FINAL HABITAT CONSERVATION PLAN

TRANSCANADA KEYSTONE PIPELINE, LP
GULF COAST PROJECT

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LIST OF ACRONYMS AND ABBREVIATIONS

ABB:	American Burying Beetle
ABBCB:	American Burying Beetle Conservation Bank
BGEPA:	Bald and Golden Eagle Protection Act
BMP:	Best Management Practice
bpd:	Barrels per Day
CGC:	Common Ground Capital, LLC
CMR Plan:	Construction, Mitigation, and Reclamation Plan
CPA:	Conservation Priority Area
CWA:	Clean Water Act
DDT:	Dichloro-diphenyl-trichloroethane
EA:	Environmental Assessment
EPA:	Environmental Protection Agency
ERP:	Emergency Response Plan
ESA:	Endangered Species Act of 1973, as amended
fps:	Feet per Second
gpm:	Gallons per Minute
HCP:	Habitat Conservation Plan
HDD:	Horizontal Directional Drill
ITP:	Incidental Take Permit
KMCA:	Keystone McAlester Conservation Area
MBTA:	Migratory Bird Treaty Act
MLV:	Mainline Valve
MOP:	Maximum Operating Pressure
NEPA:	National Environmental Policy Act
NPDES:	National Pollutant Discharge Elimination System
NRC:	National Response Center
NRCS:	Natural Resources Conservation Service
OCC:	Operations Control Center
OPS:	Office of Pipeline Safety
PHMSA:	Pipeline Hazardous Material Safety Administration
PMP:	Pipeline Maintenance Program
ROW:	Right-of-Way
SCADA:	Supervisory Control and Data Acquisition
Service:	United States Fish and Wildlife Service
SPCC:	Spill Prevention, Control, and Countermeasure
TWA:	Temporary Work Space Area
USACE:	United States Army Corps of Engineers
USDOT:	United States Department of Transportation
USFWS:	United States Fish and Wildlife Service
WLLL:	WLLL, LLC

1. INTRODUCTION

TransCanada Keystone Pipeline, LP (Keystone) is proposing to construct and operate a crude oil pipeline and related facilities from the crude oil supply hub at Cushing, Oklahoma to existing crude oil storage terminal facilities near Nederland, Texas. The project is known as the Gulf Coast Project (Project). The Project will consist of approximately 485 miles of new pipeline. The Project is planned to be placed into service in 2013. In addition to the pipeline, Keystone will construct permanent and temporary construction access roads, temporary facilities (contractor yards, pipe yards, and rail sidings) and aboveground facilities including pump stations, delivery facilities, and mainline valves.

The construction of the Project and associated facilities in Oklahoma may cause the loss and disturbance of habitat used by the American burying beetle (*Nicrophorus americanus,* ABB). This species is listed as endangered and protected under the Endangered Species Act of 1973, as amended (ESA, 16 USC 1531 – 1544). Consequently, Keystone has decided it would be prudent to apply to the United States Fish and Wildlife Service (Service) for a Section 10(a)(1)(B) permit (ITP) to authorize the incidental take of federally listed species resulting from construction, operation, maintenance, and repair (both routine and emergency – excluding oil spills) for the Project. These activities will be referred to collectively as "Covered Activities". This Habitat Conservation Plan (HCP) has been prepared in support of the Permit application. The HCP has been designed to minimize what is already expected to be a minimal level of Project-related incidental takings of ABB, most of which would be temporary in nature, and mitigate these possible impacts with long-term mitigation measures that will more than compensate for any such incidental takings, leaving the ABB in a better condition for recovery than if the Project had not been constructed.

An ESA Section 10(a)(1)(B) permit is a tool by which a non-federal entity may voluntarily obtain authorization to take listed species in connection with otherwise lawful activities such as pipeline construction and operation. Among other things, an HCP specifies conservation measures that will be implemented to minimize and mitigate, to the maximum extent practicable, a specified level of incidental take of listed species. "Incidental take" is defined by the ESA (ESA Section 10(a)(1)(B)) and relevant regulations (50 CFR 17.3) as take of any federally listed wildlife species that is incidental to, but not the purpose of, otherwise lawful activities.

We address "Covered Species" and "Evaluation Species" in this HCP. Covered Species are those for which an ITP is being sought. The Covered Species addressed in this HCP is the ABB. This species is known to occur in a portion of the Project area in Oklahoma.

Evaluation Species will not be covered by the ITP – no incidental take authorization has been requested for these species. Evaluation Species can include federally listed, proposed, and candidate species that are known to occur or have a potential to occur within the geographic scope addressed in this HCP. Although these species occur in the Plan Area addressed in the HCP, they are not considered at risk of being taken by the Covered Activities because avoidance measures will be implemented. These species include bald eagle (*Haliaeetus leucocephalus*), least tern (*Sterna antillarum*), piping plover (*Charadrius melodus*), whooping crane (*Grus americana*), Sprague's pipit (*Anthus spragueii*), and Arkansas River shiner (*Notropis girardi*).

In this HCP, potential incidental take of the ABB is expressed as the number of acres of known and potential habitat that will be directly and indirectly impacted by Covered Activities within the Plan Area. This approach is used because estimating the number of individual ABBs taken is impractical in light of the fact that the insects are nocturnal and spend the vast majority of daylight hours underground. This approach is supported by case law (*Oregon Natural Resources Council. Allen*, 476F.3d 1031, 1037 (9th Cir. 2007) and Ariz. *Cattle Growers' Ass'n v. U.S. Fish and Wildlife Service,* 273 F.3d 1229, 1249-50 (9th Cir. 2001)) where quantifying the actual number of species members taken is not practical. Use of acres of habitat as a proxy for impacts to individual ABBs is described in greater detail in Section 5 of this document.

2. PURPOSE AND NEED

The primary purpose of the Project is to transport growing domestic crude oil production to serve Gulf Coast refinery demand which is currently being met through foreign imports of crude oil. Construction of the Project will enable U.S. producers to reach a market with significantly lower transportation costs compared to alternatives such as rail, trucking or barging. It will also enable Gulf Coast refineries to access lower cost domestic production and avoid paying a premium to foreign producers of crude oil.

The market need for the Project is demonstrated in part by confirmed contractual shipper commitments. Shippers evaluate the merits of various pipeline proposals and ultimately decide which projects to support. Shippers have expressed material interest in the Project and in securing additional pipeline capacity. Shippers have already committed to binding contracts in support of the Project to transport crude oil from Cushing, Oklahoma to near Nederland, Texas. These binding commitments demonstrate a material endorsement of support for the Project. The market need for the Project is to:

- Increase domestic crude oil supply;
- Decrease demand for light domestic crude oil from U.S. Midwest refineries due to conversion projects which rely extensively on heavy crude oil supplies;
- Alleviate pipeline capacity limitations between Cushing, Oklahoma and the U.S. Gulf Coast; and
- Provide a means to reduce U.S. dependence on foreign oil supplies by increasing domestic production at Gulf Coast refineries.

In summary, the need for the Project is demonstrated by (1) confirmed shipper interest represented by binding contracts in support of the Project to transport crude oil from Cushing, Oklahoma to Nederland, Texas; (2) the growth in domestic light crude oil production in the US; (3) diminishing demand for light crude oil at Midwest U.S. refineries; (4) increasing oversupply of light crude at Cushing; (5) the large volume of light crude that is processed at Gulf Coast refineries, which is primarily imported to the Gulf Coast by tanker from foreign countries; (6) the limited existing pipeline capacity to move incremental volumes of light crude oil from Cushing to the U.S. Gulf Coast; and (7) the impracticality of transporting domestic crude oil to the Gulf Coast by other modes of transportation.

2.1. PROJECT DESCRIPTION SUMMARY

Keystone is proposing to construct and operate a crude oil pipeline and related facilities from Cushing, Oklahoma to near Nederland, Texas. The Project will consist of approximately 485 miles of new, 36-inch-diameter pipeline and will have a nominal capacity to deliver up to 830,000 barrels per day (bpd) of crude oil. It will interconnect with the southern terminus of the 298-mile-long, 36-inch-diameter Keystone Cushing Extension. Approximately 156.2 miles of new pipeline will be constructed in Oklahoma. A Project location in Oklahoma overview map is included as Figure 1.

Specific Issues and Reasons:

In past years, the Service provided guidance detailing measures which could be implemented to avoid or minimize take of ABBs prior to the start of construction activities. These measures included (1) trapping and relocating and (2) diversionary baiting (bait away). In 2012, the Service changed the ABB protocol and removed these activities from the approved avoidance measures. Because of these changes, no approved measure is currently available to facilitate avoidance of take for the Project, as proposed. In response to these changes, and given the possibility that take may occur, Keystone decided to apply for a Section 10 ITP. The HCP is a requirement for obtaining the Permit.

Problems to be Solved:

Keystone's intention is to construct the Project while complying with the ESA. Because no approved measures to avoid take are currently available for the Project, as proposed, an ITP is required to assure compliance with the ESA.

Background and Historical Information:

The Project was originally a part of the Keystone XL project, a larger project. A portion of the larger Keystone XL Project has been suspended due to the denial of a Presidential Permit. Keystone decided to move forward with construction of the portion of the original project in Oklahoma and Texas under the project name Gulf Coast Project. Keystone is able to construct the Project in the absence of the additional facilities included in the Keystone XL Project due to its independent utility as a domestic crude oil pipeline. This HCP addresses that portion of the Project within the ABB range in Oklahoma.

Stakeholders:

- TransCanada – Keystone
- Oil producers, refiners, and marketers
- Consumers of petroleum products

FIGURE 1

2.2. REGULATORY CONTEXT

2.2.1. Endangered Species Act

Section 9 of the ESA prohibits "take" of any federally listed endangered wildlife species. By definition, the Service has extended the take prohibition to most species listed as threatened. The ESA defines "take" as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" (ESA § 3(19)). "Harm" is not defined in the statute, but the Service's regulations define it as "an act which actually kills or injures wildlife and may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering" (50 CFR 17.3). Section 10(a)(1)(B) of the ESA authorizes the Service to issue a permit allowing take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity."

Section 10(a)(2)(A) of the ESA provides that in order to obtain an ITP, the applicant must submit an HCP that identifies or satisfies several substantive criteria: (1) the impact that will likely result from the taking; (2) the steps the applicant will take to minimize and mitigate the impacts and the funding available to implement those steps; (3) what alternative actions to the taking were considered and the reasons the alternatives were not chosen; and (4) other measures that the Service may require as necessary or appropriate for purposes of the conservation plan. The Service's ESA implementing regulations also provides permittees with "no surprises" assurances, which provide certainty as to their future obligations under an HCP (50 CFR 17.22, 17.32, 63 FR 8859). The Service's Habitat Conservation Planning Handbook ("HCP Handbook") provides overall guidance on the elements of an HCP (USFWS 1996).

Section 7(a)(2) of the ESA requires that each federal agency must consult with the Service to ensure that agency actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. "Jeopardize" is defined by the regulations as engaging in an action that would reasonably be expected, directly or indirectly, to appreciably reduce the likelihood of the survival and recovery of the species in the wild (50 CFR 402.02). Issuance of an ITP is considered an action for which the mandate of consultation applies (HCP Handbook at 1–6). With respect to the issuance of ITPs, the Service functions as both the "action" agency and the "resource" agency, so that the Service is actually consulting "with itself." According to the HCP Handbook, the consultation must include consideration of direct and indirect effects on the species, as well as the impacts of the Project on listed plants and critical habitat, if any (HCP Handbook; 3–17 through 3–19).

2.2.2. National Environmental Policy Act

The Service considers issuance of an ITP a federal action subject to the requirements of the National Environmental Policy Act (NEPA, 42 USC 4321–4327). NEPA requires federal agencies to (1) study proposed projects to determine if they will result in significant environmental impacts; and (2) review the alternatives available for the Project and consider the impact of the alternatives on the environment (NEPA § 102(c)). The scope of NEPA is broader than the ESA in that it requires that the agency consider

the impacts of the action on the "human environment," including a variety of resources such as water quality, air quality, and cultural and historic resources. In the context of an HCP and ITP, the scope of the NEPA analysis covers the direct, indirect, and cumulative effects of the proposed incidental take and the mitigation and minimization measures proposed in the HCP (HCP Handbook at 5–1).

As defined by NEPA regulations, indirect impacts are those effects "caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern in land use, population density, or growth rate…" (40 CFR 1508.8).In accordance with NEPA regulations, therefore, it is appropriate to consider the degree to which the Covered Activities and any connected actions are likely to induce other growth and development that may have further effects on the resources under consideration in this HCP. If the Service considers the construction of the Project to be a connected action to the issuance of the Section 10(a) Permit, then the Service should also consider the degree to which such construction will induce other growth and development. Based on existing judicial guidance, relevant factors in the causal analysis concerning growth-inducement include (1) whether the action is the sole cause; (2) whether the action has a useful purpose other than serving new growth; (3) whether the action is intended to induce growth or to address existing levels of demand, and; (4) whether growth is being regulated at the local level. The test embraced by the courts demonstrates a pragmatic approach that recognizes a stopping point must exist in any causal analysis.

The HCP Handbook describes the Service's procedures for complying with NEPA with respect to HCPs. Most HCPs require preparation of an Environmental Assessment (EA) to comply with NEPA. The Service will review Keystone's Permit application and HCP pursuant to the EA.

2.2.3. Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA) of 1940 (16 USC 668) prohibits taking, possession, and commerce of bald eagles and golden eagles or any part, nest, or eggs without a permit issued by the Secretary of the Interior. "Take" under BGEPA is defined as pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb." "Disturb" is defined in 50 CFR 22.3 as the act of agitating or bothering a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, the following: (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or shelter behavior. Furthermore, "disturb" also includes impacts that result from human-induced alterations occurring near a nest site, which was used previously by eagles, during a time when eagles are absent from the area, and if, when the eagle returns, these alterations agitate or bother an eagle to the extent that it interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death, or nest abandonment.

The golden eagle was never listed as threatened or endangered under the ESA, and on August 8, 2007, the Service removed the bald eagle from the List of Threatened and Endangered Wildlife due to the species' recovery (72 FR 37345). As a result, neither species is protected from "take" under the ESA, but the BGEPA provides protection for bald and golden eagles. The Service concluded that a mechanism should be available to authorize take of bald and golden eagles pursuant to the BGEPA (74 FR 46836).

On November 10, 2009, the Service authorized limited take of bald and golden eagles under the BGEPA for cases where the take to be authorized is associated with otherwise lawful activities (74 FR 46836). Keystone does not intend to apply for authorization from the Service for the incidental take of bald or golden eagles pursuant to the BGEPA because such take is not anticipated to result from the construction and maintenance of the Project.

2.2.4. Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918 (16 USC 703-712) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior.

3. DESCRIPTION OF THE AREA TO BE ANALYZED

3.1. PLAN AREA

The "Plan Area" is the geographic area that is analyzed in the NEPA document. It may be considered as analogous to the "Action Area" in a Section 7 consultation. The Plan Area is that portion of the Project area within the ABB range in Oklahoma which includes all the counties known to support ABBs within the state of Oklahoma, including Atoka, Bryan, Coal, Creek, Hughes, Okfuskee, and Seminole. The Plan Area is analyzed in this HCP. The Plan Area is shown in Figure 2.

3.2. PERMIT AREA

The "Permit Area" includes all lands over which the permittee has direct control, as well as, all areas where take of Covered Species will be authorized by the ITP. For this HCP, the Plan Area and Permit Area are synonymous. The Permit Area is shown on Figure 2.

3.3. ENVIRONMENTAL SETTING

For this HCP, the Plan Area is defined as that portion of the Project right-of-way (ROW) located within the current ABB range in Oklahoma (Figure 2). The Plan Area bisects portions of Atoka, Bryan, Coal, Creek, Hughes, Okfuskee, and Seminole counties. General physical and vegetative characteristics of the Plan Area are described below.

3.3.1. Regional Geology and Topography

The Plan Area traverses central Oklahoma and crosses three different ecoregions including the Cross Timbers, Arkansas Valley, and the South Central Plains (Figure 3). Each of these ecoregions is discussed in further detail below.

The Northern Cross Timbers subset of the Cross Timbers ecoregion of Oklahoma are naturally covered by oak savanna, scrubby oak forest, eastern red cedar (*Juniperus virginiana*), and tallgrass prairie. Tallgrass prairie occurs on fine-textured soils derived from shale or limestone. Livestock farming is the main land use and soils are highly erodible when disturbed. Streams are typically shallow and have sandy substrates (Woods et al., 2005).

Figure 2

Figure 3

The Lower Canadian Hills subset of the Arkansas Valley ecoregion of Oklahoma is underlain by Pennsylvanian-age shale, sandstone, and coal. This ecoregion is a transition between the dryer cross-timbers to the west and the more mesic Arkansas Valley to the east. Native vegetation is a mixture of oak woodland, tallgrass prairie, oak-hickory forest, and oak-hickory-pine forest. Most streams are composed of a series of long pools that are interspersed with occasional, short riffle sections (Woods et al., 2005).

The Cretaceous Dissected Uplands of the South Central Plains ecoregion of Oklahoma are underlain by poorly-consolidated deposits. The Cretaceous Dissected Uplands are mostly underlain by calcareous sands, gravels, and clays of the Cretaceous age. Natural vegetation is oak-hickory-pine forest (Woods et al., 2005).

3.3.2. Hydrology and Water Resources

The Plan Area is drained by perennial rivers, intermittent streams, and ephemeral drainages (Figure 4). Many of the rivers have been dammed to create reservoirs. Major streams and rivers that will be crossed by the Project include Deep Fork River (Creek County), North Canadian River (Okfuskee/Seminole counties), Little River (Hughes County), South Canadian River (Hughes County), Clear Boggy Creek (Atoka County), and Red River (Bryan County).

Two reservoirs occur in the vicinity of the Plan Area including Atoka Reservoir and Lake Texoma; however, neither is crossed by it. Numerous municipal ponds and private stock ponds of varying size have also been constructed along creeks and in uplands within the Plan Area.

3.3.3. Vegetation

The distribution of vegetation community types in the Plan Area is controlled by a variety of factors, such as geology, soils, slope, aspect, water availability, and land use. In general, the dominant community types within the Plan Area include upland forest, riparian forest, and mixed grass pasture. Limited areas of native prairie, oak savannas, and developed land are also present. Dominant vegetation in the upland forest community type typically includes post oak (*Quercus stellata*), blackjack oak (*Q. marilandica*), black hickory (*Carya texana*), mockernut hickory (*C. tomentosa*), and eastern red cedar. Dominant vegetation in the riparian forest community type typically includes American elm (*Ulmus americana*), boxelder (*Acer negundo*), sycamore (*Platanus occidentalis*), hackberry (*Celtis occidentalis*), green ash (*Fraxinus pennsylvanica*), pecan (*C. illinoinensis*), coralberry (*Symphoricarpos orbiculatus*), Indian woodoats (*Chasmanthium latifolium*), Virginia wildrye (*Elymus virginicus*), and poison ivy (*Toxicodendron radicans*). Dominant vegetation in the mixed grass pasture community type typically includes Bermudagrass (*Cynodon dactylon*), tall fescue (*Schedonorus phoenix*), giant ragweed (*Ambrosia trifida*), switchgrass (*Panicum virgatum*), broomsedge (*Andropogon virginicus*), little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), and Johnsongrass (*Sorghum halepense*).

Figure 4

3.3.4. Public Lands

No State Parks occur within the Plan Area. The Plan Area does however cross a small portion of the Deep Fork Wildlife Management Area (WMA). Keystone coordinated with Oklahoma Department of Wildlife Conservation to ensure that construction and operation of the Project were consistent with wildlife management objectives at the WMA.

3.3.5. Listed, Proposed, Candidate, and Other Protected Species

3.3.5.1. Covered Species

This HCP covers one species, the ABB, for incidental take. Among other things, this HCP describes the potential for impacts to individuals and potentially suitable habitat, which may result in take of the Covered Species. It is important to note that the ESA does not prohibit impacts to potential habitat for listed species, rather, it prohibits take of individuals of a listed species. Thus, even if a particular parcel of property contains potential habitat for listed species, it does not mean that the habitat is occupied by a given species at a particular time. It is also important to note that potential habitat for listed species or habitat occupied by listed species is not necessarily "Critical Habitat" as defined by the ESA. In order for listed species habitat to be considered "Critical Habitat" within the regulatory context, the Service must go through a formal rule making process, including allowing opportunity for public review and comment. No critical habitat has been designated for the ABB.

American Burying Beetle (*Nicrophorus americanus*)

The American Burying Beetle (ABB) is a large black beetle with orange markings. The size range of individuals is 1 – 1.8 inches (approximately 2.5 to 4.6 centimeters (cm)) (Backlund and Marrone 1997). The species historically occurred across a large range with documented occurrences from 150 counties in 34 states in the eastern and central United States. The species is also documented from southern Canada (USFWS 1991). Documentation of records is not uniform throughout this broad historical range. More records exist from the Midwest, southern Canada, and the northeastern U.S. relative to the southern Atlantic and Gulf of Mexico region (USFWS 1991). During the 20th century, the ABB disappeared from over 90 percent of its historical range (Ratcliffe 1996). Historic population levels are not known, but the species is thought to have been at least locally common. Populations of ABBs rapidly declined across the eastern portion of their range and became almost completely extirpated from areas east of the Mississippi River by the mid-1970s (a small population remained at Block Island off the coast of Rhode Island). Presently, the species is mainly found along the western periphery of its former range. Larger populations are found in two general areas: Arkansas and Oklahoma; and Nebraska and South Dakota. The species has also been documented to occur in limited areas of Texas, Kansas, and Missouri.

