ENVIRONMENTAL CONSEQUENCES

CHAPTER 4

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Analysis and Assumptions

Assumptions

For the purpose of analysis, the following assumptions were made:

1. Keystone's construction, operation, and reclamation methods and environmental protection measures contained in the Construction, Mitigation, and Reclamation Plan (Plan) (Appendix E) will be implemented on all land ownership (federal, state, and private) unless specific exceptions are stated. Individual landowners may include specific construction and reclamation requirements in ROW agreements with Keystone. These site-specific requirements are likely to result in similar or less environmental impacts than discussed here.

2. Keystone will acquire all necessary federal, state, and local permits and approvals to construct and operate the Keystone system (not including powerlines, which will be controlled and operated by power companies), regardless of whether these permits and approvals are listed.

Guidelines

1. For the Proposed Action and all alternatives, the term "Construction Phase" is defined fully in Chapter 2.0. Activities in this phase include the surface-disturbing activities needed to construct the pipeline, pump stations, lateral tie-ins, pigging stations, valves, and permanent access roads so that the pipeline system can be placed into service. It also includes reclamation activities for areas where the surface has been disturbed.

2. For the Proposed Action and all alternatives, the term "Operation Phase" is defined fully in Chapter 2.0. Activities in this phase include the transportation of crude oil in the Keystone pipeline system. This definition also includes normal operations, routine pipeline ground and aerial inspections, emergency response activities, future routine internal and external integrity inspections and repairs along short segments of the entire pipeline, and future reclamation activities such as reseeding and repair of erosion control structures.

3. Prior to abandonment, Keystone will coordinate with appropriate federal and state land management agencies to ensure that abandonment procedures follow agency-approved procedures at that time.

4. For all resources, unless specific exceptions are stated, short-term impacts are those that will occur over a five-year period or less, while long-term impacts are those that exceed five years.

5. Keystone's committed environmental protection measures included in the Plan (Appendix E) were used to evaluate environmental impacts.

4.2 Proposed Action

4.2.1 Air Quality

Issues

- Fugitive dust generation from pipeline construction equipment and unpaved road traffic;
- Hydrocarbon combustion emissions from construction equipment; and
- Fugitive emissions from pump stations and valves.

Construction

The quantity of fugitive dust (particulate matter) generated by construction is dependent on the area of surface disturbance and the type of equipment causing surface disturbance. Local dust concentrations increase as the silt fraction in the soil increases and as excavation and clearing equipment increase in size. A general particulate matter (PM_{10}) emissions factor for all types of construction activity is 0.11 ton per acre per month (South Coast Air Quality Management District 1996). The majority of pipeline construction activities will pass by a specific location within a 30-day period, resulting in temporary increases in hydrocarbon combustion emissions (nitrogen oxides, carbon monoxide) and local airborne particulate matter concentrations. All states crossed by the project are in attainment for PM_{10}. No dust control or mobile emissions permits from state agencies will be required.

Keystone will limit dust impacts in residential and commercial areas adjacent to pipeline construction by utilizing dust minimization techniques (primarily watering disturbed surfaces) in accordance with the Plan (Appendix E). Wind-generated dust after construction will be controlled utilizing land surface reclamation measures outlined in the Plan.

Operation

All pipeline pumps will be electrical and no storage tanks will be installed at any location along the pipeline. As a consequence, there will be no long-term hydrocarbon emissions from project operations except for very small fugitive emissions from valves and pumping equipment.

4.2.2 Geology, Minerals, and Paleontology

Issues

- Disturbance of unique geological features that are protected under state or federal programs;
- Loss of access to underlying mineral resources from installation of pipeline facilities; and
- Potential loss of vertebrate or invertebrate fossils that are considered by paleontologists to have scientific importance.

Construction

No unique geological features that have received state or federal protection will be disturbed by project facilities.

