07(vm), 5/15/07(lm), 5/15/07(lm), 6/18/07(lm), 6/19/07	6/20/07	2/8/07, 2/1/5/07			√		TBD
Chickasaw Nation of OK	OK	8/3/06, 2/1/07	10/5/06, 2/16/07, 5/15/07(lm), 6/22/07(vm), 6/25/07(vm), 6/25/07, 6/26/07(lm), 6/26/07, 7/2/07(vm)	6/26/07	2/8/2007			√		TBD
Chippewa-Cree	MT	8/3/06, 1/17/07, 2/1/07	10/5/06, 2/16/07, 5/15/07(nr), 6/22/07(lm), 6/25/07, 6/28/07, 6/29/07	6/29/07	2/8/07, 2/15/07			√		TBD
Choctaw Nation of OK	OK	8/3/06, 2/1/07	10/5/06, 2/16/07, 5/15/07, 5/15/07, 5/15/07, 5/18/07, 5/21/07(nr), 6/6/07, 6/7/07, 6/7/07 6/7/07	10/5/06, 2/7/07	2/7/07, 2/15/07		√			

TABLE 3.11.3-2
(Continued)

Native American Nation	Office State	Letters Sent	Telephone Contact	Email Sent	Fax Sent	Meeting Held	No Objection to Project	DOS Consultation Ongoing	No Response from Tribe to Date	Programmatic Agreement Signatory
Citizen Potawatomi Nation	OK	8/3/06, 2/1/07	2/16/07		2/8/07, 2/15/07					
Comanche Nation	OK	3/22/2007	4/25/07, 5/15/07				√			
Confederated Salish and Kootenai Tribes of the Flathead Indian Nation	MT	3/22/2007	5/15/07(vm), 5/15/07, 6/22/07(vm), 6/27/07				√			TBD
Crow Creek Sioux	SD	8/3/06, 9/19/06, 1/17/07, 2/1/07	10/5/06, 2/16/07, 6/7/07	2/15/07	2/8/07, 2/15/07		√			
Delaware Nation	OK	8/3/06, 2/1/07	10/5/06, 2/16/07, 5/15/07, 6/22/07(vm), 6/27/07, 6/28/07	6/28/07, 6/28/07	2/8/07, 2/15/07			√		TBD
Eastern Band of Cherokee Indians	NC	8/3/06, 2/1/07	10/5/06, 2/16/07, 5/15/07(vm), 6/22/07(vm), 6/25/07	2/15/07	2/8/07, 2/15/07		√			
Eastern Shawnee Tribe of OK	MO	8/3/06, 2/1/07	2/16/07, 5/15/07(lm)	2/15/07, 3/5/07	2/8/07, 2/15/07		√			
Eastern Shoshone Tribe	WY			6/13/07				√		TBD
Flandreau Santee Sioux Tribe	SD	8/3/06, 9/19/06, 1/17/07, 2/1/07	10/19/06, 2/16/07, 2/27, 6/7/07(vm), 6/11/07, 6/12/07(vm), 6/13/07, 7/2/07(vm)	10/19/06 2/15/07, 6/13/07	2/8/07, 2/15/07			√		TBD

TABLE 3.11.3-2
(Continued)

Native American Nation	Office State	Letters Sent	Telephone Contact	Email Sent	Fax Sent	Meeting Held	No Objection to Project	DOS Consultation Ongoing	No Response from Tribe to Date	Programmatic Agreement Signatory
Forest County Potawatomi Community of Wisconsin Potawatomi Indians	WI	8/3/06. 2/1/07	10/19/06, 2/16/07, 6/22/07(vm), 6/25/07(vm), 6/27/07(vm), 6/28/07(vm), 6/29/07	6/29/07	2/8/07, 2/15/07			√		TBD
Fort Peck Tribes	MT	6/28/2007	5/15/07, 5/17/07, 6/6/07	5/17/07, 6/14/07, 6/18/07, 6/19/07		5/30/2007		√		TBD
Fort Sill Apache	OK	3/22/2007	5/21/2007	5/21/07				√		TBD
Gros Ventre and Assiniboine Tribe of Ft. Belknap	MT	3/22/2007	5/21/07, 6/22/07, 6/25/07, 6/26/07 (vm), 6/27/07(vm), 6/28/07(vm), 6/29/07, 7/3/07						√	
Gun Lake Potawatomi	MI	8/3/06, 2/1/07	10/19/06, 2/16/07, 6/22/07(vm), 6/25/07(vm), 6/27/07(vm), 6/28/07(vm), 6/29/07(vm), 7/3/07(vm)	10/19/06	2/16/07			√		TBD
Hannahville Indian Community	MI	8/3/06, 2/1/07	10/19/06, 2/16/07, 6/22/07, 6/25/07, 6/27/07 (vm), 7/3/07	2/15/07	2/8/2007				√	

TABLE 3.11.3-2
(Continued)