The ABB is a member of the genus *Nicrophorus* which also includes other species that occur in areas supporting the ABB. Species in the genus are generally referred to as burying, sexton, or undertaker beetles because they share the unique behavior of burying carrion to provide a source of nutrition for developing young. The ideal size carrion appears to be in the weight range of 3.5 to 7 ounces (approximately 100 – 200 grams) (Kozol et al. 1988). Primary carrion sources are small birds and mammals. Northern bobwhites (*Colinus virginianus*) and mourning doves (*Zenaida macroura*) are

examples of birds which would provide appropriate-sized carrion. Small mammals such as eastern cottontails (*Sylvilagus floridanus*), gray squirrels (*Sciurus carolinensis*), and rats (*Neotoma* spp.) are examples of mammals in the preferred size range. ABBs are also reported to utilize other carrion within the appropriate size range such as snakes and fish. Kozol et al. (1988) found no significant difference in the ABBs preference for avian verses mammalian carcasses. At Fort Chaffee (western Arkansas), Holloway and Schnell (1997) found that ABB numbers were higher in areas with high densities of small mammals.

The life history of the ABB is similar to that of other burying beetles (Kozol et al. 1988; Pukowski 1933; Scott and Traniello 1987). The ABB is a nocturnal species that lives only for one year. ABBs are active in the summer months and bury themselves in the soil during the winter. Teneral (period when the adult insect is newly emerged from the pupal case or nymphal skin) ABBs emerge in late summer, over-winter as adults, and comprise the breeding population the following summer (Kozol 1990). Adults and larvae are dependent on carrion for feeding and reproduction.

When the nighttime ambient air temperature is consistently below 60° F (15.5° C), ABBs bury into the soil and become inactive (USFWS 1991). In Oklahoma, this typically occurs from late September until mid-May (USFWS 2011a). However, the length of the inactive period can vary depending on temperature. Recent studies indicate that ABBs bury to depths ranging from 0 to 8 inches (to 20.3 cm) in Arkansas (Schnell et al. 2007). Habitat structure (i.e., woodland vs. grassland) does not appear to be a factor influencing over-winter survival rates in Oklahoma (Holloway and Schnell 1997).

The ABB is active in the summer months, emerging from their winter inactive period when ambient nocturnal air temperatures consistently exceed 60°F. They are most active from 2 to 4 hours after sunset, with no captures recorded immediately after dawn (Bedick et al. 1999). During the daytime, ABBs are believed to shelter under soil or leaf litter.

ABBs are nocturnal and highly mobile. The longest distance recorded for an individual was 6.2 miles over six nights. The maximum distance moved by one ABB in one night was 1.8 miles (Creighton and Schnell 1998). When not involved with brood rearing, carrion selection by adult ABBs for food can include an array of available carrion species and size (Trumbo 1992). Burying beetles are capable of finding a carcass between 1 and 48 hours after death at a distance up to 2 miles (Ratcliffe 1996).

The ABB displays an interesting and relatively complex reproductive behavior. Reproductive activity usually begins in mid-May and is completed by mid-August in Oklahoma. In summer months and during hours of darkness, ABBs search for dead animals using chemoreceptors located on their antennae. ABBs can detect carrion up to two miles away under ideal wind conditions. When suitable carrion is located males release pheromones that attract females. When females arrive, there is often competition between the males for mates. Mating pairs then prepare the carcass (by removing hair or feathers and covering it with body secretions that act as preservatives) and excavate a brood chamber where the carcass will be buried. ABBs are known to move carcasses to areas with soils more suitable for burying the carrion. ABBs then mate and lay eggs in the soil near the brood chamber. Larvae emerge a few days later and feed on the buried carcass. ABBs are unique insects because they provide bi-parental care for the developing young.

ABBs are considered feeding habitat generalists and have been successfully live-trapped in several vegetation types including native grasslands, grazed pasture, riparian zones, coniferous forests, mature forest, and oak-hickory forest, as well as on a variety of soil types (Creighton et al. 1993; Lomolino and Creighton 1996; Lomolino et al. 1995; USFWS 1991). Ecosystems supporting ABB populations are diverse and include primary forest, scrub forest, forest edge, grassland prairie, riparian areas, mountain slopes, and maritime scrub communities (Ratcliffe 1996; USFWS 1991). The ABB readily moves between different habitats (Creighton and Schnell 1998; Lomolino et al. 1995).

The ABB appears to be most common in areas representing broad transition zones between forested and open habitats. It is a habitat generalist and neither a prairie nor woodland specialist as was once commonly believed. However, ABB are more restrictive when choosing locations to bury a suitable carcass for reproduction. In Oklahoma, the ABB has been captured in a variety of habitats including grasslands, grazed pastures, bottomland forest, riparian zones, and oak-hickory forest (USFWS 2005). Soil conditions for suitable ABB reproductive habitat must be conducive to burial of carcasses (Anderson 1982; Lomolino and Creighton 1996).

Some noteworthy areas in Oklahoma with relatively large populations of ABBs occur at Camp Gruber in Cherokee County, areas around McAlester in Pittsburg County, and areas near Atoka in Atoka County (a particularly large population occurs just across the Oklahoma border at Fort Chafee, Arkansas). ABBs have been found in 27 Oklahoma counties and may also occur in additional counties. The Project ROW in Oklahoma passes through six counties with confirmed presence of ABBs (Atoka, Bryan, Coal, Hughes, Okfuskee, and Seminole) and one county with unconfirmed presence (Creek) (unpublished USFWS data 2012).

The causes for the ABB's decline are complex and not well-understood. The ABB's vulnerability to extinction is likely due to its complex life history and dependence on carrion, which is a finite resource that varies widely spatially and temporally (Karr 1982; Pimm et al. 1988; Peck and Kaulbars 1987). The general explanation for the species' decline is usually attributed to anthropogenic habitat alteration or changing land use practices at the landscape level. Some examples of these anthropogenic alterations include direct loss of habitat associated with urbanization, industrial development, row crop farming, fragmentation of habit, wide scale use of pesticides, interruption of behavior caused by artificial lighting, and various other proposed causal factors, including extinction of the once common passenger pigeon (*Ectopistes migratorius*). The passenger pigeon, which formerly occurred in the billions across most of the ABB's range, was an ideal size and almost certainly provided an abundant and important carrion source. The decline and disappearance of this species occurred just prior to the ABB's. Other suitable carrion species, such as northern bobwhites and greater prairie-chickens (*Tympanuchus cupido*), have also experienced drastic declines. Competition for limited carrion is apparently exacerbated by increasing numbers of mid-sized mammals such as skunks (*Mephitis mephitis*), raccoons (*Procyon lotor*), foxes (*Vulpes* spp.), and coyotes(*Canis latrans*) which have increased in number in response to extinction or extirpation of large predators and a drastic reduction in fur trapping. These medium sized mammals, which often compete with ABBs for carrion, often thrive in the patchy and fragmented habitat of the modern landscape.

Relatively recently, fire ants (*Solenopsis invicta*) have become competitors for carrion and a potential source of mortality for burying beetles where they co-occur (Warriner 2004; Godwin and Minich 2005). Collins and Scheffrahn (2005) noted that fire ants may reduce ground-nesting populations of rodents and birds, and in some instances, may completely eliminate ground-nesting species from a given area. Fire ant infestations are not evenly distributed; rather, they tend to be more numerous in open, disturbed habitats. Fire ants now infest large areas within the ABB's range in Oklahoma (USDA 2003).

No single factor can fully explain the decline of ABBs. It is apparent that the organism simply cannot tolerate the wide range of landscape changes and other human activities imposed upon them. Perhaps the species' complex and highly evolved life cycle makes it more susceptible to negative effects from high levels of disturbance and landscape alteration relative to other species. Large populations today seem to be limited to relatively large blocks of land with low human population densities, intact native plant communities, and high densities of small birds and mammals.

3.3.5.2. Evaluation Species

Bald Eagle (*Haliaeetus leucocephalus*)

The bald eagle was listed as endangered in 1967 (32FR 4001) and downlisted to threatened in 1995 (60 FR 35999). Successful recovery efforts led to its removal from the federal list of threatened and endangered species on July, 9 2007 (72 FR37345). At the time of its listing, numbers of bald eagles in the lower 48 states had been severely reduced. This can be accredited to hunting in the nineteenth century and then as a result of an extended period of very low reproductive success in the mid twentieth century caused by high levels of organochlorine pesticides in the environment, especially dichloro-diphenyl-trichloroethane (DDT) (64 FR 36453). The banning of the use of DDT combined with earlier prohibitions on hunting (i.e., BGEPA and MBTA) and subsequent habitat protection and other management efforts allowed bald eagles to increase greatly in number. Currently, bald eagles occupy much of their former range.

Bald eagles are typically associated with aquatic habitats. They are commonly found along most major river systems and reservoirs in Oklahoma. Fish usually comprise a large portion of their diet, but bald eagles are opportunistic and will take waterfowl, mammals, and turtles, as well as eat carrion (Ortego et al. 2009). The typical bald eagle nesting period in Oklahoma is October through July.

Although the bald eagle has been federally delisted, it is protected by MBTA and BGEPA. Though the same level of protection is not provided, the Eagle remains protected from "take" of their offspring, eggs, parts, or nests, as well as disturbance. "Disturb" means to agitate an eagle to the degree that it causes or is likely to (1) cause injury, (2) interfere with breeding, feeding, or sheltering behavior, or (3) cause nest abandonment. The MBTA and BGEPA are enforced by the Service. Any anticipated impact to bald or golden eagles would require a special use permit under the BGEPA prior to the activity expected to result in take.

One active bald eagle nest, that is located approximately 1,203 feet west of the Project ROW, was identified during nesting surveys that were conducted for the Project during 2011 and 2012. This nest is located adjacent to the North Canadian River and, at is shortest length, has over 400 feet of mature

deciduous forest separating it from the ROW. The recommendation from the National Bald Eagle Management Guidelines for avoiding disturbance to bald eagles during activities, such as the construction Keystone has proposed, is 660 feet. However, Keystone proposes to construct the portion of the Project within one mile of the nest outside of the breeding season (before January 1).

Least Tern (*Sterna antillarum*)

The least tern is the smallest member of the tern family with a wingspan of 20 inches and is typically 8 to 10 inches in length. They have a grayish back and wings, and snowy white undersides. Least terns can be distinguished from all other terns by their combination of a black crown, white forehead, and a variable black-tipped yellow bill (USFWS 2011b).

The interior population of the least tern was listed as endangered on May 28, 1985 (50 FR 21784-21792) (USFWS 1985b). Historically, the breeding range of this population extended from Texas to Montana and from eastern Colorado and New Mexico to southern Indiana. In Oklahoma, interior least terns nest along most of the larger rivers, as well as at the Salt Plains National Wildlife Refuge near Jet, Oklahoma (USFWS 2011b). No critical habitat has been designated for this population.

Interior least terns spend 4 to 5 months at their breeding sites. They arrive at breeding areas from late April to early June. Nesting areas of interior least terns include sparsely vegetated sand and gravel bars within a wide, unobstructed river channel or salt flats along lake shorelines (Nelson 1998; USFWS 1990).

The interior least tern is piscivorous, feeding in shallow waters of rivers, streams, and lakes. In addition to small fish, terns also may feed on crustaceans, insects, mollusks, and worms. On the Great Plains, fish are the primary diet of this species (Nelson 1998; USFWS 1990). Although terns nesting at sand and gravel pits or other artificial habitats may travel up to 2 miles to forage (USFWS 1990), terns usually feed close to their nesting sites. Feeding behavior involves hovering and diving over standing or flowing water.

Alteration and destruction of riverine habitats, primarily as a result of changes in channel characteristics due to channelization, irrigation, and construction of reservoirs and pools, is a threat to the long-term survival of this species.

The interior least tern is known to use reaches of the North Canadian River, South Canadian River, and Red River in Oklahoma (USFWS 2011b). The Plan Area would cross the North Canadian River on the Okfuskee County – Seminole County border and the South Canadian River in Hughes County. The species also occurs along the Red River in Bryan County, Oklahoma and Fannin County, Texas.

Piping Plover (*Charadrius melodus*)

The piping plover was listed as endangered and threatened December 11, 1985 (50 FR 50726, USFWS 1985a). Piping plover on the Great Lakes were listed as endangered, while the remaining Atlantic and Northern Great Plains populations were listed as threatened. Populations of piping plover within the Plan Area are considered to belong to the threatened Northern Great Plains population. Primary habitat includes: (1) prairie alkali lakes and wetlands;(2) shallow, seasonally to permanently flooded, wetlands with sandy to gravelly, sparsely vegetated beaches, salt-encrusted mud flats, and/or gravelly salt flats;

(3) springs and fens along edges of alkali lakes and wetlands; (4) adjacent uplands 200 feet above the high water mark of alkali lakes or wetlands; (5) rivers with sparsely vegetated channel sandbars, sand and gravel beaches on islands, temporary pools on sandbars and islands, and the interface with the river; and (6) reservoirs with sparsely vegetated shoreline beaches, peninsulas, and islands composed of sand, gravel, or shale. Critical habitat has been designated for the piping plover; however, none of these areas are in Oklahoma.

Threats to piping plover nesting habitat include reservoirs, channelization of rivers, and modifications of river flows that have eliminated hundreds of kilometers of nesting habitat along Northern Great Plains' rivers (USFWS 1994). Eggs and young are vulnerable to predation and human disturbance, including recreational activities and off-road vehicle use. Human-caused disturbance to wintering habitats is also a threat to the continued existence of this species. Motorized and pedestrian recreational activities, shoreline stabilization projects, navigation projects, and development can degrade and eliminate suitable wintering habitat for this species.

Suitable migration stopover habitats include sandy shorelines of lakes and rivers (Campbell 2003), gravel bars, or mudflats in agricultural fields. These habitats are present along the North Canadian River, South Canadian River, and Red River within the Plan Area. The Project would cross the North Canadian River on the Okfuskee – Seminole County line, the South Canadian River in Hughes County, and the Red River in Bryan County. However, piping plovers rarely, if ever, nest in Oklahoma.

Whooping Crane (*Grus americana*)

The whooping crane was listed as endangered on March 11, 1967 (32 FR 4001). Whooping cranes occur only in North America and the total wild population was estimated at 338 birds in 2006 (Canadian Wildlife Service [CWS] and USFWS 2007). This estimate includes 215 birds in the Aransas-Wood Buffalo National Park Population that winters in coastal marshes in Texas and migrates to Canada to nest in the Wood Buffalo National Park and adjacent areas. The other population includes 123 captive-raised birds that have been released in Florida and the eastern U.S. in an effort to establish a non-migratory population in Florida and a migratory population between Florida and Wisconsin (CWS and USFWS 2007). The overall decline of whooping cranes has been attributed to habitat loss, direct disturbance and hunting by humans, predation, disease, and collisions with manmade features (CWS and USFWS 2005).

During spring and fall migration, the Aransas-Wood Buffalo National Park population moves through the central Great Plains including portions of Montana, South Dakota, Nebraska, Kansas, Oklahoma, and Texas. Birds from this population depart from their wintering grounds in Texas from late March through May 1. Fall migration typically begins in mid-September with most birds arriving on wintering grounds between late October and mid-November (CWS and USFWS 2005).

Whooping cranes use a variety of habitats during migration (Howe 1987; Lingle 1987; Lingle et al. 1991; Johns et al. 1997). The whooping crane is most closely associated with river bottoms, marshes, potholes, prairie grasslands, and croplands (CWS and USFWS 2005). Whooping cranes generally use seasonally or semi permanently flooded marshes, broad river channels, and shallow portions of reservoirs for roosting and various cropland and emergent wetlands for feeding (Austin and Richert 2001; Johns et al. 1997).

They generally feed on small grains (including a number of cultivated crops), aquatic plants, insects, crustaceans, and small vertebrates (Oklahoma State University 1993). Cranes roost on submerged sandbars in wide unobstructed channels that are isolated from human disturbance (Armbruster 1990).

Suitable migration stopover habitats include sandy shorelines of lakes and rivers as well as large palustrine wetlands and row crop agricultural fields. The Project would cross the North Canadian River on the Okfuskee – Seminole County line, the South Canadian River in Hughes County, and the Red River in Bryan County. No large wetlands with a potential for providing stopover habitat have been identified within the Plan Area. Row crop agricultural fields do, however, occur within and in the vicinity of the Plan Area and could provide stopover foraging habitat. The primary migration corridor for whooping cranes is located to the west of the Plan Area; few sightings occur within this part of Oklahoma compared to areas farther west.

Critical habitat for migrating whooping cranes has been designated in Oklahoma at the Salt Plains National Wildlife Refuge (43 FR 20938-942; CWS and USFWS 2005). This area is located more than 100 miles northwest of the Plan Area in Oklahoma; no critical habitat would be impacted by the Project.

Sprague's Pipit (*Anthus spragueii*)

The Sprague's pipit is a candidate for federal listing as threatened or endangered (75 FR 56028). Sprague's pipit is a medium sized (5.5 inches long), short distance migrant songbird (passerine). They breed in the northern Great Plains primarily in Montana, North Dakota, and South Dakota (Jones 2010).

Migration occurs through the central Great Plains in April to May and late September through early November (Jones 2010). They winter from the southeast corner of Arizona, southern New Mexico, central and southern Texas, and southern Oklahoma. The highest wintering densities occur in Texas (Jones 2010).

Sprague's pipits establish nesting territories and construct nests on the ground in intermediate height and density grasslands, primarily with native grasses, little bare ground, and few shrubs during May to August (Jones 2010). Breeding territories are established for both nesting and foraging and are likely influenced by the size of grassland patches and the amount of grassland in the landscape (Jones 2010). Males establish and maintain territories, presumably using a high altitude (984 feet), high pitch display (Jones 2010). They forage primarily on the ground and eat insects in the summer and insects and seeds during fall and winter (NatureServe 2012).

There are an estimated 870,000 Sprague's pipits in North America and populations have experienced a range-wide declined at a rate of about 3 percent per year since 1980 in the U.S. (Jones 2010). Decline in this species is attributed to habitat loss, degradation, and fragmentation through conversion to seeded pasture, hayfields, and croplands, as well as overgrazing by livestock and reduced fire frequency (Jones 2010). Current threats to the Sprague's pipit include habitat loss, degradation, and fragmentation; inappropriate land management (overgrazing, mowing, reduced fire frequency); nest predation and parasitism; energy development, introduced plants, and droughts (Jones 2010).

Sprague's pipits occur in the central and western two-thirds of Oklahoma and in the southern portion of the panhandle during migration; however, they have not been observed in the eastern third of the state (Jones 2010) where the Plan Area is located.

Arkansas River Shiner (*Notropis girardi*)

The Arkansas River shiner was listed as threatened on November 23, 1998 (63 FR 64771). This listing was based on habitat destruction and modification from stream dewatering or depletions due to diversion of surface water and groundwater pumping, construction impoundments, and water quality degradation. Competition with the Red River shiner (*Notropis bairdi*) in the Cimarron River also has contributed to reduced distribution and abundance of the Arkansas River shiner. Critical habitat has been designated for the Arkansas River shiner in the Cimarron River in Kansas and Oklahoma and the South Canadian River in Oklahoma (70 FR 59807).

The Arkansas River shiner inhabits the main channels of wide, shallow, sandy bottomed rivers and larger streams in the Arkansas River basin (Gilbert 1980). Studies by Polivka and Matthews (1997) in the South Canadian River indicated that this species used a broad range of microhabitat features. Microhabitat types such as bank, island, sand ridges, backwaters, mid channel, and pools were analyzed separately for abundance at all sampling locations. Bank habitat, islands, and sand ridges supported greater numbers of Arkansas River shiners than the other types. Sand was the predominant type of substrate in these microhabitats. Seasonally, adults selected bank and backwater areas in the winter and remained in islands and sand ridges during the fall, spring, and summer. In contrast, juveniles exhibited their highest numbers in backwaters; however, they also were abundant in bank and sand ridge habitats. The spawning period for the Arkansas River shiner occurs from June 1 through August 15 (NatureServe 2012). Spawning consists of pelagic, non-adhesive eggs that are broadcast and drift with the current during high flow periods. Hatching occurs within 1 or 2 days, with larvae capable of swimming within 3 or 4 days (63 FR 64771). Larvae seek out backwater pools and quiet water at the mouth of tributaries where food is more abundant (Moore 1944).

The Project would cross the North and South Canadian rivers using Horizontal Directional Drilling (HDD) methods. The Arkansas River shiner is known to occur in the South Canadian River and potentially occurs in the North Canadian River and critical habitat has been designated in the South Canadian River. Keystone will cross these rivers without impact to the rivers or the Arkansas River shiner.

4. PROPOSED COVERED ACTIVITIES

Keystone proposes to construct and operate a crude oil transmission system from an oil supply hub at Cushing, Oklahoma to crude oil storage facilities near Nederland, Texas. The Covered Activities include those necessary to construct and operate the pipeline within the Plan Area (Figure 2) as addressed in this HCP as well as the Construction, Mitigation and Reclamation Plan discussed throughout this document and set forth in Appendix A.