The proposed pipeline route does not cross any active quarries or mines. A pipeline (or other utility) may preclude or interfere with the future extraction of underlying mineral resources. The proposed route crosses sand, gravel, clay, and stone deposits in North Dakota, South Dakota, and Nebraska where the proposed route is not adjacent to an existing ROW corridor. Glacial sand and gravel deposits occur over a large area within these states and loss of access to underlying deposits will be very small relative to the available mineral

materials supply. In Kansas, Missouri, and Illinois, the route will be in or adjacent to an existing pipeline corridor that already precludes development of mineral resources.

The proposed route crosses an area in Madison County, Illinois where coal historically has been mined with underground methods (Illinois Geological Survey 2004). It is possible that surface mining methods will be used to extract shallow coal seams underlying the pipeline. If a new surface mining proposal in this area were approved in the future, the presence of a pipeline could serve as an impediment or complication to such a proposal. However, the Keystone pipeline route follows existing pipelines within Illinois and, as such, does not represent a significant new impediment to any such development

The proposed route does not cross the wellpads of any active oil and gas wells. Future wells can be located to avoid the pipeline ROW so that extraction of these resources will not be precluded.

There is the potential for discovery of Pleistocene-era mammal fossils during pipeline grading and trenching where the proposed route crosses continental glacial drift in North Dakota, South Dakota, Nebraska, and Missouri. Any mammalian fossils incidentally excavated during pipeline construction will not be recovered or studied for the scientific record.

Where karst terrain is present near the surface or suspected to be near the surface, Keystone will conduct studies necessary to characterize the karst features and evaluate effects on construction techniques. Generally this will only be an issue where deep horizontal directional drilling is proposed at major water crossings.

Operation

No additional disturbance or loss of unique geological features, mineral resources, or scientifically important fossils will occur because there will be no additional surface disturbance required.

4.2.3 Soils

Issues

- Accelerated wind or water erosion on disturbed areas during construction and operation (including maintenance activities);
- Reduced soil quality and corresponding reductions in the productivity of desirable vegetation or crops as a result of accelerated erosion, soil mixing, compaction, spills, or disturbance of irrigation or drainage features; and
- Hydrocarbon contaminated soils encountered within the pipeline trench caused by leaks and spills from adjacent pipelines.

Construction

Grading and excavating for the proposed pipeline and ancillary facilities will disturb a variety of agricultural, rangeland, wetland, and forestland soils. Certain inherent soil characteristics influence the agricultural productivity and revegetation potential after disturbance. The major soil characteristics of concern are indicated in **Table 4.2-1**, as well as with their extent along the proposed route in each state. The quantification of acreage for each of the characteristics is based on data in the STATSGO general soils mapping database.

Table 4.2-1 Acreage Summary, Soil Characteristics of Concern

State/ County	Total Acres[1]	Highly Erodible Water[2]	Prime Farmland[3]	Hydric[4]	Compaction Prone[5]	Stony – Rocky[6]	Shallow Bedrock[7]	Droughty[8]
KEYSTONE MAINLINE								
North Dakota	3,343	270	1,607	392	198	39	45	0.0
South Dakota	3,099	167	6	383	398	21	4	0.0
Nebraska	3,027	625	1,906	126	154	7	30	0.0
Kansas	1,402	351	642	16	105	3	22	0.0
Missouri	3,936	728	2,069	803	2,054	260	271	0.0
Illinois	736	57	537	218	454	1	5	0.0
Keystone Mainline Subtotal[9]	15,243	2,198	8,237	1,938	3,363	533	373	0.0
CUSHING EXTENSION								
Nebraska	35	15	30	0	0	0.0	0.0	0.0
Kansas	2,968	182	2,221	20	155	138	536	0.0
Oklahoma	1,155	63	770	<1	5	113	150	0.0
Cushing Extension Subtotal[9]	4,158	260	3,012	20	160	251	686	0.0
Project Total	19,401	2,458	11,248	1,959	3,522	582	1,059	0.0

[1]Based on a total of 110-foot-wide ROW for 30- and 36-inch pipe and a 95-foot-wide ROW for 24-inch pipeline during construction, except in certain wetlands and as agreed with landowners, in shelterbelts and other forested areas, and commercial/industrial areas where an 85-foot-wide construction ROW will be used, or in areas requiring extra width for workspace necessitated by site conditions. Acreage does not account for 1,820 acres associated with pipe storage/contractor yards or disturbance associated with transmission lines or access roads. Individual soils may occur in more than one characteristic class.