Native American Nation	Office State	Letters Sent	Telephone Contact	Email Sent	Fax Sent	Meeting Held	No Objection to Project	DOS Consultation Ongoing	No Response from Tribe to Date	Programmatic Agreement Signatory
Ho-Chunk Nation of Wisconsin	WI	8/3/06, 2/1/07, 2/8/07	6/22/07 (vm), 6/25/07 (vm), 6/26/07(vm), 6/27/07	2/15/07, 6/27/07, 6/28/07, 7/2/07				√		TBD
Huron Potawatomi Nation	MI	8/3/06, 2/1/07	10/17/06, 2/16//07, 6/25/07 (lm), 6/27/07 (vm)	2/15/07	2/15/07				√	
Iowa Tribe of Kansas and Nebraska	KS	8/3/06, 9/19/06, 2/1/07	6/18/07, 6/18/07	2/15/07	2/8/07, 2/1/507		√			
Iowa Tribe of Oklahoma	OK	8/3/06, 2/1/07	10/5/06, 2/16/07, 6/18/07 (vm), 7/2/07	2/15/07, 6/20/07	2/15/07			√		TBD
Jena Band of Choctaw Indians	LA	8/3/06, 2/1/07	2/16/07 no answer, 6/21/07 (vm), 6/22/07	2/15/07	2/8/07, 2/15/07		√			
Jicarilla Apache Tribe	NM	3/22/20 07	6/21/07, 6/25/07	5/21/07, 5/22/07, 5/23/07			√			
Kaw Tribe of Oklahoma	OK	8/3/06, 9/19/06, 10/4/06, 1/17/07, 2/1/07	10/04/06, 2/16/07, 5/21/07, 5/23/07, 5/30/07, 6/15/07	10/5/06, 2/15/07, 5/21/07, 5/22/07, 5/23/07	2/8/07, 2/15/07		√			
Kialegee Tribal Town of the Creek Nation of Oklahoma	OK	8/3/06, 2/1/07	5/22/07, 5/22/07	10/6/06			√			

TABLE 3.11.3-2
(Continued)

Native American Nation	Office State	Letters Sent	Telephone Contact	Email Sent	Fax Sent	Meeting Held	No Objection to Project	DOS Consultation Ongoing	No Response from Tribe to Date	Programmatic Agreement Signatory
Kickapoo Traditional Tribe of Texas	TX	8/3/06, 2/1/07	6/21/07 (lm), 6/28/07, 7/3/07		2/15/07					
Kickapoo Tribe of Kansas	KS	8/3/06, 2/1/07	10/6/06, 2/16/07, 5/22/07, 5/22/07 (vm), 6/18/07		2/7/07, 2/15/07		√			
Kickapoo Tribe of Oklahoma	OK	8/3/06, 2/1/07	10/6/06, 2/16/07, 7/2/07	10/6/06	2/16/07			√		TBD
Kiowa Indian Tribe of Oklahoma	OK	8/3/06, 2/1/07, 3/22/07	6/18/07 (lm), 6/21/07, 6/25/07, 6/27/07	6/18/07			√			
Lower Brule Sioux	SD	8/3/06, 9/19/06, 1/17/07, 2/1/07	10/6/06, 2/16/07, 6/19/07(vm), 6/21/07(vm), 6/25/07(vm), 6/27/07(vm), 6/28/07(vm), 6/29/07(vm), 7/3/07(vm)	10/6/06	2/15/07, 2/16/07				√	
Lower Sioux Indian Community	MN	8/3/06,1 /17/06, 2/1/07		2/15/07				√		TBD
Mandan, Hidatsa and Arikara Nation	ND	8/3/06, 9/19/06, 1/17/07 2/1/07	10/5/06, 2/16/07 (lm), 5/22/07(vm), 6/25/07, 7/2/07(vm)	2/15/07	2/8/07, 2/15/07				√	

TABLE 3.11.3-2
(Continued)

Native American Nation	Office State	Letters Sent	Telephone Contact	Email Sent	Fax Sent	Meeting Held	No Objection to Project	DOS Consultation Ongoing	No Response from Tribe to Date	Programmatic Agreement Signatory
Miami Tribe of Oklahoma	OK	8/3/06, 2/1/07	10/5/06, 2/16/07 (lm), 5/22/07(vm), 6/25/07, 7/2/07(vm)	6/25/07	2/8/07, 2/15/07			√		TBD
Mille Lacs Band of Ojibwe	MN					5/30/2007		√		TBD
Modoc Tribe of Oklahoma	OK	3/22/2007	6/19/2007	6/19/2007			√			
Muscogee-Creek Nation	OK	8/3/06, 9/19/06, 2/1/07	10/19/06, 2/16/07, 6/19/07(vm), 6/21/07(vm), 6/25/07, 6/27/07(lm), 6/28/07	6/28/07, 6/28/07, 6/29/07, 7/2/07	2/7/07, 2/15/07			√		TBD
Northern Arapaho Tribe	WY	3/22/2007	5/15/07, 6/13/07, 7/2/07(vm)	5/15/07				√		TBD
Northern Cheyenne Tribe	MT	3/22/2007	6/19/07(vm), 6/21/07, 6/25/07, 6/27/07(vm), 6/28/07, 6/29/07, 7/3/07(vm)						√	
Northern Ute Tribe	UT		6/19/07, 6/21/07, 6/22/07, 6/25/07				√			
Oglala Sioux	SD	9/19/06, 2/1/07	10/5/06, 2/16/07, 6/19/07, 6/21/07, 6/25/07, 6/27/07	6/27/07, 6/27/07	2/7/07, 2/15/07			√		TBD