4.1. PIPELINE CONSTRUCTION OVERVIEW

The Project is planned to be constructed as follows:

- Keystone will be constructing approximately 485 miles of 36-inch diameter pipeline from Cushing, Oklahoma to near Nederland, Texas.
- This Project would be constructed with 3 mainline spreads (construction sections), varying in lengths from 112.87 to 186.14 miles, in 2012 – 2013.
- The area addressed in this HCP (Plan Area) is a subset of Spread 1 and consists of 138.8 miles within the ABB range in Oklahoma; 83.6 miles of which are located in the ABB conservation priority area.

4.1.1. Ancillary Facilities Summary

In addition to the pipeline, Keystone proposes to install and operate aboveground facilities in the Plan Area. These facilities consist of 3 pump stations in the Plan Area (1 in the ABB non-priority area in Oklahoma and 2 in the ABB conservation priority area), 11 intermediate mainline valves (MLV) in the Plan Area (5 in the ABB non-priority area in Oklahoma and 6 in the ABB conservation priority area), and maintenance facilities. All of these facilities would be located within the permanent easement or on Keystone fee owned property. Additionally, there would be check valves located within the intermediate MLVs downstream of major river crossings. The ABB range in Oklahoma and ABB conservation priority area are discussed in more detail in Section 5.1.2.3.

Additional facilities such as power lines required for the pump stations, remotely operated valves, and densitometers would be installed and operated by local power providers; not by Keystone.

4.1.2. Pipeline ROW

The installation of the new 36-inch diameter pipeline would occur within a 110-foot-wide construction ROW, consisting of a 60-foot temporary construction ROW and a 50-foot permanent ROW. The construction ROW would be reduced to 85 feet in certain areas, which could include some wetlands, cultural sites, residential areas, and commercial/industrial areas.

4.1.3. Temporary Work Space Areas

In addition to the typical construction ROW, Keystone has identified typical types of additional Temporary work space areas (TWA) that would be required. These include areas requiring special construction techniques (e.g., river, wetland, and road/rail crossings, HDD entry and exit points, steep slopes, and rocky areas) and construction staging areas.

4.1.4. Pipe Stockpile Sites, Railroad Sidings, and Contractor Yards

Extra workspace areas outside of the temporary construction ROW covering about 218.58 acres would be required during the construction of the Project in the Plan Area to serve as pipe storage sites, railroad sidings, and contractor yards. Pipe stockpile sites along the pipeline route have typically been identified in proximity to railroad sidings. To the extent practical, Keystone would use existing commercial/industrial sites or sites that previously were used for construction. Existing public or private roads would be used to access each yard. Both pipe stockpile sites and contractor yards would be used

on a temporary basis and would be restored, as appropriate, upon completion of construction. A land survey of pipe stockpile sites, railroad sidings, and contractor yards will be completed prior to construction. The boundaries of these sites will be clearly marked to ensure that inadvertent use of additional areas does not occur.

4.1.5. Access Roads

The Project would use public and existing private roads to provide access to most of the construction ROW. 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 generally be restricted to the existing road footprint, widening of roads may also be required in some areas. Private roads and any new temporary access roads would be used and maintained only with permission of the landowner or land management agency.

Access pads would be placed within the construction ROW at crossings of public and private roads, requiring a total of about 37,860 cubic yards of gravel. There are approximately 147 such road crossings.

4.1.6. Aboveground Facilities

The Project would not require any land outside of the permanent ROW within the Plan Area. Gravel would be used to stabilize the land for permanent facilities, including pump stations, valve sites, and permanent access roads.

Pump Stations

A total of 3 new pump stations, each situated on approximately 5- to 15-acre sites, would be constructed within the Plan Area. Each pump station would consist of up to six pumps driven by electric motors, an electrical equipment shelter, a variable frequency drive equipment shelter, an electrical substation, one sump tank, a remotely operated MLV, a communication tower, a small maintenance building, and a parking area for station maintenance personnel. Stations would operate on locally purchased electric power and would be fully automated for unmanned operation. The pump stations would have an uninterruptable power supply (battery backup) on all communication and specific controls equipment in the case of a power failure. Communication towers at pump stations would generally be approximately 33 feet in height. However, antenna height at select pump stations, as determined upon completion of a detailed engineering study, may be taller (but in no event would exceed a maximum height of 190 feet). Communication towers would be constructed without guy wires. The pipe entering and exiting the pump station sites would be located below grade. Keystone would use down-shielding of exterior lights to minimize impacts to wildlife and would install a security fence around the entire pump station site. Inspection and maintenance personnel would access the pump stations through a gate that would be locked when no one is at the pump station.

Other Aboveground Facilities

Keystone proposes to construct 11 intermediate MLV sites along the new pipeline ROW in the Plan Area. Intermediate MLVs would be constructed within a fenced 40- by 50-foot site located within the permanent easement. Remotely operated intermediate MLVs would be located at major river crossings, other surface water features over 100 feet in width, and at intermediate locations. Additional remotely operated MLVs would be located at pump stations. These remotely operated valves can be activated to shutdown the pipeline in the unlikely event of a spill. The actual spacing intervals between the MLVs and intermediate MLVs would be based upon the location of the pump stations, surface water features wider than 100 feet, sensitive environmental resources, and other hydraulic profile considerations.

Keystone would use high-resolution internal line inspection, maintenance, and cleaning tools known as "pigs" during operation of the Project. The Project would be designed to permit pigging of the entire length of the pipeline with minimal interruption of service. Pig launchers and/or receivers would be constructed and operated completely within the boundaries of the pump stations or delivery facilities. Launchers and receivers would allow pigging of the pipeline with high resolution internal line inspection tools and maintenance cleaning pigs.

4.2. CONSTRUCTION PROCEDURES

The proposed facilities would be designed, constructed, tested, and operated in accordance with all applicable requirements included in the U.S. Department of Transportation (USDOT) regulations at 49 CFR 195, *Transportation of Hazardous Liquids by Pipeline*, other applicable federal and state regulations, and in accordance with the Project-specific special conditions recommended by the Pipeline Hazardous Material Safety Administration (PHMSA) and agreed to by Keystone. These regulations and special conditions are intended to ensure adequate protection for the public and to prevent crude oil pipeline accidents. Project-specific special conditions (as well as 49 CFR 195) specify pipeline material and qualification to be used, minimum design requirements, and measures to ensure protection from internal, external, and atmospheric corrosion.

To manage construction impacts, Keystone would implement its Construction Mitigation and Reclamation Plan (CMR Plan, Appendix A). This plan contains procedures that would be used throughout the Project to avoid and/or minimize permanent impacts. Subsections address specific environmental conditions. Procedures to restore impacts to the permanent ROW are described in the CMR Plan.

The Project's Spill Prevention, Control, and Countermeasure (SPCC) Plan (specifically prepared for the Project and reviewed by TransCanada's safety, environmental, and engineering departments for accuracy and approval) would be implemented to avoid or minimize the potential for harmful spills and leaks during construction. The plan describes spill prevention practices, emergency response procedures, emergency and personnel protection equipment, release notification procedures, and cleanup procedures. Keystone would use Environmental Inspectors on each construction spread. The Environmental Inspectors would review the Project activities daily for compliance with state, federal, and local regulatory requirements and would have the authority to stop specific tasks as approved by the Chief Inspector. The inspectors would also be able to order corrective action in the event that

construction activities violate any provisions of the CMR Plan, landowner requirements, or any applicable permit requirements.

These measures would apply to the basic design and construction specifications applicable to lands disturbed by the Project. This approach would enable construction to proceed with a single set of specifications for lands being crossed. On private lands, these requirements may be modified slightly to accommodate specific landowner requests or preferences.

4.2.1. General Pipeline Construction Procedures

Before starting construction at a specific site, engineering surveys of the ROW centerline and additional TWAs would be finalized. Acquisition of ROW easements and any necessary acquisitions of property in fee would then be completed.

Pipeline construction generally proceeds as a moving assembly line and is summarized below. Keystone currently plans to construct the entire pipeline Project in 3 spreads, 1 of which is located in Oklahoma. Standard pipeline construction is composed of specific activities, including survey and staking of the ROW, clearing and grading, pipe stringing, bending, trenching, welding, lowering in, backfilling, hydrostatic testing, and cleanup. In addition to standard pipeline construction methods, special construction techniques would be used where warranted by site-specific conditions. These special techniques would be used when constructing across rugged terrain, surface water features, wetlands, paved roads, highways, and railroads.

Normal construction activities would be conducted during daylight hours, with the following exceptions.

- Completion of critical tie-ins on the ROW may occur after daylight hours. Completion requires tie-in welds, non-destructive testing, and sufficient backfill to stabilize the trench.
- HDD operations may be conducted after daylight hours, if determined by the contractor to be necessary to complete a certain location. In some cases, that work may be required continuously until the work is completed; this may last one or more 24-hour days. Such operations may include drilling and pull-back operation, depending upon the site and weather conditions, permit requirements, schedule, crew availability, and other factors.
- While not anticipated, certain work may be required after the end of daylight hours due to weather conditions, for safety, or for other Project requirements.

<u>Survey and Staking</u>

Before construction begins at any given location, the limits of the approved work area (i.e., the construction ROW boundaries and any additional TWAs) would be marked and the location of approved access roads and existing utility lines would be flagged. Landowner fences would be braced and cut and temporary gates and fences would be installed to contain livestock, if present. Wetland boundaries and other environmentally sensitive areas also would be marked or fenced for protection at this time. Before the pipeline trench is excavated, a survey crew would stake the centerline of the proposed trench and any buried utilities along the ROW.

Clearing and Grading

A clearing crew will follow the survey crew and will clear the work area of vegetation (including crops) and obstacles (e.g., trees, logs, brush, rocks). Standard agricultural implements would be used on agricultural lands and standard machinery used in timber clearing would be used in forested lands. The amount of top soil stripping would be determined in consultation with the landowner (based on agricultural use) and the NRCS. Full right-of-way stripping for forested lands would be avoided as practical. Temporary erosion control measures such as silt fence or straw bales would be installed prior to or immediately after vegetation removal along slopes leading to wetlands and riparian areas. Grading would be conducted where necessary to provide a reasonably level work surface. Where the ground is relatively flat and does not require grading, rootstock would be left in the ground. More extensive grading would be required in steep side slopes or vertical areas and where necessary to safely construct the pipe along ROW.

Trenching

The trench would be excavated to a depth that provides sufficient cover over the pipeline after backfilling. Typically, the trench would be seven to eight feet deep and four to five feet wide in stable soils. In most areas, the USDOT requires a minimum of 30 inches of cover and as little as 18 inches in rocky areas. To reduce the risk of third party damage Keystone proposes to exceed the depth of cover requirements in most areas. In all areas, except areas of consolidated rock, the depth of cover for the pipeline would be a minimum of 48 inches (Table 1). In areas of consolidated rock, the minimum depth of cover would be 36 inches. Trenching may precede bending and welding or may follow based on several factors including soil characteristics, water table, and weather conditions at the time of construction.

Table 1: Minimum Pipeline Cover for Pipeline Installation

LOCATION	NORMAL COVER (inches)	ROCK EXCAVATION AREA COVER (inches)
Most Areas	48	36
Wetlands and Surface Water Features	60	36
Dry Creeks, Ditches, Drains, Gullies, etc.	60	36
Drainage Ditches @ Public Roads & Railroads	60	48

Generally, the crews on each construction spread are synchronized with the welding crews for efficiency. The amount of open trench is minimized to the extent possible.

Pipe Stringing, Bending, and Welding

Prior to or following trenching, sections of externally coated pipe approximately 80 feet long (also referred to as “joints”) would be transported by truck over public roads and along authorized private access roads to the ROW and placed or “strung” along the ROW.

After the pipe sections are strung along the trench and before joints are welded together, individual sections of pipe would be bent to conform to the contours of the trench by a track-mounted, hydraulic pipe-bending machine. For larger bend angles, fabricated bends may be used.

After pipe sections are bent, joints would be welded together into long strings and placed on temporary supports. During welding, pipeline joints would be lined up and held in position until securely joined. Keystone proposes to non-destructively inspect 100 percent of the welds using radiographic, ultrasonic, or other USDOT approved method. Welds that do not meet established specifications would be repaired or removed. Once welds are approved, a protective epoxy coating will be applied to the welded joints. The pipeline will then be electronically inspected for faults in the epoxy coating and visually inspected for any faults, scratches, or other coating defects. Damage to the coating would be repaired before the pipeline is lowered into the trench.

In rangeland areas used for grazing, construction activities can potentially hinder the movement of livestock. Construction activities may also hinder the movement of wildlife. To minimize the impact on livestock and wildlife movements during construction, Keystone would leave hard plugs (short lengths of unexcavated trench) or install soft plugs (areas where the trench is excavated and replaced with minimal compaction) to allow livestock and wildlife to cross the trench safely. Soft plugs would be constructed with a ramp on each side to provide an avenue of escape for animals that may fall into the trench. Construction inspectors visually inspect the trench prior to pipeline installation and backfilling and would rescue any wildlife or stock discovered in an open trench.

Lowering In and Backfilling

Before pipe is lowered, the trench would be inspected to ensure it is free of livestock or wildlife, as well as rock and other debris that could damage the pipe or its protective coating. In areas where water has accumulated, dewatering may be necessary to permit inspection of the bottom of the trench. Discharge of water from dewatering would be accomplished in accordance with applicable discharge permits. The pipeline then would be lowered into the trench. On sloped terrain, trench breakers (e.g., stacked sand bags or foam) would be installed in the trench at specified intervals to prevent subsurface water movement along the pipeline. The trench would then be backfilled using the excavated material. In rocky areas, the pipeline would be protected with an abrasion resistant coating or rock shield (fabric or screen that is wrapped around the pipe to protect the pipe and its coating from damage by rocks, stones, and roots). Alternatively, the trench bottom could be filled with padding material (e.g., sand, soil, or gravel) to protect the pipeline. No topsoil would be used as padding material. Topsoil would be returned to its original horizon after subsoil is backfilled in the trench.

Hydrostatic Testing

The pipeline would be hydrostatically tested in sections of approximately 30 miles (with a maximum 50 miles) to ensure the system is capable of withstanding the operating pressure for which it is designed. This process involves isolating the pipe segment with test manifolds, filling the segment with water, pressurizing the segment to a pressure a minimum of 1.25 times the maximum operating pressure at the high point elevation of each test section, and maintaining that pressure for a period of 8 hours.

Fabricated assemblies may be tested prior to installation in the trench for a period of 4 hours. The hydrostatic test would be conducted in accordance with 49 CFR 195.

Water for hydrostatic testing would generally be obtained from rivers, streams and municipal sources in close proximity to the pipeline and in accordance with federal, state, and local regulations. Intakes would be screened to prevent entrainment of fish and intake and discharge locations would be determined with construction contractors (no water will be obtained from Arkansas River Shiner habitat). A preliminary list of potential hydrostatic test water sources is included in Table 2. Generally the pipeline would be hydrostatically tested after backfilling and all construction work that would directly affect the pipe is complete. If leaks are found, they would be repaired and the section of pipe retested until specifications are met. There are no chemicals added to the test water. The water is generally the same quality as the source water since there are no additives to the water. Water used for the testing would then be returned to the source or transferred to another pipe segment for subsequent hydrostatic testing. After hydrostatic testing, the water would be tested to ensure compliance with the National Pollutant Discharge Elimination System (NPDES) discharge permit requirements, treated if necessary, and discharged.

The used hydrostatic test water would be discharged either to the source within the same water basin or to a suitable upland area near the test discharge. To reduce the velocity of the discharge to upland areas, energy dissipating devices would be employed.

Hydrostatic test water would not be discharged into state-designated exceptional value waters, waters which provide habitat for federally-listed threatened or endangered species, or waters designated as public water supplies, unless appropriate federal, state, or local permitting agencies grant written permission. To avoid impacts from introduced species, no inter-basin transfers (discharge) of hydrostatic test water would occur without specific permitting approval to discharge into an alternative water basin. Discharge lines would be securely supported and tied down at the discharge end to prevent whipping during discharge. Hydrostatic testing is discussed further in the CMR Plan (Appendix A).

Table 2: Potential Hydrostatic Test Water Sources in the Plan Area

COUNTY(IES)	APPROXIMATE MILEPOST	STREAM NAME	MAX. WATER WITHDRAWAL (million gallons)
OKLAHOMA			
Creek	22.2	Deep Fork River	6.6
Okfuskee/Seminole	38.6	North Canadian River	0.3
Hughes	70.4	Little River	21.6
Atoka	126.9	Clear Boggy Creek	18.0
OKLAHOMA/TEXAS BORDER			
Bryan/Fannin	156.1	Red River	9.3

Pipe Geometry Inspection

The pipeline would be inspected prior to final tie-ins using an electronic caliper (geometry) pig to ensure the pipeline does not have any dents, bulging, or ovality that might be detrimental to the operation of the pipeline.

Final Tie-ins

Following successful hydrostatic testing, test manifolds would be removed and the final pipeline tie-in welds would be made and inspected.

Commissioning

After the final tie-ins are complete and inspected, the pipeline will be cleaned and dewatered. Commissioning involves verifying that equipment has been installed properly and is working, that controls and communications systems are functional, and that the pipeline is ready for service. In the final step, the pipeline would be prepared for service by filling the line with crude oil.

Cleanup and Restoration

During cleanup, construction debris on the ROW will be disposed of and work areas will be graded. Preconstruction contours will be restored as closely as possible. Segregated topsoil will be spread over the surface of the ROW and permanent erosion controls will be installed. After backfilling, final cleanup will begin as soon as weather and site conditions permit. Every reasonable effort will be made to complete final cleanup (including final grading and installation of erosion control devices) within approximately 20 days after backfilling the trench (approximately 10 days in residential areas), subject to weather and seasonal constraints. Construction debris will be removed and taken to an appropriate disposal facility.

After permanent erosion control devices are installed and grading is complete, all disturbed work areas except cultivated fields will be seeded. Seeding is used to stabilize the soil, re-vegetate areas disturbed by construction, and restore native vegetation. Timing of the reseeding efforts will depend upon weather and soil conditions and will be subject to the prescribed rates and seed mixes specified by the landowner, land management agency, or Natural Resources Conservation Service (NRCS) recommendations. On agricultural lands, seeding will be conducted according to landowner requirements.

Keystone will repair or replace any breaches in fences required for access to the ROW. Keystone will also restrict access to the permanent easement using gates, boulders, or other barriers to minimize unauthorized access. Pipeline markers will be installed at road and railroad crossings and other locations (as required by 49 CFR 195) to show the location of the pipeline. Markers will identify the owner of the pipeline and provide emergency contact information. Special markers providing information and guidance to aerial patrol pilots will also be installed.

The ROW will be inspected after the first growing season to gauge the success of re-vegetation and noxious weed control. Eroded areas will be repaired and areas that were not successfully re-vegetated will be reseeded by Keystone or Keystone will compensate the landowner for reseeding. The CMR Plan

(Appendix A) provides detailed information with regard to re-vegetation and weed control procedures which will be employed.

4.2.2. Non-Standard Construction Procedures

In addition to standard pipeline construction methods, special construction techniques would be used where warranted by site-specific conditions. These special techniques would be used when crossing roads, highways, and railroads; steep terrain; unstable soils; surface water features; wetlands; and residential and commercial areas. These special techniques are described below.

Road, Highway, and Railroad Crossings

Construction across paved roads, highways, and railroads would be in accordance with the requirements of road and railroad crossing permits and approvals. In general, all major paved roads, all primary gravel roads, highways, and railroads would be crossed by boring. Boring requires the excavation of a pit on each side of the feature, the placement of boring equipment in the pit, and boring under the road. Once the hole is bored, a prefabricated pipe section would be pulled through the borehole. For long crossings, sections can be welded onto the pipe string just before being pulled through the borehole. Each boring would be expected to take 1 to 2 days for most roads and railroads and 10 days for long crossings such as interstate or four-lane highways.

Most smaller, unpaved roads and driveways would be crossed using the open-cut method where allowed by local authorities or private owners. Most open-cut road crossings can be finished and the road resurfaced in 1 or 2 days.

Pipeline, Utility, and Other Buried Feature Crossings

Keystone and its pipeline contractors would comply with USDOT regulations, utility agreements, and industry best management practices (BMP) with respect to utility crossing and separation specifications. One-call notification would be made for all utility crossings so respective utilities are identified.

Unless otherwise specified in a crossing agreement, the contractor would excavate to allow installation of the pipeline across the existing utility with a minimum clearance of 12 inches. The clearance would be filled with sandbags or suitable fill material to maintain the clearance.

For some crossings, the owner of the utility may require the facility to be excavated and exposed by their own employees prior to the Keystone construction activities. In those cases, Keystone would work with owners to complete work to their specifications. Where the owner of the utility does not require pre-excavation, generally, the pipeline contractor would locate and expose the utility before conducting excavation.

Steep Terrain

Additional grading may be required in areas where the proposed pipeline route would cross steep slopes. Steep slopes often need to be graded for safe operation of construction equipment and to accommodate pipe-bending limitations. In such areas, slopes would be excavated prior to pipeline installation and reconstructed after installation is complete.

In areas where the pipeline route crosses along the side of a slope, cut and fill grading may be required to obtain a safe work area. Topsoil would be stripped from the entire ROW and stockpiled prior to cut and fill grading on steep terrain. Soil from the high side of the ROW would be excavated and moved to the low side of the ROW to create a safe and level work terrace. After the pipeline is installed, the soil from the low side of the ROW would be returned to the high side and the slope's contour would be restored as near as practical to preconstruction condition. Topsoil from the stockpile would be spread over the surface, erosion control features installed, and seeding implemented.