[2]Includes soils listed as identified by a STATSGO database search.

[3]Includes land listed by the NRCS (1995) as potential prime farmland if adequate protection from flooding and adequate drainage are provided.

[4]As designated by the NRCS (1995).

[5]Includes soils that have clay loam or finer textures in somewhat poor, poor, and very poor drainage classes.

[6]Includes soils that have either: 1) a cobbly, stony, bouldery, gravelly, or shaly modifier to the textural class, or 2) have >five percent (weight basis) of stones larger than three inches in the surface layer.

[7]Includes soils that have bedrock within 60 inches of the soil surface.

[8]Includes coarse-textured soils (sandy loams and coarser) that are moderately well to excessively drained.

[9]Discrepancies in acreage totals are due to rounding.

Approximately 14 percent of the overall project surface disturbance will affect soils that are highly erodible by water. The hilly portions of Kansas and Missouri will be particularly susceptible to accelerated sheet erosion, rilling, or gullying.

Overall, approximately half of the proposed route crosses soils designated by the NRCS as prime farmland. Prime farmland is particularly extensive in Illinois. These soils typically possess the most favorable qualities for agricultural production (e.g., fertility, structure, depth and waterholding capacity, microbial populations, infiltration and percolation rates, slope, and drainage). Short-term impacts such as soil compaction from equipment traffic, excavation and handling, and spills of fuels and lubricants may alter the capability of these soils temporarily following construction.

Hydric soils generally are defined as those that have evidence of saturation within 12 inches of the land surface for an extended period of time during the growing season. Approximately 13 percent of the overall proposed route is occupied by soils that fit this description, with the most notable occurrences in the Dakotas, Missouri, and Illinois. The presence of a hydric soil is often associated with native wetland hydrology and vegetation or with agricultural (farmed) wetlands. Both compaction-prone and hydric soils are especially prone to structural and aeration damage when trafficked or excavated. Soil compaction to a degree that will adversely affect backfilling and restoration efforts will be most likely to occur during wet conditions. In some of these areas, drain tile systems may exist which could be disturbed by project construction. Acceptable clay texture soil replacement may be more difficult due to the presence of large clods or blocks of soil materials.

Stony or rocky soils associated with glacial till will be crossed in North Dakota and near-surface bedrock will be crossed in Missouri. Revegetation recovery rates may be slow in these areas. Similarly, in areas of shallow bedrock (relative to the trench excavation depth), excavation may result in rock fragments remaining on the surface or within the trench backfill at levels that will limit the success of restoration efforts. This will be a particular issue in Missouri where this soil limitation occurs along about nine percent of the proposed route.

Although droughty soils were not identified as present along the proposed route on the basis of inquiries of the STATSGO database, it is likely that small, scattered areas of droughty soils will be crossed. Similarly, scattered areas of saline and/or sodic soils are known to occur in the project region generally from Kansas northward. Droughty soils will be prone to wind erosion during construction and will be more difficult to successfully stabilize and revegetate following construction. Saline and/or sodic soils often have drainage limitations and may undergo compaction impacts similar to the hydric or compaction–prone soils. In addition, the success of stabilization and restoration efforts in these areas may be limited unless additional treatments and practices are employed to offset the adverse physical and chemical characteristics of the soils.

Potential impacts to soils will be minimized or mitigated by the soil protection measures identified in the Plan. The measures include procedures for segregating and replacing topsoil, trench backfilling, relieving areas compacted by heavy equipment, removing surface rock fragments, and implementing water and wind erosion control practices. In addition, Keystone will work closely with landowners and soil conservation agencies to identify and implement recommended soil conservation practices in specific areas where they are needed. Damaged irrigation and tile drainage systems will be repaired in accordance with the Plan.

To accommodate potential discoveries of contaminated soils, Keystone will develop unanticipated contaminated soil discovery procedures in consultation with relevant agencies. These procedures will be added to the Plan. If hydrocarbon contaminated soils are encountered during trench excavation, the state agency responsible for emergency response and site remediation will be contacted immediately. A remediation plan of action will be developed in consultation with that agency. Depending on the level of contamination found, affected soil may be replaced in the trench or removed to an approved landfill for disposal.