In steep terrain, temporary sediment barriers such as silt fences and straw bales would be installed during clearing to prevent the movement of disturbed soil into wetland, surface waters, or other environmentally sensitive areas. Temporary slope breakers consisting of mounded and compacted soil would be installed across the ROW during grading and permanent slope breakers would be installed during cleanup. Following construction, seed would be applied to steep slopes and the ROW would be mulched with hay, straw, or erosion control fabric. Sediment barriers would be maintained across the ROW until permanent vegetation is established. TWAs may be required for storage of graded material and/or topsoil during construction.

Unstable Soils

Construction in unstable soils, if encountered, would be in accordance with measures outlined in the CMR Plan (Appendix A). Construction in these areas could require extended TWAs. Special construction and mitigation techniques would be applied to areas with high potential for landslides, erosion-prone locations, and blowouts. To facilitate reclamation, Keystone could implement measures such as the use of photodegradable mats and livestock controls.

Stream Crossings

Approximately 54 perennial streams would be crossed one or more times during construction in the Plan Area. Perennial streams would be crossed using either the open-cut method or HDD. These design methods are further described below. Stream crossings were assessed by qualified personnel with respect to the potential for channel aggradation or degradation and lateral channel migration. The level of assessment for each crossing varied based on the professional judgment of the qualified design personnel. The pipeline would be installed as necessary to address any hazards identified by the assessment. The pipeline would be installed at the design crossing depth for at least 15 feet beyond the design lateral migration zone of the channel. The design of the crossings also would include the specification of appropriate stabilization and restoration measures. The actual crossing method employed at a perennial stream would depend on permit conditions from the U.S. Army Corps of Engineers (USACE) and other relevant regulatory agencies, as well as additional conditions that may be imposed by landowners or land managers at the crossing location.

The preferred crossing method would be to use the open-cut crossing method. The open-cut method involves trenching through the stream while water continues to flow through the construction work area. Pipe segments for the crossing would be fabricated adjacent to the stream. Generally, backhoes operating from one or both banks would excavate the trench within the streambed. In wider rivers, in-stream operation of equipment may be necessary. Hard or soft trench plugs would be placed to prevent

the flow of water into the upland portions of the trench. Trench spoil excavated from the streambed generally would be placed at least 10 feet away from the water's edge unless stream width is great enough to require placement in the stream bed. Sediment barriers would be installed where necessary to control sediment and to prevent excavated spoil from entering the water. After the trench is dug, the prefabricated pipeline segment would be carried, pushed, or pulled across the stream and positioned in the trench. When crossing saturated wetlands with flowing waterbodies using the open-cut method, the pipe coating would be covered with reinforced concrete or concrete weights to provide negative buoyancy. The need for weighted pipe would be determined by detailed design and site conditions at the time of construction. The trench would then be backfilled with native material or with imported material if required by applicable permits. Following backfilling, the banks would be restored and stabilized.

Keystone plans to use the HDD method of construction for 7 stream/river crossings in the Plan Area (Table 3). The HDD method involves drilling a pilot hole under the stream, then enlarging the hole through successive passes until the hole is large enough to accommodate a prefabricated segment of pipe. Throughout the process of drilling and enlarging the hole, slurry consisting mainly of water and bentonite clay would be circulated to power and lubricate the drilling tools, remove drill cuttings, and provide stability to the drilled holes. Pipe sections long enough to span the entire crossing would be staged and welded along the construction work area on the opposite side of the crossing and then pulled through the drilled hole. Ideally, use of the HDD method results in no impact on the banks, bed, or water quality of the feature being crossed.

Table 3: Surface Water Features Crossed using Horizontal Directional Drilling

SURFACE WATER FEATURE	APPROXIMATE MILEPOST
Deep Fork River	22.2
North Canadian River	38.6
Little River	70.4
South Canadian River	74.3
Fronterhouse Creek	122.8
Clear Boggy Creek	126.9
Red River	156.1

Approximately 96 intermittent streams would be crossed within the Plan Area. When crossing streams, Keystone would adhere to the guidelines outlined in Keystone's CMR Plan (Appendix A) and the requirements of its Clean Water Act (CWA) Section 404 permit from the USACE.

Additional TWAs would be required on both sides of all surface water features to stage construction, fabricate the pipeline, and store materials. These workspaces would be located at least 10 feet away from the ordinary high water mark, except where the adjacent upland consists of actively cultivated or

rotated cropland or other disturbed land. Before construction, temporary bridges would be installed across all perennial surface water features to allow construction equipment to cross.

During clearing, sediment barriers such as silt fences and staked straw bales would be installed and maintained on drainages across the ROW to minimize the potential for sediment runoff. Silt fences and straw bales located across the working side of the ROW would be removed during the day when vehicle traffic is present and would be replaced each night. Alternatively, drivable berms could be installed and maintained across the ROW in lieu of a silt fence or straw bales.

In general, equipment refueling and lubricating near surface water features would take place in upland areas that are 100 feet or more from the water. When circumstances dictate that equipment refueling and lubricating would be necessary in or near streams or wetlands, Keystone would follow its SPCC Plan to address the handling of fuel and other hazardous materials and any such materials that would require secondary containment.

After the pipeline is installed, restoration would begin. Banks would be restored to preconstruction contours or to a stable configuration. Appropriate erosion control measures such as rock riprap, gabion baskets (rock enclosed in wire bins), log walls, or willow cuttings would be installed as necessary on steep banks in accordance with permit requirements. More stable banks would be seeded with native grasses and mulched or covered with erosion control fabric. Banks would be temporarily stabilized within 24 hours of completing in-stream construction. Sediment barriers, such as silt fences, straw bales or drivable berms would be maintained across the ROW at all approaches until permanent vegetation is established. Temporary equipment bridges would be removed following construction.

Wetland Crossings

Data from wetland delineation field surveys, aerial photography, and National Wetland Inventory mapping were used to identify wetlands crossed by the proposed pipeline. Wetland crossings will be facilitated according to the terms and conditions of Keystone's CWA Section 404 permit issued by the USACE. Pipeline construction across wetlands would be similar to typical conventional upland cross-country construction procedures, with several modifications where necessary to reduce the potential for pipeline construction to affect wetland hydrology and soils.

The wetland crossing method used would depend largely on the stability of the soils at the time of construction. If wetland soils are not excessively saturated at the time of construction and can support construction equipment without equipment mats, construction would occur in a manner similar to conventional upland cross-country construction techniques. Topsoil would be segregated over the trench line. In most saturated soils, topsoil segregation would not be possible. Additional TWAs would be required on both sides of particularly wide saturated wetlands to stage construction, fabricate the pipeline, and store materials. These additional TWAs would be located in upland areas a minimum of 10 feet from the wetland edge.

Construction equipment working in saturated wetlands would be limited to that area essential for clearing the ROW, excavating the trench, fabricating and installing the pipeline, backfilling the trench, and restoring the ROW.

Clearing of vegetation in wetlands would be limited to trees and shrubs, which would be cut flush with the surface of the ground and removed from the wetland. To avoid excessive disruption of wetland soils and the native seed and rootstock within the wetland soils, stump removal, grading, topsoil segregation, and excavation would be limited to the area immediately over the trench line to the extent practical. Trench width would be that required to provide an even, safe, work area which depends upon topography, soil moisture content, and groundwater levels. Saturated soils usually require a wider trench in order to maintain a safe ditch and to avoid unstable trench walls. During clearing, sediment barriers, such as silt fence and staked straw bales, would be installed to minimize the potential for sediment runoff.

Fences and Grazing

Existing fences will be crossed or paralleled by the construction ROW. Before cutting any fence for pipeline construction, each fence would be braced and secured to prevent the slacking of the fence. To prevent any livestock from escaping, the opening in the fence would be closed temporarily when construction crews leave the area. If gaps in natural barriers used for livestock control are created by pipeline construction, the gaps would be fenced according to the landowner's requirements. All existing improvements, such as fences, gates, irrigation ditches, cattle guards, and reservoirs would be maintained during construction and repaired to preconstruction conditions (or better) upon completion of construction activities.

4.2.3. Aboveground Facilities Construction Procedures

Construction activities at each of the new pump stations would follow a standard sequence of activities: clearing and grading, installing foundations for the electrical building and support buildings, and erecting the structures to support the pumps and/or associated facilities. A block valve is installed in the mainline with two side block valves; one to the suction piping of the pumps and one from the discharge piping of the pumps. Construction activities and the storage of building materials would be confined to the pump station construction sites.

The sites for the pump stations would be cleared of vegetation and graded as necessary to create a level surface for the movement of construction vehicles and to prepare the area for the building foundations. Foundations would be constructed for the pumps and buildings and soil would be stripped from the construction footprint.

After the completion of startup and testing, the pump station sites would be graded and a permanent security fence would be installed around each pump station site.

Where delivery and pigging facilities are co-located with a pump station, facilities will be located entirely within the facility.

Intermediate MLV construction would be carried out concurrently with the construction of the pipeline. Wherever practical, intermediate MLVs would be located near public roads to allow year-round access. If necessary, permanent access roads or approaches would be constructed to each fenced MLV site.

Construction Workforce and Schedule

Workforce

Keystone proposes to begin construction of the Project during 2012, with a target in-service date of November 2013. Keystone anticipates a peak work force of approximately 4,000 construction personnel for the entire Project. Construction personnel would consist of Keystone employees, contractor employees, construction inspection staff, and environmental inspection staff.

Keystone is planning to build the Project in one construction spread (Spread 1) in Oklahoma. This spread is 156.2 miles in length; 138.8 miles of which are located within the ABB range in Oklahoma. The construction schedule may affect the final spread configuration, which may result in the need for additional but shorter spreads.

It is anticipated that 700 construction workers and up to 40 inspection personnel would be required for each construction spread. The spread would require 6 to 8 months to complete installation of the pipeline and reclamation of the ROW. Construction of new pump stations would require 20 to 30 additional workers at each site. Construction of all pump stations would be completed in 18 to 24 months.

Keystone, through its construction contractors and subcontractors, would attempt to hire temporary construction staff from the local population. Provided qualified personnel are available, up to 50 percent may be hired from the local work force for the spread. This may not be possible in more rural areas.

Schedule

Construction within the Plan Area is anticipated to begin in November of 2012 and be completed by late 2013.

4.2.4. Future Plans and Abandonment

No plans for abandonment of these facilities have been identified at this time. If abandonment of any facility is proposed in the future, abandonment would be implemented in accordance with applicable federal and state permits, approvals, codes, and regulations.

4.3. OPERATIONS AND MAINTENANCE

The Project's facilities would be maintained in accordance with 49 CFR 194, 49 CFR 195, and Project-specific special conditions recommended by PHMSA and agreed to by Keystone, and other applicable federal and state regulations. Operation and maintenance of the pipeline system would be accomplished by Keystone personnel.

An annual Pipeline Maintenance Program (PMP) would be implemented by Keystone to ensure the integrity of the pipeline. The PMP would include valve maintenance, periodic inline inspections, and cathodic protection readings. Data collected in each year of the program would be fed back into the decision-making process. Additionally, the pipeline would be monitored 24 hours a day, 365 days a year from the oil control center (located in Calgary, Canada) using leak detection systems and supervisory

control and data acquisition. During operations, Keystone would have a Project-specific Emergency Response Plan (ERP) in place to manage a variety of events.

4.3.1. Normal Operations and Routine Maintenance

The pipeline would be inspected regularly via aerial and ground surveillance at a frequency consistent with 49 CFR 195 and the Project-specific special conditions. These surveillance activities would provide information on possible encroachments of nearby construction activities, erosion, exposed pipe, and other potential concerns that may affect the safety and operation of the pipeline. Evidence of population changes would be monitored and High Consequence Areas identified. Pipeline integrity management in High Consequence Areas must meet the requirements in 49 CFR § 195.452. MLVs would be inspected twice annually and the results documented (49 CFR § 195.420).

In order to maintain accessibility of the permanent easement and to accommodate pipeline integrity surveys, woody vegetation along the pipeline permanent easement would be periodically cleared, as needed. Cultivated crops would be allowed to grow in the permanent easement. Trees would be removed from the permanent easement. Keystone would use mechanical mowing or cutting along its permanent easement for normal vegetation maintenance. Trees along the paths of areas where the pipe was installed via HDDs would not normally require any maintenance activities.

The ROW will be monitored to identify any areas where soil productivity has been degraded as a result of pipeline construction. Reclamation measures would be implemented to address any such concerns. Applicable reclamation measures are outlined in the CMR Plan (Appendix A).

Multiple overlapping and redundant systems would be implemented to ensure pipeline integrity and safety. These measures include (1) a quality assurance program for pipe manufacture and pipe coating, (2) fusion-bonded epoxy coating for pipe, (3) cathodic protection, (4) non-destructive testing of 100 percent of the girth welds, (5) hydrostatic testing to 125 percent of the MOP, (6) periodic internal cleaning and high-resolution in-line inspection, (7) depth of cover exceeding federal standards, (8) periodic aerial surveillance, (9) public awareness program, (10) Supervisory Control and Data Acquisition (SCADA) system, and (11) Operations Control Center (OCC) (with complete redundant backup) providing monitoring of the pipeline every 5 seconds, 24 hours a day, every day of the year.

SCADA facilities would be located at all remotely operated pump stations and delivery facilities. The pipeline SCADA system would allow the control center to perform the following functions:

- Remote reading of automated MLV positions;
- Remote starting and stopping at pump stations;
- Remote reading of tank levels;
- Remote closing and opening of automated MLVs;
- Remote reading of line pressure and temperature at all automated intermediate valve sites, at all pump stations, and at delivery metering facilities; and
- Remote reading of delivery flow and total flow.

The Project will have an OCC manned by an experienced and highly trained crew 24 hours per day every day of the year. A fully redundant backup OCC would be constructed and available as needed.

Real time information communication systems, including backup systems, will provide up-to-date information from the pump stations to the OCC plus the ability to contact field personnel. The OCC will have highly sophisticated pipeline monitoring systems and multiple leak detection systems.

4.3.2. Abnormal Operations

The preparation of manuals and procedures for responding to abnormal operations would comply with 49 CFR Section 195.402. Section 195.402(a) requires a pipeline operator to prepare and follow a manual of written procedures for conducting normal operations and maintenance activities and handling abnormal operations and emergencies. Section 195.402(d) (Abnormal Operation) requires the manual to include procedures to ensure safety when operating design limits have been exceeded.

SCADA and Leak Detection

Keystone proposes to utilize a SCADA system to remotely monitor and control the pipeline system. Highlights of Keystone's SCADA system would include:

- Redundant fully functional backup system available for service at all times;
- Automatic features installed as integral components within the SCADA system to ensure operation within prescribed pressure limits;
- Additional automatic features installed at the local pump station level would also be utilized to provide pipeline pressure protection in the event communications with the SCADA host are interrupted; and
- Pipeline is monitored every 5 seconds, 24 hours a day, every day of the year.

Keystone also would have a number of complimentary leak detection methods and systems available within the OCC. These methods and systems are overlapping to ensure early detection of leaks. The leak detection methods are as follows:

- Remote monitoring performed by the OCC Operator, which consists primarily of monitoring pressure and flow data received from pump stations and valve sites, by the Keystone SCADA system. Remote monitoring is typically able to detect leaks down to approximately 25 to 30 percent of pipeline flow rate.
- Software based volume balance systems that monitor receipt and delivery volumes. These systems are typically able to detect leaks down to approximately 5 percent of pipeline flow rate.
- Computational Pipeline Monitoring or model based leak detection systems that divide the pipeline system into smaller segments and monitor each of these segments on a mass balance basis. These systems are typically capable of detecting leaks down to a level of approximately 1.5 percent of pipeline flow rate.

- Computer based, non-real-time, accumulated gain/loss volume trending to assist in identifying low rate or seepage releases below the 1.5 to 2 percent by volume detection thresholds.
- Direct observation methods, which include aerial patrols, ground patrols, and public and landowner awareness programs that are designed to encourage and facilitate the reporting of suspected leaks and events that may suggest a threat to the integrity of the pipeline.

Emergency Response Plan

A Project-specific ERP will be prepared for the Project. The ERP will be submitted and approved by the Office of Pipeline Safety (OPS) and PHMSA prior to operation. A comprehensive ERP for the first Keystone Pipeline Project has been reviewed and approved by PHMSA. That ERP would be used as the basis for preparation of an ERP specific to the Project. When finalized, Keystone will submit the ERP to PHMSA for approval prior to commencing operations.

The National Response Center (NRC) would be notified immediately in the event of a release of crude oil that: (1) violates water quality standards, (2) creates a sheen on water, or (3) causes a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines (40 CFR 112). In addition to the NRC, timely notifications would also be made to other agencies, including the appropriate local emergency planning committee, sheriff's department, appropriate state agencies, the U.S. Environmental Protection Agency (EPA), and affected landowners. Keystone must provide immediate notification of all reportable incidents in accordance with 49 CFR Part 195, and will notify the appropriate PHMSA regional office within 24 hours of any non-reportable leaks occurring on the pipeline.

Under the National Contingency Plan, the EPA is the lead federal response agency for oil spills occurring on land and in inland waters. The EPA would evaluate (1) size and nature of a spill, (2) its potential hazards, (3) the resources needed to contain and clean it up, and (4) the ability of the responsible party or local authorities to handle the incident. The EPA would monitor all activities to ensure that the spill is being contained and cleaned up appropriately. All spills meeting legally defined criteria (see criteria above per 40 CFR 112) must be monitored by the EPA, even though most spills are small and cleaned up by the responsible party. In the unlikely event of a large spill, Keystone and its contractors would be responsible for recovery and cleanup. The usual role of local emergency responders is to notify community members, direct people away from the hazard area, and address potential impacts to the community such as temporary road closings.

A fire associated with a spill is relatively rare. According to historical data (PHMSA 2008), only about 4 percent of reportable liquid spills are ignited. In the event of a fire, local emergency responders would execute the roles listed above and firefighters would take actions to prevent the crude oil fire from spreading to residential areas. Local emergency responders typically are trained and able to execute the roles described above without any additional training or specialized equipment. Keystone would also work with emergency response agencies to provide pipeline awareness education and other support.

Remediation

Corrective remedial actions would be dictated by federal regulations and enforced by the EPA. Required remedial actions may range from the excavation and removal of contaminated soil to allowing the contaminated soil to recover through natural environmental processes (e.g., evaporation, biodegradation). Decisions concerning remedial methods and extent of the cleanup would account for state mandated remedial cleanup levels, potential effects to sensitive receptors, volume and extent of the contamination, potential violation of water quality standards, and the magnitude of adverse impacts caused by remedial activities.

- In the event of a spill, several federal regulations define the notification requirements and response actions. Any injury to natural resources, including the ABB, associated with an oil spill will be addressed under the Oil Pollution Act, National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300), and the Clean Water Act, or the Natural Resource Damage Assessment and Restoration Program, and/or other appropriate laws and regulations. At the most fundamental level, these interlocking programs mandate notification and initiation of response actions in a timeframe and on a scale commensurate with the threats posed. The appropriate remedial measures would be implemented to meet federal and state standards designed to ensure protection of human health and environmental quality.

4.4. MAINTENANCE SCHEDULES

Aerial patrols will be conducted over the restored ROW at least 26 times a year at intervals not to exceed 3 weeks. Personnel will drive to pump stations and MLVs at intervals not to exceed 7.5 months, but at least twice each calendar year to perform maintenance on these facilities. Pipeline ROWs will be mowed periodically (no shorter than 8 inches), as needed, to control brush and woody vegetation.

5. ANALYSIS OF IMPACTS

5.1. EFFECTS TO COVERED SPECIES AND IMPACT ANALYSIS

In this HCP, we provide a detailed analysis of predicted impacts to ABBs and their habitat resulting from the Covered Activities. These impacts generally include direct mortality of the species as a result of ground disturbance during construction and operation of the Project, temporary and permanent loss of habitat, and long-term effects of the Project such as habitat fragmentation. Quantification of ground disturbance activities was accomplished using ArcGIS software and spatial data derived from construction plans and drawings. Using ArcGIS, we were able to accurately determine the amount of potential ABB habitat impacted in acres. Impacts were assigned to 2 categories; permanent and temporary. An additional category of impact includes permanent change in cover type. This impact is used to describe permanent conversion of forested habitat to open habitat in forested areas that are not currently fragmented.

These impact types represent permanent loss of ABB habitat and areas of the Project ROW, and TWAs that will return to their original or better condition within 5 years, respectively. Further, these impacts were categorized into two geographic areas; the current ABB range in Oklahoma (based on counties

with confirmed ABB occurrences) and the conservation priority area, which is an area within the ABB range in Oklahoma with well-documented populations of ABBs and relatively higher quality habitat.

With regard to analyses of impacts to ABBs, it is important to consider that the Applicant is also taking measures focused on reducing impacts on the ABB and its habitat. These measures include a variety of activities focused on reducing take during the construction and operational phases of the Project, as well as, addressing various indirect and long-term Project impacts by restoring habitat disturbed during the construction process. These efforts are further discussed in Section 6.3.1.

Potential impacts to the ABB from the Covered Activities are discussed in the following sections. These impacts include those that directly impact individual ABBs as well as indirect effects relating to habitat loss, alteration, or fragmentation. It is important to address ABB impacts in light of the species' current conservation status. Historically, the species is thought to have been present and locally common in a large part of the eastern United States. During the 20th century, populations of ABBs experienced rapid declines. Currently, ABB populations occur in only a few scattered areas around the periphery of the former range (USFWS 1991).

Although ABBs use forested habitat, population densities seem to reach their maximum in areas that can be described as savannas or early successional stages of regenerating forested habitats. In other words, ABBs appear to prefer habitats containing a mix of open areas, scattered trees, and patchy areas of brush or small saplings. The ABB is neither a prairie specialist (such as *Nicrophorus marginatus*) nor a forest specialist (such as *N. orbicollis*) (USFWS 1991; Creighton et al. 1993; Ratcliffe 1996; personal observations by Dr. David Williams). Rather the ABB appears to mainly utilize patchy habitat or ecotones representing the interface of these general habitat types (Lomolino et al. 1995).

Many hypotheses have been presented to provide a causal mechanism for the ABB's decline. These hypotheses include conversion of habitat, habitat fragmentation, increased competition for carrion, soil compaction, pesticide use, light pollution, fire ants, and extinction of the passenger pigeon (Sikes and Raithel 2002; Schnell et al. 2007). Other causes have been proposed as well. Most of the proposed causal factors relate to anthropogenic habitat alteration or disturbance (i.e., landscape level changes in land use practices). It is likely that several of these factors have contributed to declines in ABB populations and drastic reductions in their distribution. Unfortunately, most of these causal mechanisms are difficult or impossible to reverse. Efforts to conserve the species must take these factors into account. Effective conservation strategies should focus on both reducing impacts to existing populations and protecting existing habitat.

A primary direct effect to the ABB is loss of individuals due to mortality caused by soil disturbing activities such as clearing and grading. Another direct impact associated with construction is temporary disruption of behavior patterns which may result in effects such as abandonment of suitable reproductive habitat or exposure to predators. These impacts clearly may occur, however, the number of individuals affected is assumed to be low. For past projects, diversionary baiting (bait away) and trapping and relocating have been used to minimize direct impacts in areas confirmed to support ABBs by presence-absence surveys. The Service is currently reviewing the use of trapping and relocating to reduce take prior to soil disturbance. If recommended by the Service, Keystone would implement this measure. Currently, our planned efforts to reduce take during the construction phase include (1) limiting

the amount of nighttime work requiring artificial lighting, (2) down-shielding all lights used around constructed facilities or contractor yards, and (3) educational programs for construction personnel.

Although several years of presence-absence survey data has been collected by the Service and other project proponents near the Plan Area, to our knowledge, no ABB population density map or data set is available to estimate take directly. Collection of data to estimate population densities would likely require a longitudinal study because populations vary spatially and temporally. Because of these and other constraints, no practical method for estimating direct mortality resulting from the Project is available. Although attempts to model ABB habitat are ongoing (Crawford and Hoagland 2010), these models cannot accurately predict ABB population densities.

Accurate estimation of permanent ABB habitat loss is a relatively simple process; however, the long-term and indirect effects of the Project are much more difficult to estimate. Certain types of impacts, such as construction of pump stations, would involve permanent loss of potential habitat. The long-term habitat effects of linear projects such as pipelines and electrical transmission lines in already-fragmented rural landscapes are less easily quantified. Because Keystone has committed to restoring ROWs following construction (ripping to relieve soil compaction and re-establishment of native vegetation), permanent loss of habitat has been greatly reduced. These activities will most likely result in relatively better ABB habitat because soil compaction and a prevalence of non-native grass species are common in many habitats within the Plan Area.

Because restoration will prevent permanent loss of large areas of habitat within the Plan Area, the greatest concern with regard to long-term effects of the Project is habitat fragmentation. Prevailing viewpoints are based on the idea that linear projects fragment habitat and result in increased edge habitat which is unfavorable to ABBs (USFWS 1991). Fragmentation is thought to have a negative effect on ABBs because it usually results in increased numbers of vertebrate scavenger species, which leads to increased competition for carrion (Kozol 1995; Ratcliffe 1996; Amaral et al. 1997; Bedick et al. 1999) and direct predation by some of these vertebrate scavengers (Jerzenski and Hoback 2011). This is thought to directly interfere with the ABB's ability to feed and reproduce. Additionally, fragmentation can reduce the carrion prey base of appropriate size for ABB reproduction (Oxley et al. 1974) or increase invasive plant and animal species (Marvier et al. 2004).

Undoubtedly, fragmentation of large blocks of native habitat causes shifts in species composition and population levels. Certain species (i.e., skunks, opossums (*Didelphis marsupialis*), and coyotes) thrive in these habitats and likely compete directly with ABBs for carrion and, in limited opportunistic instances, may prey directly on ABBs. These effects are well-supported in the scientific literature; however, relatively little is known about the effects of projects that increase edge in habitat that is already fragmented. The prevailing viewpoint, although based on sound ecological theory, is most likely not applicable to projects that primarily create relatively narrow linear corridors across habitat that is naturally comprised of a patchy mosaic of plant communities and is already fragmented by numerous other linear corridors such as roads, transmission lines, and pipelines. More succinctly stated, the creation of additional edge in landscapes that are already fragmented does not necessarily lead to adverse impacts to the species.

For example, some of the highest ABB population levels on record occur at Fort Chaffee, Arkansas. ABBs clearly thrive under the habitat conditions present at the installation. Examination of habitats and levels of anthropogenic disturbance at the base can provide important information relative to long-term effects of habitat fragmentation on ABBs. Fort Chaffee has been impacted by habitat fragmentation in a pattern similar to that caused by pipeline projects, roads, and other land uses in the Plan Area. The base historically supported a patchy landscape comprised of upland forests, riparian forests, savannas, and prairies (a plant community structure similar to that of the Plan Area). The base now features a network of interior roads, firebreaks, maintained pipeline ROWs, firing ranges, and other training facilities. Habitats are also seasonally disturbed due to military training (including use of heavy mechanized equipment) and controlled burns which are conducted periodically. Given the high ABB population present, it is clear that habitat fragmentation and moderate anthropogenic disturbance alone are not likely to be limiting factors for the species.

Other characteristics of habitats at Fort Chaffee may be even more informative when considering the long-term effects of linear projects on ABB habitat. Most of Fort Chaffee (excluding the Cantonment Area) does not feature permanent human habitation, large areas illuminated by exterior lights, row crop agriculture, or cattle grazing. The base does support healthy populations of birds and small mammals, areas with suitable soils, and plant communities dominated by native species. Because the habitat is fragmented, it is likely that other habitat characteristics outweigh any negative effects relating to habitat fragmentation. Thus, the context in which habitat fragmentation occurs, rather than the fragmentation itself, appears to be an important factor which should be considered when analyzing the long-term effects of the Project. This information suggests that the effects of habitat fragmentation and other types of short duration anthropogenic disturbance alone do not necessarily lead to declines in ABB populations.

Fortunately, only limited amounts of additional habitat fragmentation will occur within the Plan Area (Figure 5). Most of the ROW crosses a landscape that was historically comprised of a patchy mosaic of forests, prairies, and savannas. Although plant community structure has been altered on a large scale, it continues to be comprised of a patchy mosaic of habitat types. In order to estimate the extent of habitat fragmentation that would result from the Covered Activities, high resolution aerial imagery was used to identify large, contiguous blocks of forested habitat that would be bisected by the ROW. Habitat fragmentation is assumed to not increase in areas where the ROW crosses open or scrubby habitat or where the ROW is co-located along existing ROWs, roads, or other interruptions in habitat.

In situations where accurate assessment of take or long-term effects is impractical or impossible, the Service has allowed project proponents to mitigate for impacts by using acres of habitat impacted as a proxy for individuals taken. The impact analysis presented in this HCP addresses impacts resulting from both the construction and operational phases of the Project. Impacts include direct impacts on ABBs such as mortality or disruption of behavior. Indirect impacts such as alteration or fragmentation of habitat are also addressed. Habitat impacts have been categorized as permanent and temporary for the purpose of quantification.

Figure 5

Use of Acres Impacted as a Proxy for Take

Measuring or accurately estimating the number of ABBs that may be taken is impractical because (1) the species is primarily active at night, (2) spends a large portion of its life underground, (3) has populations that vary temporally and spatially, and (4) direct observation of injured or killed ABBs is unlikely because they would be crushed or buried under soils. Furthermore, no practicable method for measuring take has been published. In situations where measuring or accurately estimating take of individuals is impracticable, the Service has agreed to an approach using acres of habitat impacted as a proxy for take.

A discussion of various impacts resulting in expected take of the species was considered during the development of this HCP.

5.1.1. Direct and Indirect Impacts to ABB

The Plan Area addressed in this HCP is comprised of the ABB range in Oklahoma. Land use and land cover in the Plan Area can be described as "patchy" and comprised of agricultural lands, improved grass pastures, native prairie, savannas, small woodlots, riparian forests, and forested uplands. The entire area features scattered residences, small urban areas, and numerous roads, pipelines, and transmission line ROWs. ABB habitat quality within these counties varies considerably. Similarly, ABB population density varies spatially and temporally within the Plan Area. A discussion of Covered Activities that may result in direct and indirect impacts to ABBs is provided in the following sections.

5.1.1.1. Construction Phase

Mortality of adult, larvae, and eggs of ABBs is likely to result from Covered Activities, especially during the construction phase. This phase of the Project will involve clearing ROW with heavy mechanized equipment, excavation of trenches for installation of pipe, building access roads, construction of pump stations, and various other ground disturbing activities as described in Section 4 of this document. This phase of the Project will have a greater likelihood of causing direct mortality to ABBs when compared to the operation and maintenance phase. Similarly, increased human activity and other habitat effects, such as decreased soil moisture during the construction phase, will likely impact ABB behavior.

Mortality of Adults, Larvae, and Eggs

Death of ABBs at various life history stages may result from Covered Activities. During the ABB active period (late May through late September), adults which are not reproducing typically spend daylight hours buried in soils or leaf litter near the surface. Adults become active during hours of darkness and seek sources of carrion for feeding and potential reproductive sites. Sources of carrion can include birds, small mammals, and snakes (Bedick, Ratcliffe, and Higley 2004). When reproducing, ABB pairs bury a carcass and excavate a brood chamber several inches below the soil surface. The brood chamber houses eggs and developing larvae. The carcass provides a food source to nourish ABB offspring. Because a large part of the ABB's lifecycle takes place underground, areas suitable for burying (e.g., loose, sandy loam soils) are generally preferred over other soil types. Newly eclosed adults emerge from the brood chamber, disperse, and feed on carrion prior to overwintering buried a few inches below ground.

Because of their unique life history, ABBs spend a large amount of time relatively immobile and buried a few to several inches below the soil surface.

Crushing or Exposure of Individuals or Brood Chambers by Construction Equipment

Although ABBs are robust beetles, they are susceptible to death or injury by crushing at all stages of their life cycle. This is particularly likely when vehicles and heavy equipment are operating in areas inhabited by reproducing ABBs. Adults that are not reproducing and are sheltering in soils or leaf litter during the day may be killed or injured by crushing. Clearing of ROW, excavation of trenches and similar ground disturbing activities may destroy brood chambers and adults, eggs, and larvae contained within by crushing. Mortality for ABBs in all of these life stages is possible, although quantification of take would be almost impossible. Similarly, uncovering or digging into or near brood chambers may result in exposure of the brood chamber and/or ABBs inside resulting in mortality caused by desiccation, heat stress, and/or predation by various scavengers and small mammals.

Fuel Spills

Heavy equipment used to construct the Project will require refueling at various times. Although unlikely, death of ABBs could result from fuel spills. Fuels such as diesel and gasoline could result in mortality of ABBs if the spill were to occur at a brood site or where adult (non-reproducing) ABBs were sheltering or overwintering. Construction BMPs will be used to minimize or avoid this hazard; however, the possibility of mortality resulting from fuel spills cannot be eliminated from consideration.

Behavior Disruption

ABBs may also be adversely affected by disruptions of their normal behavior resulting from increased human activity, vehicle traffic, noise, and use of artificial lighting for work taking place at night. Similarly, reductions in soil moisture and increases in soil temperature resulting from clearing and grading may cause ABBs to alter their behavior patterns to avoid these areas. The effects of such disruption are not well-understood.

Increased Human Activity, Vehicle Traffic, and Noise

Although the behavior of ABBs is not completely understood, it is prudent to acknowledge that they may be (at least to some degree) adversely affected by intense human activity, elevated levels of vehicle traffic, and excessive noise. It is difficult to predict whether this effect would be positive or negative. It is possible that increased human activity could lead to a decrease in direct mortality because ABBs may abandon the area. An alternative viewpoint would be that human activity would result in negative effects because displacement of individual ABBs from the Plan Area may result in an increase in interspecific competition for resources as ABBs attempt to utilize new areas and a potential increase in exposure to avian and mammalian predators. Such effects are difficult to quantify and describe. Effects from these activities are expected to be minor and for a short duration, however. These disruptions should be considered temporary effects during the construction phase and would therefore be unlikely to have any long-term negative effect on the species.

Decrease in Soil Moisture and Increase in Soil Temperature

Clearing of vegetation and grading ROWs exposes soils to sun and wind and thereby may result in decreased soil moisture and elevated soil temperature. ABBs are known to be sensitive to changes in soil moisture and high temperature (Bedick et al. 2006). ABBs apparently seek out areas with relatively higher soil moisture and may cope with elevated air temperatures by remaining inactive and buried in soil. In some situations, mortality of ABBs could be caused by reduction of soil moisture and elevated temperature in areas near sheltering, brooding, or overwintering areas. Grading and clearing of ROWs therefore may result in mortality or temporary behavioral changes which may directly or indirectly adversely affect the ABB.

Disruption of Behavioral Patterns Caused by Artificial Lighting

ABBs, like many insects, are attracted to artificial lights (Bedick et al. 1999). This attraction may disrupt their normal feeding and reproductive behavior. In some instances, portions of the Project may be constructed at night. Construction at night would require supplemental lighting as well as use of vehicle mounted lights. Such uses of artificial light may result in temporary adverse impacts to the species by disrupting behavior. Disruption in behavior could expose the species to increased mortality by predation.

5.1.1.2. Operations and Maintenance Phase

The operations and maintenance phase of the Project will have a relatively lesser likelihood of directly impacting individual ABBs resulting in mortality, injury, or changes in behavioral patterns. Because the ROW will be restored following construction, there is a strong likelihood that ABBs will return to the Project area after the restoration phase is complete. One aspect of the operational phase that is not well-understood is the effect of increased soil temperatures caused by flowing oil through the pipeline. Evidence suggests that the transport of oil through the pipeline creates heat that is dissipated through the soil to the ground surface. The TQUEST geothermal model was used to predict soil temperature changes at the ground surface and at various depths and distances from the center of the pipeline (Hazen 2011). Based on conversations with the Service and conclusions of this study, the effect of elevated soil temperatures is not likely to have any adverse effect on ABBs in the Plan Area. This effect is however believed to have a greater impact on ABBs in more northern latitudes. For the Plan Area, the effect of soil heating by the operational pipeline is generally agreed to be negligible.

Mortality of Adults, Larvae, and Eggs

The likelihood for mortality caused by crushing will be drastically reduced during the operation and maintenance phase of the Project. Impacts to ABBs could result from crushing or disturbance of carcasses during mowing and other vegetation maintenance activities. Heavy vehicle traffic and other human activity will be limited to routine maintenance at various above-ground facilities and emergency repairs (as needed) along other parts of the ROW.

Crushing or Exposure of Individuals or Brood Chambers by Construction Equipment

Potential crushing of individual ABBs and disturbance or destruction of brood chambers would be limited to locations along the pipeline in need of repair. Since use of heavy equipment and excavation will be limited, the possibility for mortality caused by crushing will be greatly reduced. Such events are predicted to be infrequent over the timeframe of the Permit.

Effects on Behavior

The effect of the Project on ABB behavior during the operations and maintenance phase is also difficult to quantify. While the Project may result in an increase in ABB habitat quality in portions of the Project area (ROWs will be ripped to relieve soil compaction and re-vegetated following construction), they will also create increased edge habitat in certain areas. As discussed earlier, the effects of increased edge along certain portions of the ROW are difficult to estimate. Increased edge would mainly occur where the ROW crosses large forested areas (some areas the Project would be built parallel and immediately adjacent to existing pipeline ROWs or roads). Edge effects in open and semi-open habitats likely would have less adverse impacts when compared to increased edge in forested habitats. Additional edge would not be created in cleared areas, areas with savanna like conditions, or areas that are immediately adjacent to other ROWs.

Increased Edge Habitat

Fragmented areas by definition have larger amounts of edge habitat relative to large tracts of unfragmented habitat. Areas of increased edge often support large populations of small mammal scavenger species such as skunks, raccoons, foxes, and coyotes (Wilcove et al., 1986). These mammals are thought to (1) compete with ABBs for carrion and (2) opportunistically prey directly on ABBs. Additionally, fragmentation can reduce the carrion prey base of appropriate size for ABB reproduction (Oxley et al. 1974) or increase invasive plant and animal species (Marvier et al. 2004).

Disruption of Behavioral Patterns Caused by Artificial Lighting

The use of artificial lights will be reduced or eliminated from the Project area during the operation and maintenance phases. Lights at above-ground facilities will be down-shielded and only installed at the three pump station locations. Other artificial lights along the Project ROW would only occur in the event of emergency repairs or other unexpected maintenance activities.

5.1.2. Habitat Impacts

5.1.2.1. Temporary Habitat Loss

The Project will result in temporary loss of ABB habitat. Construction activities will result in (1) increased human activity, traffic, and noise, (2) reduction in soil moisture, (3) increase in soil temperature by removal of vegetation and increased exposure to sunlight, (4) removal of topsoil, and (5) use of artificial lighting. These impacts are considered temporary because the Project ROW will be restored following

construction activities and minor local increases in human development or activity are expected to result from the Project.

5.1.2.2. Permanent Habitat Loss

The Project will also result in a limited amount of permanent habitat loss. This includes conversion of habitat at above-ground facilities such as pump stations, MLVs, and new permanent access roads. This impact, expressed in acres, represents a relatively small percentage of the entire Project footprint.

Habitat Fragmentation

As discussed previously, the effects of additional habitat fragmentation resulting from pipeline construction and operation in habitats that are already fragmented are not well-understood. Because the Project ROW crosses large areas of previously fragmented habitats, effects of habitat fragmentation would be greatest in areas that are currently not fragmented. Since the Project ROW and TWAs will be restored following construction, the only permanent habitat fragmentation resulting from the Covered Activities would be those associated with cleared corridors through forested areas that have not already been fragmented as agreed to with the Service. For quantification purposes, we examined recent aerial imagery to delineate areas where the ROW will cross uninterrupted blocks of forested habitat. We did not include areas of the ROW that are co-located parallel to existing pipelines, roads, or other cleared areas. Increased edge would not result in most of the Plan Area because the majority of these areas are either (1) already fragmented due to anthropogenic disturbance or (2) naturally "fragmented" because they are comprised of a mosaic of forest, savanna, and prairie areas.

5.1.2.3. Habitat Delineation Method

Based on information presented in the preceding sections, it is clear that estimates of take of individual ABBs resulting from Covered Activities are impractical. We have presented all potential direct and indirect effects on the species that we anticipate. It is concluded that take of the species may occur and that some habitat will be permanently lost, altered, or affected by fragmentation. We propose an approach that uses habitat impacts as a proxy for take. For the purposes of habitat delineation, the Service has identified an ABB conservation priority area (CPA) within the ABB range in Oklahoma (Figure 2). The CPA was delineated by the Service and is based on habitat quality, survey data, and general habitat models. Impacts were categorized as temporary, permanent cover change, and permanent. GIS layers were developed in order to quantify impacts based on impact type (temporary or permanent) and by geographical area (ABB range in Oklahoma and conservation priority area).

ABB Range in Oklahoma

The ABB range in Oklahoma is comprised of areas of the State known to support ABBs. This range is based on counties with confirmed ABB occurrences. The boundaries of the ABB range in Oklahoma are mapped using county boundaries (i.e., if a county has a confirmed ABB occurrence the entire county is considered to be within the ABB range). The Plan Area within the ABB range in Oklahoma includes portions of Atoka, Bryan, Coal, Creek, Hughes, Okfuskee, and Seminole counties (Figure 2).

Conservation Priority Area

The CPA is comprised of those portions of the Plan Area supporting high quality habitat or known populations of ABBs (Figure 2). This area was designated by Service biologists at the Oklahoma Field Office. Project impacts in the CPA portion of the Plan Area are anticipated to have a larger effect relative to impacts in the ABB range in Oklahoma due to the higher quality of habitat and more intensive use by ABBs within the CPA.

Summary of Permanent and Temporary Habitat Impacts

Table 4: Impact Analysis for the ABB CPA and the ABB Range in Oklahoma

CONSTRUCTION IMPACT	CONSERVATION PRIORITY AREA (CPA) (acres)	ABB RANGE IN OK (acres)
PERMANENT IMPACTS		
Access Roads	0.20	--
Pump Stations	6.78	10.25
MLVs	0.06	--
TOTAL:	**7.04**	**10.25**
TEMPORARY IMPACTS		
Access Roads	1.33	0.64
Contractor Yards	--	--
TWAS	32.05	17.99
Permanent Easement	127.39	49.84
Pipe Yards	--	--
Rail Sidings	--	--
Shoofly Roads	--	--
Temporary Easement	147.87	57.60
TOTAL:	**308.64**	**126.07**
PERMANENT CHANGE IN COVER TYPE		
Habitat Fragmentation	27.28	5.99
TOTAL:	**27.28**	**5.99**

NOTE: For ease of calculating mitigation in different areas, this table separates CPA acres from the ABB range. In addition, areas that are obviously unsuitable as habitat have been removed. The corresponding table in the EA (Table 2.3.3) includes the total number of acres, regardless of suitability for ABBs.