Operation

Very small scale, isolated surface disturbance impacts resulting in accelerated erosion, soil compaction, spills, and related reductions in the productivity of desirable vegetation or crops could result from pipeline maintenance traffic and incidental repairs. Impacts related to excavation and topsoil handling are not likely to occur. If they do occur, they will be limited to small areas where certain pipeline maintenance activities take place.

4.2.4 Water Resources

4.2.4.1 Surface Water

Issues

- Water quality degradation from temporary increases in suspended solids concentrations during in-stream construction activities or erosion from disturbed lands;
- Increased sedimentation in streams resulting from in-stream construction or nearby activities;
- Channel and bank modifications that affect channel morphology and stability;
- Reduced flows in streams where water is withdrawn for hydrostatic testing; and
- Water quality degradation in streams, lakes, impoundments, or surface water-based public water supplies from pipeline spills or leaks, or from spills or leaks of fuel, lubricants, or hazardous materials during construction or operations.

Construction

Waterbody Crossings

Depending upon the construction technique used, the installation of the pipeline across water bodies can cause the following impacts:

- Temporary degradation of water quality in the form of increased suspended solids concentrations
- Sedimentation (deposition of solids introduced into suspension by construction activities)
- Channel and bank modifications.

As described in Section 2.1.8, Keystone is proposing the following water crossing techniques:

- Horizontal Directional Drilling (HDD)
- Open Cut Wet Crossings
- Open Cut Dry Flumed Crossing
- Open Cut Dry Dam and Pump Crossing

Keystone is proposing to utilize HDD at nine major river crossings (two Missouri River, one Platte River, one Chariton River, two Cuivre River, one Mississippi River, one Hurricane Creek, and one Kaskaskia River crossings). Since HDD does not involve any intended direct contact with the water body, channel bed, or banks, no impact is expected at these crossings. At present, Keystone is proposing open cut wet crossings at the remainder of the crossings. Open cut wet crossings involve the direct excavation of the channel and banks in contact with any flow present. Additional HDD or dry crossing procedures may be considered at some of these proposed open cut crossings pending determination of crossing-specific resources (aquatic life), which may warrant extraordinary mitigation. At open cut wet crossings the extent of increased suspended solids concentrations and downstream sedimentation impacts will depend on the flow conditions at the time of construction and the channel substrate. Measures related to managing spoil, timing, access, and equipment are included in the Plan. These measures will limit impacts of increased suspended solids concentrations and downstream sedimentation. Most open cut crossings will be completed in 48 hours or less. Larger open cut crossings may take upwards of seven to 10 days.

Runoff and the resulting erosion of lands adjacent to water bodies can lead to the introduction of solids into suspension and the deposition of sediment in-stream. The Plan includes extensive procedures to limit the extent of disturbed land adjacent to water bodies, to control erosion, and methods to prevent sediments from entering water bodies or wetlands. These measures include Best Management Practices (BMPs), such as clearing limits, buffer strips, drainage diversion structures, and sediment barrier installations. In accordance with the Clean Water Act (CWA), Keystone will comply with the National Pollutant Discharge Elimination System (NPDES) permit process with respect to pipeline construction and operation. Keystone will develop and file a Storm Water Pollution Prevention Plan (SWPPP) as part of the NPDES permitting effort. This plan will include BMPs to minimize soil erosion and sedimentation.

Open cut crossings will involve disturbance of stream banks and channel bottoms. The Plan includes procedures for limiting the extent of this disturbance and the restoration of disturbed areas. Restoration includes grading, stabilization, and revetment BMPs. These BMP's embrace bioengineering concepts, which encourage the restoration of natural streambanks.

The pipeline will be constructed under flood management structures (levees and drainage ditches) as well as river channels with potential for lateral scour. The pipeline will be buried at an adequate depth under channels, adjacent floodplains, and flood protection levees to avoid pipe exposure caused by channel degradation and lateral scour. Determination of the pipeline burial depth will be based on site-specific channel and hydrologic investigations where deemed necessary. Rivers that exhibit highly modified channels and extensive levee systems include the Chariton and Cuivre rivers in Missouri.