This summary table (Table 4) quantifies permanent and temporary impacts by CPA and the ABB range in Oklahoma. Permanent change in cover type from forested to open habitat is expressed in acres of permanently altered cover type and miles of habitat fragmentation in forested areas that are not already fragmented.

5.1.2.4. Total Direct and Indirect Habitat Impacts

Table 4 presents quantification of the total direct and indirect impacts on ABBs resulting from the Project. Habitat categorized as within the ABB range in Oklahoma and CPA was used as a proxy for estimates of take. The ABB range in Oklahoma and CPA data were supplied by the Service.

This impact results in:

- 7.04 acres of permanent habitat loss in the CPA
- 308.64 acres of temporary habitat loss in the CPA
- 27.28 acres of permanent change in cover type in the CPA
- 10.25 acres of permanent habitat loss within the ABB range in Oklahoma (excluding CPA)
- 126.07 acres of temporary habitat loss within the ABB range in Oklahoma (excluding CPA)
- 5.99 acres of permanent change in cover type within the ABB range in Oklahoma (excluding CPA)

Mitigation for construction-related take on 485 acres equals approximately 865 acres. Keystone will mitigate for any future impacts on up to 65 acres (take) at the specific ratios above, dependent upon whether the impacts are permanent or temporary, as well as whether the impacts will occur in lands preserved for the ABB, in conservation priority areas, or outside of these areas, but within the species' range.

5.2. FINAL PRECONSTRUCTION IMPACT ASSESSMENT

The assessment of impacts presented in this HCP is conservative in favor of the ABB. For example, the impact analysis presented in the previous section is based on the assumption that the entire plan area (with the exception of wetlands, surface water features, roads, and developed areas) currently supports ABB populations. We have accounted for all ground disturbing activities within the Plan Area and treated these as such. For this reason, the impacts set forth in this document represent the outer bounds of impacts to the species.

Current USFWS approved-methodology includes the use of presence-absence surveys to confirm ABB occupation of areas prior to ground disturbance activities. Keystone completed surveys in September of 2012. This effort consisted of conducting 3-night surveys at approximately 137 survey sites within the Plan Area (3 sites associated with pump stations were already surveyed during 2012). These surveys provided current documentation concerning which portions of the Plan Area actually support ABB populations at this time. Negative surveys were used as the basis for reducing the amount of acreage impacted from approximately 2,147 acres estimated in the August 15, 2012 version of this HCP to

approximately 485 acres. Since the effective survey radius is 0.5 mile, 1 mile of impacts were deducted for each negative survey location. The presence-absence surveys have been validated by the Service.

Presence-absence surveys conducted during the active season (May 20 – September 20) of one year are only valid until the beginning of the next active season. Because of this, any areas with additional soil disturbance after May 20, 2013 would require additional surveys and/or mitigation. Additional soil disturbance would include (1) construction involving ground disturbance after May 20, 2013 and (2) any maintenance or repair requiring ground disturbance in restored areas after the 5-year period of temporary impacts (or after restored habitat is suitable and occupied). The take associated with such additional disturbance has been included in the total amount of take requested.

5.3. EVALUATION SPECIES EFFECTS AND IMPACT ANALYSIS

Bald Eagle (*Haliaeetus leucocephalus*)

Direct and Indirect Impacts

The primary construction impacts would be disturbance of bald eagle habitat. Bald eagles in the Plan Area primarily hunt in aquatic habitats, although they could hunt in nearly any open habitat available. The Covered Activities will largely be restricted to upland habitats. Only minimal loss of bald eagle habitat is expected from the Covered Activities.

The bald eagle is known to use reaches of the North Canadian River, South Canadian River, and Red River. No direct impacts to eagle nesting habitat are anticipated at these locations since river crossings would be completed using HDD. Minimal hand clearing of vegetation and human access would be required within the riparian areas of these rivers.

One active bald eagle nest, located approximately 1,203 feet west of the Project ROW, was identified during nesting surveys conducted for the Project during 2011 and 2012. This nest is located adjacent to the North Canadian River and, at is shortest length, has over 400 feet of mature deciduous forest separating it from the ROW. All major stream crossings will be completed by the HDD method which will also leave most of the riparian habitat intact.

Aerial surveillance would be conducted 26 times per year or no greater than once every 3 weeks. The aircraft will fly over an area at an altitude of about 1,000 feet during aerial patrols. Indirect impacts during aerial and ground surveillance are unlikely to disturb bald eagles during nesting periods.

The Covered Activities are not expected to result in harassment of any non-nesting bald eagles that may occur in the Plan Area. Because non-nesting eagles are fully mobile, they would be capable of avoiding any activities they perceive as a threat.

Only minimal indirect impact from habitat disturbance is expected. The Project is not expected to cause bald eagles to abandon any habitats that they might currently be using for hunting, nesting, or roosting. Clearing of woody vegetation from the ROW is not expected to decrease the amount of habitat available for eagles to use for hunting because the species typically hunts in aquatic and other open habitats (Campbell 2003). Any increase in the amount of open habitat available to eagles to use for hunting that

may result from the clearing of ROW is expected to result in neutral or negligibly beneficial effects on the species.

Cumulative Impacts

A review to identify non-federal projects or activities in the vicinity of the Project was completed by searching publicly available sources, internet news announcements, permit application filings, and agency provided information. No future state, local, or private actions that are reasonably certain to occur in the Plan Area have been identified for the Project.

Conservation Measures

Keystone will notify all personnel performing Covered Activities within 1.3 miles of a bald eagle nest. They will be provided with training on how to identify bald eagles and instructed to avoid the nest and conduct their work as quickly and quietly as possible.

If any bald eagle nests are found within 600 feet of the ROW, Keystone will deploy a biological monitor to observe the eagles while construction activities are performed. To ensure that no harassment to eagles occurs, the biological monitor will halt construction if a bald eagle is seen to approach an activity that could present a hazard to the bird, or if construction activities appear to be preventing the eagles from regularly attending the nest. In order for the latter determination to be made, the monitor will be deployed at least two days prior to the commencement of construction activities so that general eagle activity patterns can be established.

Effects to Bald Eagle

No impacts to the bald eagle or significant impacts to their habitat are anticipated.

Least Tern (*Sterna antillarum*)

Direct and Indirect Impacts

The primary construction impacts to least terns would be disturbance and potential exposure to fuel spills from construction machinery. The chance of construction related spills within least tern habitat is minimal because, according to Keystone's CMR Plan (Appendix A), hazardous materials, chemicals, fuels, and lubricating oils would not be stored, staged, or transferred (other than possible refueling) within 100 feet of any surface water feature, wetland, storm drain, drop inlet, or high consequence area. Refueling and lubrication of construction equipment would generally be restricted to upland areas at least 100 feet away from streams and wetlands. Where this is not possible, the equipment would be fueled by designated personnel with special training in refueling, spill containment, and cleanup. Keystone would mark and maintain a 100 foot area from these river crossings (a 300 foot area would be marked and maintained at the South Canadian River) free from hazardous materials, fuel storage, and vehicle fuel transfers. If interior least terns are found at these crossings, Keystone would adhere to the 0.25 mile buffer of no construction activity until young have fledged.

During the 2008 surveys, interior least terns were observed foraging at the Red River and the South Canadian River, but were not present at the North Canadian River. Currently, construction activities, including the HDD crossings of the North Canadian, South Canadian, and Red Rivers are scheduled to occur between November 2012 and April 15, 2013, which is outside of the timeframe when least terns are present at these river crossings. No direct impacts to least tern breeding habitat are anticipated at these locations, since pipeline placement across the rivers would be completed by the HDD method. Minimal hand clearing of vegetation and limited human access would be required within the riparian areas. Hydrostatic test water will not be withdrawn from the South Canadian River.

In the event construction related activities occur after April 15 at these surface water features, Keystone would conduct presence/absence surveys to identify occupied breeding territories and/or active nest sites to avoid impacts to this species. If occupied breeding territories and/or active nest sites are identified, the Service would be notified and appropriate protection measures would be implemented on a site-specific basis. These measures should limit any impacts to this species resulting from construction activities, increased noise, and human presence at work site locations.

Similar constraints and/or mitigation measures detailed above may apply to pipeline maintenance activities. It is highly unlikely that a leak in the pipeline would occur near these locations when least terns were present. In the event of a leak, crude oil would likely be contained by the soil covering it, thereby reducing the risk of crude oil reaching the river. MLVs will be placed on both sides of crossings to shut off the flow of oil in the case of a spill.

Direct contact with crude oil could result in adverse effects to interior least terns due to oiling of plumage, ingestion of crude oil from contaminated plumage and prey, and transfer of crude oil to eggs and young. While this type of exposure has the potential to cause adverse effects to individuals, the probability of adverse effects to interior least terns is unlikely.

Aerial surveillance would be conducted 26 times per year or no greater than once every 3 weeks and the aircraft will fly over an area at an altitude of about 1,000 feet during those aerial patrols. Aerial and ground surveillance are unlikely to disturb terns during migration periods at stopover locations.

Cumulative Impacts

A review to identify non-federal projects or activities in the vicinity of the Project was completed by searching publicly available sources, internet news announcements, permit application filings, and agency provided information. No future state, local, or private actions that are reasonably certain to occur in the Plan Area have been identified for the Project.

Conservation Measures

Pre-construction surveys would occur within 0.25 mile from suitable breeding habitat at the North Canadian River and South Canadian River in Oklahoma and the Red River at the Oklahoma/Texas border, prior to any construction-related activities occurring at these rivers after April 15.

Construction would not be permitted within 0.25 mile from an occupied nest site during the breeding season or until the fledglings have left the nesting area.

Effects to Least Tern

Effect on Critical Habitat:
No critical habitat has been designated for this species. Therefore, the Project would have no impact on critical habitat for the interior least tern.

Effect on the Species:
The Project is not likely to adversely affect the interior least tern. This conclusion is based on Keystone's plan to HDD the North Canadian River, South Canadian River, and Red River, coordination with the Service, and Keystone's commitment to follow recommended conservation measures from the Service.

Piping Plover (*Charadrius melodus*)

Direct and Indirect Impacts

The primary construction impacts to piping plovers would be disturbance and potential exposure to small fuel spills and leaks from construction machinery. The chance of construction related spills within piping plover habitat is minimal. According to Keystone's CMR Plan (Appendix A), hazardous materials, chemicals, fuels, and lubricating oils would not be stored, staged, or transferred (other than possible refueling) within 100 feet of any surface water feature, wetland, storm drain, drop inlet, or high consequence area.

All river crossings that provide migration stopover habitat for the piping plover (North Canadian River, South Canadian River, and Red River) would be performed using HDD, which poses a small risk of spills of drilling fluids. Drilling fluid spills are rare and are contained by the BMPs that are described within the HDD Contingency Plans required for drilling crossings. No direct impacts to the piping plover or piping plover migration habitats are anticipated from the construction and operation of the Project.

Indirect impacts could result from migrating individuals being flushed from the Plan Area during construction related activities. Since piping plovers are highly mobile, it is anticipated that individuals would move to other suitable resting and foraging habitats elsewhere in the area. Potential impacts from encountering and flushing a migrating piping plover from the Plan Area would be negligible. Habitat loss from construction would be negligible since the major rivers would be crossed using the HDD method.

There are no known occurrences of piping plovers nesting within the Plan Area. Indirect impacts during aerial and ground surveillance are unlikely to occur to migrating piping plovers at stopover locations. Aerial surveillance is conducted 26 times per year at intervals no greater than 3 weeks and the aircraft will fly over an area at an altitude of about 1,000 feet during those aerial patrols.

A spill resulting from a leak in the pipeline is unlikely to affect the piping plover. The major rivers that contain suitable habitat for migrating piping plovers would be crossed by HDD. In the unlikely event of a leak, crude oil would likely be contained by overburden before reaching the river, thereby reducing the risk of crude oil reaching the river and the potential for piping plover exposure. MLVs will be placed on both sides of crossings to shut off the flow of oil in the case of a spill.

Direct contact with a crude oil spill could result in adverse effects to piping plovers due to oiling of plumage or ingestion of crude oil from contaminated plumage and prey. While these exposure routes have the potential to cause adverse effects to individuals, the probability of adverse effects to piping plovers are unlikely due to (1) the low probability of a spill, (2) the low probability of the spill coinciding with the presence of piping plover individuals, and (3) the low probability of the spill reaching a major river in sufficient amounts to cause toxic effects. The magnitude of spill effects varies with multiple factors, the most significant of which include the amount of material released, the size of the spill dispersal area, the type of spills, the species assemblage present, climate, and the spill response tactics employed.

Aerial surveillance would be conducted 26 times per year or no greater than once every 3 weeks and the aircraft passes by an area quickly at an altitude of about 1,000 feet during those aerial patrols. Indirect impacts during aerial and ground surveillance are unlikely to disturb plovers during migration periods at stopover locations.

Cumulative Impacts

A review to identify non-federal projects or activities in the vicinity of the Project was completed by searching publicly available sources, internet news announcements, permit application filings, and agency provided information. No future state, local, or private actions that are reasonably certain to occur in the Plan Area have been identified for the Project.

Conservation Measures

The Service has recommended that if this species is observed in close proximity to the ROW during construction, its presence would be documented.

Effects to Piping Plover

Effect on Critical Habitat:
Critical habitat is not currently designated for this population. Critical habitat for wintering piping plovers on the barrier islands outside of Galveston Bay, Texas are outside of the Plan Area. Therefore, the Project would have no impact on critical habitat for the piping plover.

Effect on the Species:
The Project is not likely to adversely affect the piping plover. This conclusion is based on Keystone's construction plan to HDD the North Canadian River, South Canadian River, and Red River, coordination with the Service, and Keystone's commitment to follow recommended conservation measures from the Service.

Whooping Crane (*Grus americana*)

Direct and Indirect Impacts

The primary construction impacts would be disturbance and potential exposure to small fuel spills and leaks from construction machinery. The chance for construction-related spills within whooping crane

roosting and foraging habitat is minimal because according to Keystone's CMR Plan (Appendix A), hazardous materials, chemicals, fuels, and lubricating oils would not be stored, staged, or transferred (other than possible refueling) within 100 feet of any surface water feature, wetland, storm drain, drop inlet, or high consequence area.

No direct impacts to the whooping crane are anticipated from the construction of the Project. Suitable roosting and/or foraging habitats occur within the Plan Area at major river crossings including the North Canadian River, South Canadian River, and Red River. Habitats at these rivers would be crossed by HDD, so potential habitat loss, alteration, or fragmentation would be negligible. Based on the current migration pathway of this species, potential occurrence within or near the Plan Area could occur but would be extremely rare and would be limited to a few individuals or small groups of migrant birds (CWS and USFWS 2007).

Indirect impacts could result from migrating individuals being disturbed and displaced due to noise and human presence during construction, if it were to occur during spring or fall migrations.

Because Keystone proposes to use a small volume of water in comparison to the daily flow rate of the stream, and would return that water to the same source after hydrotesting, water use is unlikely to affect the amount of roosting or foraging habitat along the rivers used by whooping cranes.

Normal operation of the pipeline would not be expected to affect the whooping crane or habitats used during migration. Pipeline surveillance would involve routine low-level aerial flights 26 times per year or no less than every 3 weeks and/or ground based inspections once per year. Over flights during migration periods would have the potential to disturb whooping cranes during migration. To minimize this disturbance, pilots will be advised to coordinate with the Service to ensure that fly-overs do not occur when whooping cranes are in the Permit Area. Most over flights would normally be during late-morning or mid-day at an altitude of about 1,000 feet. Maintenance inspections that would require external examination of the pipeline would be unlikely to coincide with crane roosting or foraging habitats, but would have the potential to disturb migrant cranes.

Roosting habitats at rivers crossed by the HDD method would typically have 20 feet or more of overburden between the pipeline and river bottom. Therefore, heat dissipated from the pipeline would not affect riverine roosting habitats.

Direct contact with a crude oil spill could result in adverse effects to whooping cranes due to oiling of plumage and ingestion of crude oil from contaminated plumage and prey. While these exposure risks have the potential to cause adverse effects to individuals, the probability of adverse effects to whooping cranes are unlikely due to (1) the low probability of a spill, (2) the low probability of the spill coinciding with the presence of migrating whooping cranes or migration habitats, and (3) the low probability of a whooping crane contacting the spilled product. In the unlikely event of a pipeline leak, the crude oil would need to penetrate this significant amount of overburden before reaching the river, thereby reducing the risk of crude oil reaching the river. MLVs will be placed on both sides of crossings to shut off the flow of oil in the case of a spill. Further, if a significant spill event were to occur, federal and state laws would require cleanup.

Cumulative Impacts

A review to identify non-federal projects or activities in the vicinity of the Project was completed by searching publicly available sources, internet news announcements, permit application filings, and agency provided information. No future state, local, or private actions that are reasonably certain to occur in the Project area have been identified for the Project.

Conservation Measures

During spring and fall whooping crane migration periods, biological monitors would complete a brief survey of any wetland or riverine habitat areas potentially used by whooping cranes. If whooping cranes are sighted the biological monitor would contact the Service to coordinate avoidance measures. The Service would notify Keystone if whooping cranes are within the construction area through information gathered from the whooping crane tracking program.

Effects to Whooping Crane

Effect on Critical Habitat:
Designated critical habitat for the whooping crane is located at the Salt Plains National Wildlife Refuge in western Oklahoma which is well outside of the Plan Area. Therefore, the Project would have no impact on critical habitat for the whooping crane.

Effect on the Species:
The Project is not likely to adversely affect the whooping crane. This conclusion is based on the rarity of the species, its status as a migrant through the Plan Area, and Keystone's commitment to follow recommended mitigation measures from the Service. As a result, no direct impacts are expected to result from construction. Indirect impacts from disturbance of migrating whooping cranes during Project construction and hydrostatic testing are expected to be negligible.

Sprague's Pipit (*Anthus spragueii*)

Direct and Indirect Impacts

The primary construction impacts to Sprague's pipit would be disturbance and potential exposure to small fuel spills and leaks from construction machinery. The chance of construction related spills within Sprague's pipit habitat is minimal. Construction and reclamation activities would be conducted to allow for prompt and effective cleanup of spills of fuel and other hazardous materials. Each construction crew and cleanup crew would have on hand sufficient tools and materials to stop leaks including supplies of absorbent and barrier materials that would allow for rapid containment and recovery of spilled materials.

Indirect impacts could result from individuals being flushed from the Plan Area during construction related activities. Since Sprague's pipits are highly mobile, it is anticipated that individuals would move to other suitable habitats within the Project region. If this species happened to land in close proximity to the ROW during construction, its presence would be documented. Based on the linear nature of the Project and mobility of migrating individuals, potential impacts from encountering and flushing a

Sprague's pipit from the Plan Area would be negligible. Habitat loss from construction would be negligible because they use a variety of grassland habitats and the ROW will be allowed to re-vegetate after the initial construction.

Sprague's pipits occur in the central and western two-thirds of Oklahoma and in the southern portion of the panhandle during migration, but they have not been observed in the eastern third of the state (Jones 2010) through which most of the proposed Project would cross.

Indirect impacts during aerial and ground surveillance are unlikely to occur to Sprague's pipits. Aerial surveillance is conducted 26 times per year at intervals no greater than 3 weeks and the aircraft will fly over an area quickly at an altitude of about 1,000 feet during those aerial patrols.

A spill resulting from a leak in the pipeline is unlikely to affect the Sprague's pipit. Direct contact with a crude oil spill could result in adverse effects to Sprague's pipits due to oiling of plumage, ingestion of crude oil from contaminated plumage and prey, and transfer of crude oil to eggs and young. While these exposure routes have the potential to cause adverse effects to individuals, the probability of adverse effects to Sprague's pipits are unlikely due to (1) the low probability of a spill and (2) the low probability of the spill coinciding with the presence of individual Sprague's pipits. The magnitude of spill effects varies with multiple factors, the most significant of which include the amount of material released, the size of the spill dispersal area, the type of spills, the species assemblage present, climate, and the spill response tactics employed.

Cumulative Impacts

A review to identify non-federal projects or activities in the vicinity of the Project was completed by searching publicly available sources, internet news announcements, permit application filings, and agency provided information. No future state, local, or private actions that are reasonably certain to occur in the Plan Area have been identified for the Project.

Conservation Measures

The Service has recommended that if this species is observed in close proximity to the ROW during construction, its presence would be documented.

Effects to Sprague's Pipit

No impacts to the Sprague's pipit or significant impacts to their habitat are anticipated.

Arkansas River Shiner (*Notropis girardi*)

Direct and Indirect Impacts

The Project would cross both the North Canadian and South Canadian rivers in Oklahoma using the HDD method. As recommended by the Service, a buffer of 300 feet from bank full width would be maintained on each side of these rivers. Minimal hand clearing of vegetation within a maximum 3-foot wide path would be required within this 300-foot zone in order to allow limited human access to place the Tru-Tracker cable that is associated with the drilling equipment. Keystone would use existing roads or

easements within the 300-foot buffers, which would not require additional vegetation clearing in order to place the water pumps and intake structures for water withdrawals. ***Water withdrawal will not occur from the South Canadian River***. HDD entry and exit locations will be outside the 300-foot buffer, some temporary workspaces (consisting of the existing roads and easements that would be used to access the rivers to place the pumps and intake structures) would however, be within the 300-foot buffer. Crossings of these rivers would be in compliance with the HDD Plan. Consequently, no direct impacts to this species habitat are likely to occur from construction. HDD poses a small risk of spills of drilling fluids. Drilling fluid spills are rare and are contained by the BMPs that are described within the HDD Contingency Plans required for drilling crossings. Most leaks of HDD drilling mud occur near the entry and exit locations for the drill and are quickly contained and cleaned up.

Routine pipeline operations are not expected to affect Arkansas River shiner. There would be no maintenance of vegetation within the designated critical habitat area along the South Canadian River or within riparian habitats along the North Canadian River.

In the unlikely event of a spill that would enter a river, exposure to crude oil could result in adverse toxicological effects to Arkansas River shiner. However, the probability of adverse effects to Arkansas River shiner are unlikely due to (1) the extremely low probability of a spill, (2) the low probability of a spill in a river reach where the Arkansas River shiner or critical habitat is present, and (3) the low probability of the spill reaching a stream in sufficient amounts to cause toxic effects. Intermediate MLVs will be placed on both sides of crossings to shut off the flow of oil in the case of a spill.

Cumulative Impacts

A review to identify non-federal projects or activities in the vicinity of the Project was completed by searching publicly available sources, internet news announcements, permit application filings, and agency provided information. No future federal, state, or local, or private actions that are reasonably certain to occur in the Project area have been identified for the Project.

Conservation Measures

- No water withdrawals from the South Canadian River (designated critical habitat for the Arkansas River shiner) will occur.
- At the North Canadian River, non-HDD construction activities in the river and any water withdrawal from the river would be prohibited during the spawning period (May 15 through August 15).
- Water would not be withdrawn if there is no flow in the North Canadian River at the time of the HDD operation.
- The water intake for the North Canadian River withdrawal would be screened to prevent entrainment or entrapment of larval fish or other organisms.
- Vegetation clearing for installation of the Tru-Tracker wire for the HDD crossings would be limited to hand clearing using a machete or hand power tools of a path no wider than 3 feet within the

critical habitat area along the South Canadian River and the habitat along the North Canadian River.

- If the HDD crossing is unsuccessful and a different crossing method is required, the Service would be consulted to determine the measures that would be implemented to avoid and minimize adverse impacts to this species.
- Erosion control measures would be implemented as described in the CMR Plan (Appendix A). Erosion and sediment controls would be monitored daily during construction to ensure effectiveness, particularly after storm events, and only the most effective techniques would be used.

Effects to Arkansas River Shiner

Effect on Critical Habitat:
The Project is not likely to adversely impact designated critical habitat for the Arkansas River shiner at the South Canadian River crossing. This crossing will be constructed using HDD and no water for hydrostatic testing will be obtained from the South Canadian River.

Effect on the Species:
The Project is not likely to adversely affect the Arkansas River shiner. This conclusion is based on Keystone's plan to HDD the South Canadian and North Canadian rivers, Keystone's commitment to only remove a minimal amount of vegetation at these rivers, and Keystone's commitment to follow recommended mitigation measures from the Service. As a result no direct or indirect impacts are likely to result from construction and operation of the Project.

6. PROPOSED HABITAT CONSERVATION PLAN

Keystone is voluntarily seeking authorization from the Service for incidental take of the ABB while performing Covered Activities for the Project. The Section 10 (a)(1)(B) ITP will be applied for and used by Keystone. Keystone reserves the right to withdraw from the Permit at any time prior to the occurrence of take authorized by that Permit.

Sections 6.2. through 6.4. of this chapter present Keystone's habitat conservation plan. Section 10(a)(1)(B) of the ESA authorizes the Service to issue a permit allowing take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." The Service is required to issue an ITP where all requirements have been met. The applicant must submit an HCP that identifies or satisfies several substantive criteria (ESA § 10(a)(2)(A)):

- The impact that will likely result from the taking;
- The steps the applicant will take to minimize and mitigate the impacts and the funding available to implement those steps;
- What alternative actions to taking were considered and the reasons the alternatives were not selected; and

- Other measures that the Service may require as necessary or appropriate for purposes of the conservation plan.

Also, to issue a permit, after opportunity for public comment with respect to a permit application and the related conservation plan, the Secretary must find that (ESA § 10(a)(2)(B)):

- The taking will be incidental;
- The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking;
- The applicant will ensure that adequate funding for the plan will be provided;
- The taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild; and
- Other measures, if any, will be met and he has received such other assurances as he may require that the plan will be implemented.

In addition, HCPs are also required to comply with the Five Points Policy (Addendum to the HCP Handbook: 5-Point Policy (65 FR 35242; June 1, 2000) by including:

1. Biological goals and objectives, which define the expected biological outcome for each species covered by the HCP;
2. Adaptive management, which includes methods for addressing uncertainty and also monitoring and feedback to inform management decisions regarding biological goals and objectives;
3. Monitoring for compliance, effectiveness, and effects;
4. Permit duration, which is determined by the time-span of the project and designed to provide the time needed to achieve biological goals and address biological uncertainty; and
5. Public participation according to NEPA.

The expected impact of the proposed Covered Activities on the Covered Species is described in the following section.

6.1. ASSESSMENT OF TAKE

This HCP presents a habitat-based approach to identification of potential impacts to the ABB. Using habitat as a proxy for take of individual ABBs, as well as for designing mitigation measures, is consistent with longstanding Service practice with respect to insects and other organisms with a life history that makes estimates of take impractical.

This approach is appropriate given the nature of the potential impact of the Covered Activities on the species. It is possible that activities carried out in connection with the Project will have a direct effect on ABBs such as injuring or killing individuals, larvae, or eggs. This result would most likely only occur in instances where sheltering or reproducing ABBs were present in the Project ROW during land clearing and excavation activities. During the operational phase of the Project, this would be even less likely. Although direct take is possible, it is estimated to be relatively low because ABB populations are

dispersed across a wide geographical area and the width of the ROW and TWAs are relatively small when viewed at the landscape level. Most of the potential impacts anticipated as a result of the Project are indirect effects stemming from the Covered Activities which may result in an adverse impact on ABB habitat. Thus, a portion of anticipated take relates to the possibility of Covered Activities eliminating or degrading the quality of ABB habitat in such a way as to significantly impair the ABB's ability to breed, feed, and/or seek shelter in the future.

A small potential for take could occur in the event of an oil spill resulting from a leak or break in the line. Injury from such an event would be addressed under the Oil Pollution Act, National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300), and the Clean Water Act, or the Natural Resource Damage Assessment and Restoration Program, and/or other appropriate laws and regulations.

Habitat impacts can be expressed in acres temporarily and permanently disturbed. Similarly, we have estimated the relative amount of existing habitat that would be fragmented as a result of the Project. For the purposes of this HCP, fragmentation will be expressed as acres of habitat disturbed resulting in permanent cover change within forested areas. Following this, acres of habitat preserved, restored, or protected is an appropriate metric for prescribing mitigation requirements to offset impacts to the species. Given that it is mainly habitat impacts that would lead to take and that habitat restoration or enhancement is how conditions could be improved, it is appropriate to use acres of habitat as the metric for both take and mitigation in this HCP. Acres of habitat impacted should, however, be modified to account for the degree of fragmentation that will result and restoration of ROWs after construction; similarly acres of required conservation should be modified based on the condition of land used, management activities proposed, and other factors relating to the intensity of restoration efforts employed.

As has been the case for other incidental take authorization issued for the species, there is no practical way to quantify take of individuals. While surveys for ABBs can provide valuable information for determining the extent of occupation of a given area, they do not provide a precise mechanism for predicting the number of ABBs that may actually be present in an area at a given time. The effectiveness of ABB surveys in estimating the number of individuals in an area is limited because populations of the species vary both temporally and spatially. Similarly, catch rates are affected by weather-related factors such as rain, wind, and temperature. Presence-absence surveys are designed for that goal, not to estimate population size.

In addition to being a scientific necessity, this approach is consistent with case law addressing the legality of using habitat as a proxy for take of individuals of a species. Courts have recognized that as a general matter "Congress wanted incidental take impact to be stated in numbers of animals, where practical, not in terms of habitat markers." *Miccosukke Tribe of Indians or Florida v. US*, 566 F.3d 1257 [11th Cir. 2009]. Courts have also explained that "While Congress indicated its preference for a numerical value, it anticipated situations in which impact could not be contemplated in terms of a precise number…In the absence of specific numerical value, however, the Fish and Wildlife Service must establish that no such numerical value could be practically obtained." *Arizona Cattle Growers' Association v. U.S. Fish and Wildlife Service*, 273 F.3d 1229, 1249-50 [9th Cir. 2001]; see also *Oregon Natural Resources Council v. Allen*, 476 F.3.d 1031, 1037 [9th Cir. 2007] (the Service must explain why it

was unable to numerically quantify the level of take of northern spotted owls). These criteria are satisfied here because there is no scientifically credible method for counting ABBs lost or gained in the future as a result of the impact and mitigation activities associated with the Permit.

As described in Section 5.1. the methodologies used to delineate and categorize ABB habitat into two categories (i.e., ABB range in Oklahoma and conservation priority area) was based on qualitative estimates of habitat quality, presence-absence survey data, and general habitat models. It was assumed that all areas within these portions of the Plan Area supported ABB habitat. This estimate was adjusted downward to deduct acres that clearly do not support ABB habitat. This methodology was based on Service guidance with regard to unsuitable ABB habitat. Because of time constraints, we were unable to exclude areas based on certain criteria (specifically exclusion criteria based on percentages of sand, clay, and rock). We were however able to deduct other types of unsuitable habitat such as paved surfaces, roads, water features, row crop agricultural lands that are currently in production, wetlands, and developed areas. Because we could not exclude all areas of unsuitable ABB habitat, it is expected that the amount of habitat identified as being affected along the ROW will exceed the amount of actual ABB habitat impacted.

Most of the potential impacts to the Covered Species are expected to be indirect through the loss and disturbance of habitat; however, a possibility exists that some direct impacts could occur. This would most likely occur during the construction phase, when the vast majority of ground disturbing activities would be taking place. Limited direct impacts could also occur during the operations and maintenance phase. In this HCP, the amount of potential impact to the ABB based on calculated habitat impacts is an estimate of maximum potential impact. This estimate of maximum potential impact will result in a sufficient amount of permitted incidental take to cover any direct impacts to the species, should such impacts occur.

Because of the highly protective nature of the impact-minimization practices that Keystone will employ during construction of the pipeline, including its plan to minimize construction activities during periods when ABBs are active and above-ground, it is anticipated that there will be very few if any ABBs actually harmed or killed by Project activities. Furthermore, the vast majority of the theoretical “impacts” that are assumed for purposes of the Permit are temporary in nature. Habitat that will be disturbed by pipeline construction activities will be expeditiously restored, providing soil conditions that are believed to be even more attractive to ABBs than pre-construction conditions due to the reduced level of soil compaction found along restored pipeline corridors, a condition that is thought to facilitate ABB burying behavior. In contrast, the compensatory mitigation project that will be funded by Keystone, at a cost of over $4 million, has been designed to provide 1,600 acres of ideal ABB habitat in a location that has been selected with input from some of the world’s leading ABB experts. The Pittsburg County tract that will be preserved at Keystone’s expense includes an 865-acre Parcel that will be actively managed to provide attractive ABB habitat in a location where ABBs have been documented to exist in significant numbers. The 865-acre parcel size was determined based on mitigation ratios recommended by the Service in draft guidance and as provided in Table 5. Because of the mobility of ABBs during the warm season, creation of a large preserve of suitable habitat within relatively close proximity to known ABB colonies at the McAlester Ammunition Complex is expected to provide an ideal opportunity for

colonization of incoming and outgoing ABBs. It is reasonable to assume that this project will provide a dramatic overall benefit to the ABB, advancing the insect's prospects well beyond what would have been the case if the Project, and its accompanying mitigation, had not been implemented.

6.2. BIOLOGICAL GOALS AND OBJECTIVES

As defined by the Service, biological goals should be commensurate with the scope of the proposed action to ensure that they are consistent with conservation actions needed. Biological goals are the broad guiding principles for the operating conservation program and provide the rationale behind the minimization and mitigation strategies. Specific biological objectives are the measurable targets for achieving the biological goals.

The primary goals of this HCP are (1) to minimize and avoid potential impacts to the ABB during performance of the Covered Activities to the maximum extent practicable and (2) to provide permanent mitigation from impacts to the ABB in the form of off-site habitat conservation. Keystone will work with a third party conservation entity to create a Permittee Responsible Conservation Project Site. Keystone has contracted with the Common Ground Capital, LLC and WLLL, LLC to develop and manage the 865 acre permittee responsible mitigation site, named the "Keystone McAlester Conservation Area".

This mitigation approach would satisfy the objectives of this HCP, which is to facilitate the conservation and management of ABB habitat in perpetuity in order to compensate for any Project-related impacts to the species. As described below, measures will be implemented to minimize adverse effects from the Covered Activities which may result in impacts to the ABB.

6.3. IMPACT MINIMIZATION MEASURES AND MITIGATION

Keystone has identified several general and ABB-specific measures intended to minimize impacts to the proposed taking of the Covered Species as well as impacts to the Evaluation Species as a result of the Covered Activities. These measures are detailed below.

6.3.1. ABB Impact Avoidance and Minimization Measures

6.3.1.1. Carrion Surveys Prior to Disturbance

Keystone will conduct carrion surveys in the Project footprint within the consultation range for the ABB according to the Service's most recent Carrion Survey Protocol, which is based on the best available scientific and commercial information, prior to regularly scheduled maintenance.

6.3.1.2. Limited Clearing in Temporary Work Areas

To the degree possible, clearing of TWAs will be limited to decrease temporary habitat loss. Estimates of impacts for TWAs presented in this HCP likely represent the maximum area that will be disturbed by the Covered Activities.

6.3.1.3. Limited Use of Artificial Lighting

During the construction phase, most construction activity will take place in daylight hours. Construction activities taking place at night would require artificial lighting and could thereby have an impact on ABBs by disruption of normal behavior patterns. Construction at night and the use of lights would be limited to specific situations requiring this activity. Lighting required for above-ground facilities and contractor yards would be down-shielded in order to minimize the effect on ABBs.

6.3.1.4. Educational Program for Construction Personnel

Keystone will implement an education program for construction personnel engaged in the Project. This will include a presentation focused on identifying the ABB, explaining its life history, its current range, and its habitat requirements. Construction personnel will be instructed to report any sightings of ABBs or brood chambers if encountered. Signs will be placed at construction entrances identifying the area as potential ABB habitat.

6.3.1.5. Erosion Control

Erosion control techniques such as silt fencing, hay bales, water bars, and other efforts will be used to prevent washing away of topsoil, formation of gullies, or other effects which would negatively impact ABB habitat through the action of surface water. Keystone's CMR Plan provides further details with regard to erosion control following construction (Appendix A).

6.3.2. Mitigation Measures

6.3.2.1. Re-Establishment of Vegetation

Immediately following construction (which is scheduled to commence during the dormant season), disturbed areas will be temporarily stabilized by broadcasting cool season species such as annual rye grass or wheat seed. Where necessary, clean, weed-free wheat straw will be used as mulch to protect seed and increase soil moisture. These grasses are annual species that senesce when temperatures warm during summer; they will not become permanently established. During the spring, a mixture of native warm season grasses will be planted within the ROW. This will include species such as little bluestem, big bluestem, Indiangrass, and switchgrass. Natural recruitment of other native grasses and forbs will also likely occur. It should be noted that some portions of the ROW, in response to landowner requirements, will be re-vegetated using non-native species such as Bermudagrass. This type of re-vegetation will likely be restricted to areas that are currently dominated by improved grass pastures and will therefore not lead to a reduction of habitat dominated by native species. Keystone's CMR Plan provides further details with regard to restoration of ROWs following construction (Appendix A).

6.3.2.2. Relief of Soil Compaction

Immediately following construction, disturbed areas will be ripped to a depth of 24 inches to relieve soil compaction existing at the site from the use of heavy equipment while conducting the Covered Activities. This effort will improve or enhance ABB habitat by making soils easier for beetles to bury in.

Keystone's CMR Plan provides further details with regard to relief of soil compaction within ROWs following construction (Appendix A).

6.3.2.3. Addition of Supplemental Soil

In limited areas, supplemental soils will be required to provide a minimal coverage of the ROW in areas with large amounts of rock or shale. This effort will allow vegetation to be established and improve soil texture for ABBs. Keystone's CMR Plan provides further details with regard to application of supplemental soils within ROWs following construction (Appendix A).

6.3.3. Mitigation Approaches

Keystone has entered into a contractual agreement with a third party conservation entity to create a Permittee Responsible Conservation Project Site. Specifically, Keystone has contracted with the Common Ground Capital, LLC (CGC) and WLLL, LLC (WLLL) to acquire fee title to a carefully selected 1,600-acre tract of land within Oklahoma's ABB Conservation Priority Area and to set aside, within this tract, an 865-acre permittee-responsible mitigation site, named the "McAlester Conservation Area" (KMCA). In parallel, CGC/WLLL plans to develop an ABB conservation bank on the remaining 735 acres of the Pittsburg County tract lying adjacent to the KMCA. This conservation bank would be designed to provide for future potential ABB species credit needs of various entities that may impact ABB habitat in the future. It is possible that Keystone would acquire some of these credits during the operational phase of the Project if unanticipated future impacts to ABB habitat should occur in connection therewith.

Keystone submitted a detailed Management Plan for the KMCA on October 24, 2012 that provides for (1) CGC/WLLL's acquisition of fee title to the 1,600-acre Pittsburg County tract (the "Tract") within 30 days after issuance of the ITP, using $2.080 million provided by Keystone, (2) simultaneous creation of the 865-acre KMCA sub-parcel within the Tract, (3) imposition of deed restrictions on the Tract, effective as of the date of acquisition, that will prevent activities on the Tract that would be inconsistent with the Conservation Plan, (4) creation of a $1.060 million Keystone-funded endowment for the Tract in 2012, $820,000 of which would be earmarked for the KMCA and $240,000 of which would be earmarked for support of CGC/WLLL's adjacent mitigation bank, and (5) transfer of a perpetual conservation easement to a qualified land conservation organization, ensuring that this conservation organization has the legal authority and practical ability to prevent activities on the Tract that would be inconsistent with the Conservation Plan (Appendix B). Keystone's outlays to effectuate the compensatory mitigation project have exceeded $1 million. The Conservation Plan meets all requirements of the Service's August 13, 2012 draft ABB Conservation Banking Criteria and is consistent with the Service's 1991 ABB Recovery Plan.

CGC/WLLL has assumed the responsibility of acquiring and managing the entire 1,600-acre Tract for ABB habitat. The 1,600-acre Tract was placed under contract for conservation of the ABB on September 18, 2012. Although CGC/WLLL is not authorized to use any of the 1,600 acres for purposes that would conflict with the approved Conservation Plan, active conservation measures on the 735-acre bank site would be implemented over time as credit sales take place, provided the conservation bank is approved by the Service. Conservation measures on the 865-acre KMCA site will commence as soon as the Tract is

acquired by CGC/WLLL and the KMCA is carved out as Keystone's permittee-responsible mitigation site. CGC/WLLL will exercise its option to purchase the property by no later than November 3, 2012 and Keystone shall be ready, willing, and able to fund the acquisition as soon as practicable following this notice, with a target closing date not later than December 31, 2012. It is anticipated that a conservation easement will be in place by the first quarter of 2013, although deed restrictions will ensure execution of the KMCA Management Plan as soon as the Tract is acquired by CGC/WLLL. Keystone has provided appropriate funding assurances to ensure that these land acquisition, management, and restoration activities will occur as planned (Appendix C).

The project names for the two parcels within the Tract will be the "McAlester Conservation Area" and "American Burying Beetle Conservation Bank" (ABBCB). The financial assurances provided by Keystone will be adequate to ensure KMCA's long term success, even if ABBCB were to fail as a conservation bank in the future.

6.3.3.1. Mitigation Ratios

On July 31, 2012 the Service issued a draft Conservation Strategy for the American burying beetle, which included recommended mitigation ratios. These draft mitigation ratios are intended to facilitate recovery of the ABB. These ratios are based on duration of negative impacts and proximity to areas important to beetle recovery. The Service believes ABB CPAs contribute more towards ABB recovery compared to areas not within the CPA. Therefore, impacts occurring within the CPA have a higher mitigation ratio than impacts occurring outside of a CPA.

Temporary impacts are defined as any impact that is restored to its previous condition within 5 years of the negative impact. Based on the climate and vegetation types of eastern Oklahoma, the Service expects most grass and shrub dominated cover types would be re-established to their previously undisturbed state within 5 years. Impacts of new ROWs immediately adjacent and paralleling existing ROWs are considered temporary. Though Keystone believes the temporary impact ratio established by the Service far exceeds what the impact should be relative to the short duration of habitat loss related to pipeline construction (typically less than 1 year), these ratios have been adopted for calculation of impact for this HCP (Table 5).

Table 5: Mitigation Ratio Table

IMPACTS	ABB Range in OK	CPA	Mitigation Lands
Temporary	1:1	2:1	3:1*
Permanent Change in Cover	1.5:1	2.5:1	3.5:1*
Permanent	2:1	3:1	4:1*

**Mitigation ratio plus credit values lost*

For this HCP, permanent cover change refers to conversion of forested habitat to open habitat within forested areas that are not already fragmented. Because "permanent cover change" has additional impacts compared to "temporary impacts", mitigation ratios for permanent cover change are higher.