Geotechnical explorations have been initiated to define the subsurface conditions in areas to be crossed by HDD. Preliminary site-specific crossing plans, including initial results from geotechnical information, are provided in Appendix D.

Hydrostatic Test Water Withdrawal and Discharge

Depending on locations, state requirements, and availability, water will be obtained and withdrawn from nearby streams or privately owned reservoirs. Recycling water between test sections will reduce withdrawal volumes. In its preliminary hydrostatic test water management plan, Keystone has identified 29 surface water sources which could provide hydrostatic test water, depending on the flows at the time of testing and the sensitivity of the individual water bodies for other uses.

Water used for hydrostatic testing of the pipeline will be obtained from surface water resources. The volume for a 50-mile test section of 30-inch pipeline is approximately 90 million gallons. Withdrawal rates and volumes will be designed to avoid impacts to aquatic life and downstream water users. Hydrostatic test water will be discharged to the land surface at an approved location. Discharged water may evaporate or infiltrate into the soil or drainage where the water is released.

If water is withdrawn from a sensitive surface water source during a low-flow period or at a time when particular flow ranges are needed for other uses, habitat reductions for water-dependent resources (e.g., fisheries, aquatic invertebrates) could occur. A similar effect on surface water resources could occur if large withdrawals are made from aquifer zones that provide late-season baseflows to streams.

In accordance with the Plan, hydrostatic test water withdrawals from surface waterbodies will be made at controlled rates and with equipment that will minimize impacts on stream beds and aquatic life. Keystone will coordinate with federal and state agencies to further identify such water sources and seasonal concerns. Similarly, discharges of hydrostatic testing waters will be made such that water quality requirements are met. Discharge controls will include restrictions on pipeline dewatering rates, velocity control devices (such as splash pups or diffusers) and/or temporary synthetic channel linings.

Water quality will not be reduced by pipe cleaning or hydrostatic test waters because discharged water will be required to meet water quality standards imposed by the discharge permits issued by the individual states for the permitted discharge locations. Water discharge rates will not exceed the daily discharge criteria referenced in the permits.

Spill Prevention

Refueling and lubricating of most construction equipment will be restricted to upland areas at least 100 feet away from the edge of any streams, wetlands, ditches, and other waterbodies and at least 150 feet away from groundwater wells. Wheeled and tracked construction equipment will be moved to an upland area more than 100 feet away from streams, wetlands, ditches, and other waterbodies for refueling when necessary. Fuels and lubricants will be stored in designated areas and in appropriate service vehicles. Whenever possible, storage sites for fuels, other petroleum products, chemicals, and hazardous materials, including wastes will be located in uplands or at least 100 feet from waterbodies and wetlands. SPCC procedures are described in the Plan and will be implemented in the various states in compliance with 40 CFR 112 (for oil spills) and corresponding state regulations (including NPDES requirements for spills of other substances that may occur during construction activities).

In a few cases, such as for pumps or directional drill equipment located within or near a waterbody or wetland, refueling will be completed within or near a waterbody or wetland. In these situations, the specific measures identified in the SPCC portion of the Plan will be followed.

Operation

Normal operations will not adversely affect water resources. Minor surface disturbance activities from pipeline inspection and maintenance may occur infrequently and at widely spaced locations.

The USDOT prescribes pipeline design and operational requirements that limit the risk of accidental crude oil releases (leaks or spills) from pipelines. Over the operational life of the Keystone pipeline there will be a very low likelihood of a crude oil release (leak or spill) from the pipeline that could enter surface water resources and drinking water supplies. On July 1, 2006, Keystone submitted two key documents to the Department of State: a preliminary ERP and a preliminary pipeline risk assessment. The ERP outlines the measures that Keystone will implement in the event of an accident. The preliminary risk assessment evaluates accidental release of crude oil from the pipeline. The assessment included the likelihood of crude oil releases and potential for environmental affects, depending upon release volumes and locations. Based on refinements of the route, hydraulic models, and additional engineering information, an updated risk assessment will be submitted to the Department of State by the first quarter of 2007.