Permanent impacts are defined as any impact that includes long-term removal of ABB habitat from use. Because these impacts occur over a longer time frame than temporary impacts and remove more ABB habitat than permanent cover change, mitigation ratios for permanent impacts are higher. Keystone's compensatory mitigation actions, regardless of the option selected (i.e., acquisition of conservation bank credits or funding of third-party acquisition and restoration of ABB habitat) will more than offset and compensate for any incidental taking of ABB as a result of the Covered Activities.

6.3.4. Evaluation Species Impact Avoidance and Minimization Measures

Avoidance and minimization measures implemented for the Evaluation Species are described in detail in Section 5.2 and are also summarized in the following table.

Table 6: Impact Avoidance and Minimization Measures for Evaluation Species

AVOIDANCE OR MINIMIZATION MEASURE	Bald Eagle	Least Tern	Piping Plover	Whooping Crane	Sprague's Pipit	Arkansas River Shiner
	Implemented for Species? (check all that apply)					
HDD large stream crossings w/ a minimum 100-foot riparian buffer	X	X	X	X		X
Erosion and sediment controls		X	X	X		X
Initial construction clearing from November to April (outside nesting period)		X	X	X	X	
Pre-construction surveys	X	X	X	X		
Construction not permitted within 0.25 mil from occupied nest site		X				
Vegetation clearing limited to hand clearing a path no wider than 3 feet at S. Canadian River						X
No water withdrawal during spawning period (May 15 through August 15)						X
Suspend water withdrawal if no flow is present						X
Water intake screened to prevent entrainment or entrapment						X
No water withdrawal from South Canadian River						X

6.4. MONITORING PLAN

Biological Monitoring

Monitoring is used to ensure that conservation projects are meeting desired goals (effectiveness monitoring) and to identify problems at an early stage so that corrective actions can be implemented (validation monitoring for Adaptive Management). Specific monitoring plans will be developed as Project mitigation approaches are further refined. This monitoring will consist of two basic categories: (1) monitoring of restoration areas disturbed by construction within the Plan Area and (2) monitoring of off-site conservation areas.

Monitoring of restoration areas disturbed by construction within the Plan Area would be the responsibility of Keystone or its designees. This monitoring will include both aerial fly-overs and periodic site visits to ensure that restoration goals are being met. This process will provide a mechanism by which problem areas are identified and corrective actions implemented in a timely fashion. Keystone's monitoring plan is adequate to ensure restoration goals within the Plan Area are achieved. Further details concerning the monitoring plan are included in Keystone's CMR Plan (Appendix A).

Compliance Monitoring

The purpose of compliance monitoring is to provide a record accessible to the public and the Service demonstrating the Applicant's compliance with the terms and conditions of the ITP and HCP. The compliance monitoring process for the HCP will consist of the preparation and submittal of annual reports by the Applicant, as described below, to the Service for review and comment.

The intent of the compliance monitoring is to ensure that the HCP is fully functioning during the term of the ITP, as well as to provide a focus for minor modifications and adjustments to better meet the goals and objectives of the ITP.

6.4.1. Annual Reports

Keystone will submit an Annual Report of operational activities to the Service by 1 December of each year that the Permit is in effect. During the construction phase, the reports will include a summary of construction activities, identify the amount of known and potential ABB habitat cleared that year, identify whether any Covered or Evaluation Species were detected in or near the ROW, access roads, and substations of the Permit Area. This report will also identify mitigation actions performed that year and expected to be performed the following year.

Post-construction annual reports will include this same information except for the summary of construction activities. Post-construction reports will also provide a summary of maintenance activities performed that year, including any inspection activities resulting in ground disturbance or habitat alteration. These reports will also identify any mitigation credit purchased from an independently operated ABB conservation Bank.

6.4.2. Adaptive Management Plan

Generally defined, adaptive management is a process by which mitigation measures or management actions are evaluated and subsequently modified in response to new information. According to the Service's policy [see 65 CFR 35242 (June 1 2000)], adaptive management is defined as a formal, structured approach to dealing with uncertainty in natural resources management, using the experience of management and the results of research as an on-going feedback loop for continuous improvement. Adaptive approaches to management recognize that the answers to all management questions are not known and that the information necessary to formulate answers is often unavailable. Adaptive management includes, by definition, a commitment to change management practices when determined appropriate.

The primary reason for using adaptive management in HCPs is to allow for changes in the mitigation strategies that may be necessary to reach the long-term goals (biological objectives) of the HCP. Under adaptive management, the mitigation activities of the HCP can be monitored and analyzed to determine if they are producing the required results. If the desired results are not being achieved, then adjustments to the mitigation strategy should be considered.

As discussed, the Covered Activities are expected to result in limited direct mortality of individual ABBs, as well as, long-term indirect effects resulting from a small amount of permanent habit loss and habitat fragmentation in certain portions of the Plan Area. The proposed mitigation was designed to compensate for the impacts to ABBs using either credits in an approved ABB conservation bank or provision of funding to a third party for the specific purpose of acquisition and protection of land where ABB habitat would be restored, enhanced, and preserved in perpetuity. If a conservation bank is used, adaptive management would be addressed by the banking instrument (approved by the Service) for the bank. If a mitigation project specific to the Project is used and implemented by a third party, adaptive management strategies based on performance goals for that Project would be developed accordingly.

6.4.3. "No Surprises" Assurances

Under the "No Surprises" rule (63 FR 8859, codified at 50 CFR 17.22, 17.32), the Service provides participants in an approved HCP that is being properly implemented the assurance that the Service will not impose additional mitigation requirements in the event that unforeseen circumstances occur over time that negatively impacts the covered species. Unforeseen circumstances means changes in circumstances affecting a species or geographic area covered by an HCP that could not reasonably have been anticipated by the Applicant and the Service at the time of HCP development and Permit issuance, and that the result in a substantial and adverse change in the status of the Covered Species.

Similarly, the No Surprise rule also recognizes that the Applicant and the Service can reasonably anticipate that some circumstances affecting a species or geographic area covered by an HCP may change and such change can be planned for (e.g., the listing of new species or a fire or natural catastrophic events). To the extent such changed circumstances are provided for in the HCP, an applicant must implement the appropriate measures in response to the changed circumstances.

The ABB is the only species fully covered in this HCP. To qualify for No Surprises assurances, the Permittee must implement all provisions included in the HCP and the ITP that addresses such circumstances. The evaluation species discussed in this HCP are not covered species and therefore are not covered by No Surprises. The ITP associated with this HCP does not constitute a special use permit under the Bald and Golden Eagle Protection Act or the Migratory Bird Treaty Act of 1918 and are not provided No Surprises.

7. CHANGED AND UNFORESEEN CIRCUMSTANCES

7.1. CHANGED CIRCUMSTANCES

It is recognized by the Service and Keystone that many changes in human conditions and attitudes, development pressures, environmental conditions, and scientific understanding of ecological systems, among many other circumstances, could and very likely will occur over a 50-year Permit period. To address this situation, an ITP should contain a procedure by which the parties will deal with the changes in circumstances affecting a species or geographic area covered by the Permit that can be reasonably anticipated by Keystone and the Service.

7.1.1. Drought

One area of particular concern is the effect of drought during the restoration of areas disturbed during construction. Prolonged drought can have a negative effect on establishment of vegetation. In the event that drought decreases the success of restoration efforts, these efforts will be repeated as necessary to achieve the goals set forth in Keystone's CMR Plan.

7.1.2. Crude Oil Spills

To the best of our knowledge, scientific literature addressing effects of crude oil spills on ABBs is unavailable. Our assumption is that crude oil spills would have a negative impact on ABBs. Mortality would almost certainly result from individuals or brood chambers being immersed in or exposed directly to crude oil. However, potential impacts to ABBs during the cleanup phase of an oil spill are also a possibility. Emergency cleanup of a spill, if required, could involve use of heavy mechanized equipment and soil disturbance (i.e., removal of contaminated soils). This could result in mortality of ABBs from crushing. Reduction or elimination of spills has been addressed via engineering and design elements focused on reduction of that risk. Although impacts from spills are considered to be a remote possibility, any impacts to natural resources, including the ABB, associated with an oil spill will be addressed under the Oil Pollution Act, National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300), and the Clean Water Act, or the Natural Resource Damage Assessment and Restoration Program, and/or other appropriate laws and regulations.

7.1.3. Construction Timing

Construction involving ground disturbance will generally take place between November and May to avoid impacts to nesting migratory birds. If construction delays result in activity within the ABB range during the active season, Keystone will coordinate with the Service and implement any measures

recommended to reduce or avoid take, including, conducting ABB surveys or assuming presence if surveys cannot be conducted; mitigation according to the ratios seen in Table 5; and carrion surveys according to the Service's most recent Carrion Survey Protocol.

7.1.4. Delisting During Permit Tenure

If the Covered Species is delisted during the tenure of the Permit, it is expected that such delisting would be made partly in response to mitigation actions performed through funding provided by Keystone. Consequently, Keystone would not seek any mitigation funding refund and operation and maintenance of any established preserves would continue into perpetuity. However, delisting would remove the potential for Project related incidental take to occur, so maintenance activities involving the clearing of vegetation or ground disturbance within Keystone ROW would subsequently be performed without being subject to the prohibitions emplaced previously for the delisted species. Keystone would continue mitigation activities through the 5-year monitoring period for a delisted species so that if the species was subsequently re-listed, take would still be covered by the ITP.

7.1.5. Listing During Permit Tenure

If the bald eagle is relisted or any other species is newly listed, Keystone will evaluate the degree to which the species has potential to be taken by the Covered Activities and what additional measures, if any, Keystone could implement through the HCP to avoid take of the species. Depending on this evaluation, Keystone will decide whether to seek coverage of the species through an amendment to the HCP. Any anticipated impact to bald or golden eagles will require a special use permit under the BGEPA prior to the activity expected to result in take.

7.1.6. Emergency Repairs Requiring Habitat Clearing

An emergency situation could arise that requires Keystone to clear Covered Species habitat from its ROW during the active season. The location and aerial extent of any such clearing cannot be known prior to the occurrence of an emergency. The Service will be notified of any such emergency repairs. For those emergency repairs where time permits, a qualified biologist will inspect the area for carrion and move it according to the Service's most current Carrion Survey Protocol, which is based on the best available scientific and commercial information. Other methods, as recommended by the Service, to reduce direct take will also be implemented. For emergencies that demand the immediate removal of Covered Species habitat, Keystone will submit a report of the clearing of habitat to the Service within 48 hours of performance of the activity. The report will identify the number of acres of habitat that were cleared directly, and the number of acres of habitat expected to be indirectly impacted by the clearing activity. The quantification would follow the methods used by the Service and presented in Section 5.

The only types of emergencies considered herein for which the clearing of Covered Species habitat by Keystone that would be considered a Changed Circumstance are those that create immediate risk to the safety and reliability of the pipeline or to the safety of humans and their property.

7.1.7. Wildfire in ROW

It is possible that a maintenance vehicle travelling the ROW could ignite a wildfire through contact between the catalytic converter or other hot metal parts and underlying grass. This would have a greater likelihood of occurrence during prolonged drought conditions. Such a wildfire could temporarily destroy habitat outside the Permit Area. Keystone is not seeking to cover such habitat fire damage under its Permit. Keystone will to the extent allowed by its control of land damaged by fire, allow habitat for the ABB that is damaged by fire to re-generate. It is assumed that these fires, if they occur, would occur randomly and infrequently. Such a pattern would be similar to natural fire regimes (pre-European colonization) and would therefore not likely lead to permanent habitat degradation. Keystone would report any such fires generated by performance of the Covered Activities to the Service.

If additional conservation and mitigation measures are deemed necessary to respond to changed circumstances and such measures were not provided for in this HCP, the Service will not require any conservation or mitigation measures in addition to those provided for in the HCP without consent of Keystone, provided the HCP is being properly implemented.

Addressing any changes in circumstance that might occur on lands preserved in response to the conservation measures provided by Keystone will be the responsibility of bank operators or the third-party conservation entity entrusted with purchase and management of lands funded by Keystone. It is expected that changed circumstances in conservation areas will be addressed through conservation bank instruments or management plans for non-bank areas managed by a third-party conservation entity.

7.2. UNFORESEEN CIRCUMSTANCES

Unforeseen circumstances are changes in circumstances affecting a species or geographic area covered by an HCP that could not reasonably have been anticipated by the Applicant and the Service at the time of HCP development and Permit issuance, and that result in a substantial and adverse change in the status of the Covered Species. Under the No Surprise rule, with respect to a properly implemented HCP, Keystone will not be required to commit additional land, water, money, or financial compensation, or additional restrictions on land, water, or other natural resources to respond to such unforeseen circumstances beyond the level otherwise agreed upon for the species covered by this HCP without the consent of Keystone. Changes in circumstances not provided for in this document are considered unforeseen circumstances for purposes of this HCP.

No Surprises assurances apply to the listed species that are “adequately covered” under this HCP. Species are considered to be “adequately covered” if the HCP satisfied the Permit issuance criteria contained in Section 10(a)(2)(B) of the ESA with respect to that species. The species considered adequately covered under this HCP and therefore, covered by the Service’s No Surprises policy assurances is the ABB.

In the event that unforeseen circumstances occur during the term of the Permit and the Service concludes that the ABB is being harmed as a result, the Service may require additional measures from Keystone where the operating conservation plan is being properly implemented only if such measures

are limited to modifications within the ROW of the Project and associated above-ground facilities, or to the conservation plan's operating conservation program for the affected species, and maintain the original terms of the HCP to the maximum extent possible. Additional conservation measures will not involve the commitment of additional land, water, or natural resources otherwise available to Keystone under the original terms of the HCP without consent from Keystone.

7.2.1. Effects of Unforeseen Circumstances on Permit

Except as provided above, notwithstanding the occurrence of unforeseen circumstances, as long as Keystone continues to properly implement the provisions of the HCP and any additional measures required by the Service in accordance with Section 12 hereof, the Permit will remain in full force and effect. In the event that any future judicial decision or determination holds that any part of this HCP is unenforceable or enjoined for any reason or to any extent, this HCP shall be enforceable only to the degree allowed by any such decision or determination; provided that the remainder of the Permit and HCP shall remain in full force and effect to the maximum extent permitted by law.

7.2.2. Notice of Unforeseen Circumstances

The Service will have the burden of demonstrating that unforeseen circumstances exist, using the best scientific and commercial data available. The Service shall notify Keystone in writing of any unforeseen circumstances the Service believes to exist.

7.3. AMENDMENT PROCEDURES

It is necessary to establish a procedure whereby the Permit can be amended. However, it is important that the cumulative effect of any amendments will not jeopardize any endangered species or other rare species. Amendments must be evaluated based on their effect on the habitat as a whole. The Service must be consulted on all proposed amendments to operational plans for the Project that may affect any federally listed species. The types of proposed amendments and the applicable amendment procedures are described below.

7.3.1. Minor Amendments

Minor amendments involve routine administrative revisions, changes to operation and maintenance schedules, or minor changes in Project operations that do not diminish the level or means of mitigation or increase in anticipated rates of take. Such minor amendments do not materially alter the terms of the Keystone Permit. Upon written request of Keystone the Service is authorized to approve minor amendments to the HCP.

7.3.2. All Other Amendments

Other amendments may be considered major amendments to the Section 10(a)(1)(B) Permit, which would require additional steps be taken under both NEPA and the ESA.

7.4. REQUESTED PERMIT DURATION

This HCP is written in anticipation of issuance of a 10(a)(1)(B) ITP valid for 50 years covering the construction, operation, maintenance, and repair phases of the Covered Activities and the mitigation activities described in Section 6. The HCP will take effect when the Permit is issued, with take authorizations not valid until mitigation is provided in full for the Covered Species or as agreed upon by the Service and Keystone.

8. FUNDING ASSURANCES

8.1. IMPLEMENTATION COSTS

Keystone has produced and submitted to the Service an itemized summary of the ABB impact minimization and mitigation activities required by this HCP, together with the estimated financial cost required to carry out those activities (the "Implementation Costs"). Keystone has also provided funding assurances, consistent with Sections 8.1.1. and 8.1.2., to ensure that the necessary financial resources are available to implement the HCP (Appendix C). These commitments cover all actions specified under the HCP, including the impact minimization and mitigation measures specified in Section 6 of the HCP.

As further explained below, Keystone is financially capable of ensuring that all Implementation Costs will be funded through the Project's operating budget and Keystone's access to capital. In the event that Keystone's operating budget for the Project and available capital are insufficient to cover the Implementation Costs, funding will be assured through corporate credit facilities.

8.1.1. Operating Budget

Prior to issuance of an ITP, Keystone has estimated the Implementation Costs and will use funds within the Project's operating budget to pay for the Implementation Costs. Keystone's parent company, TransCanada Corporation ("TransCanada"), has allocated $2.3 billion to the Project, and as of June 30, 2012, approximately $900 million has been invested in the Project. Additional information about TransCanada's financial position is available on SEDAR at ***www.sedar.com***, with the U.S. Securities and Exchange Commission on EDGAR at ***www.sec.gov/info/edgar.shtml*** and on the TransCanada website at ***www.transcanada.com***. Keystone and TransCanada are ready, willing, and able to fund the Implementation Costs.

8.1.2. Corporate Credit Facility

TransCanada has the capacity to fund the Project through internally-generated cash flow, access to capital markets (e.g., through the sale of stock or the issuance of bonds), and the ability to borrow funds through committed credit facilities that currently total more than $4 billion. Should Keystone's cash from operations somehow become insufficient to fund the Implementation Costs, TransCanada expects to maintain access to credit facilities sufficient to assure funding of the Implementation Costs. Additional information about TransCanada's capital resources, including corporate credit facilities, is available through the resources referenced in Section 8.1.1.

9. ALTERNATIVES TO THE TAKING

Keystone considered various alternatives that would avoid take of the ABB. These alternatives included re-routing the Project to the west of the current proposed ROW. This alternative would have avoided take of the ABB but may have resulted in take of other listed species. Furthermore, re-routing to the west would have added significantly to the cost of the Project and would add significant miles to the route when the least environmental impact would be to reduce mileage. The exact cost of re-routes and species that may have been affected cannot be accurately estimated because an alternative route has not been identified. The selection of pipeline routes is a complex process that involves consideration of a wide range of factors in addition to impacts to listed species. Design alternatives, such as elevating the pipeline, may have removed some minor negative effects (i.e., soil heating) but would not have significantly reduced ground disturbance associated with construction or fragmentation of habitat. Additionally, construction of an elevated pipeline would most likely have resulted in a greater area of permanent ABB habitat loss because of the placement of piers or other supports required to elevate the pipe. Similarly, elevated pipe may have resulted in take of other listed species. Elevating pipelines is not a construction technique typically employed for safety and reliability reasons. Finally, a "no action" alternative would be for Keystone to not construct the pipeline; however, this alternative would not meet Keystone's purpose and need of the Project.

10. SUCH OTHER MEASURES THAT THE SERVICE MAY REQUIRE

If a dead, injured, or sick ABB, bald eagle, or any other endangered or threatened species is discovered, Keystone is required to contact the Service's Law Enforcement Office in Tulsa, Oklahoma for care and disposition instructions. Extreme care will be taken in handling sick or injured individuals to ensure effective and proper treatment. Care will also be taken in handling dead specimens to preserve biological materials in the best possible state for analysis for cause of death. In conjunction with the care of sick or injured endangered or threatened species or preservation of biological materials from a dead specimen, Keystone and its contractor/subcontractor have the responsibility to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

If during the tenure of this Permit the Covered Activities are altered such that there may be an increase in the anticipated take of the Covered Species, Keystone is required to contact the Service and obtain authorization and/or amendment of the Permit before commencing any construction or other activities that might result in take beyond that described in the HCP.

The authorization granted by the Permit will be subject to full and complete compliance with, and implementation of, the HCP and all specific conditions contained in the Permit. The Permit terms and conditions shall supersede and take precedence over any inconsistent provisions in the HCP or other Permit documents.

Acceptance of the Permit serves as evidence that Keystone understands and agrees to abide by the terms of the Permit and all applicable Sections of Title 50 Code of Federal Regulations Parts 13 and 17 pertinent to issued permits.

11. PUBLIC AND AGENCY PARTICIPATION

Keystone has been actively pursuing public and agency input on the Project. This includes meeting with concerned groups, individuals, public officials, and agencies to properly coordinate this proposed action with all potentially concerned entities. Public scoping meetings for the NEPA analysis were not required for this Project.

Additionally, the following agencies, organizations, and individuals have been consulted or coordinated with during the process of addressing endangered species concerns for the Project.

- **exp** Energy Services, Inc., Tallahassee, FL and Houston, TX
- Enercon Services, Inc., Oklahoma City, OK
- USFWS, Albuquerque, NM
- USFWS, Tulsa, OK

This document was originally prepared by Enercon Services, Inc. and **exp** Energy Services, Inc. on behalf of Keystone and developed through coordination with the Service.

12. CONCLUSION

Keystone looks forward to working with the Service throughout the approval and long-term implementation of the HCP for the Project. Keystone is committed to minimizing and mitigating for the impacts of the taking to the Covered Species to the maximum extent practicable and to avoid and minimize impacts to Evaluation Species as evaluated and determined through the HCP process.

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