To reduce the amount of product that could enter surface waters, federal regulation (49 CFR 195.260(3)) stipulates that new pipelines must have valves installed on both sides of any waterbody, which has at least a 100-foot width between ordinary high water marks. According to the OPS, intermittent and ephemeral streams are not considered waterbodies. In general, wetlands also are not considered by the OPS to be waterbodies. Consequently, valves are required by OPS for the larger perennial streams. Keystone will comply with these OPS requirements. Valve locations in addition to those required for major waterbody crossings are described in Chapter 2.0. These additional valves will further aid in minimizing the amount of material, which could be released into other waterbodies in the unlikely event of a spill. The location of valves, spill containment measures, and Keystone's ERP will minimize adverse effects to perennial, intermittent, and ephemeral waterbodies, as well as to groundwater.

4.2.4.2 Groundwater

Issues

- Groundwater quality degradation during or after construction from disposal of materials, pipeline spills, or leaks that seep into shallow aquifers used for domestic, agricultural, or public water supplies.

Construction

Reductions in groundwater quality from spills, leaks, or disposal practices are not anticipated during construction. Most of the aquifers along the route will be at least temporarily isolated from any spills on the land surface and attending personnel will be able to respond to an incident before contaminants migrate into groundwater. In areas with near-surface groundwater or in areas adjacent to surface waterbodies, additional procedures and measures will be implemented as presented in Chapter 2.0 and in the Plan.

Operation

While routine operation of the Keystone Pipeline and ancillary facilities will not affect groundwater resources, there is the possibility that a crude oil release could migrate through near-surface materials and enter a water-bearing zone or system. Public water supply wells were identified within 300 feet of the proposed pipeline centerline in Seward and Jefferson counties, Nebraska, and Chariton County, Missouri.

The USDOT prescribes pipeline design and operational requirements that limit the risk of accidental crude oil releases (leaks or spills) from pipelines. Over the operational life of the Keystone pipeline, there will be a very low likelihood of a crude oil release from the pipeline that could enter water supply aquifers. On July 1, 2006, Keystone submitted two key documents to the Department of State: a preliminary ERP and a preliminary pipeline risk assessment. The ERP outlines the measures that Keystone will implement in the event of an accident. The preliminary risk assessment evaluates accidental release of crude oil from the pipeline. The assessment included the likelihood of crude oil releases and potential for environmental affects, depending upon release volumes and locations. Based on refinements of the route, hydraulic models, and additional engineering information, an updated risk assessment will be submitted to the Department of State by the first quarter of 2007.

4.2.4.3 Wetlands

Issues

- Potential modifications in wetland productivity because of modifications to surface and subsurface flow patterns from pipeline construction;
- Temporary and permanent modifications in wetland vegetation community composition and structure from clearing and operational maintenance;
- Loss of wetlands due to backfilling or draining;
- Wetland soil disturbance;
- A temporary increase in turbidity and fluctuations in wetland hydrology; and
- Construction through prairie pothole areas could affect the water retaining substrate in these wetlands and result in permanent alterations to their water holding capacity.

Construction

Based on 2006 field survey results and photointerpretation, less than three percent (67 miles) of the proposed pipeline route will cross wetlands. Of this total there are approximately 46.2 miles of palustrine emergent

wetlands (marshlands and meadows), 9.1 miles of palustrine forested wetlands (riparian woodlands), 2.3 miles of palustrine scrub-shrub, and 9.9 miles of stream channels and open water. None of the proposed pump stations will be located in wetlands, based on NWI mapping.

Effects on wetland vegetation will be greatest during and immediately following construction. To mitigate the potential for these impacts, Keystone will implement procedures as outlined in the Plan.

The construction ROW width will be reduced to 85 feet through certain wetlands to minimize potential effects. Keystone will restore or mitigate impacts to wetlands affected by construction activities, to the extent practicable. Pipeline construction through wetlands must comply, at a minimum, with USACE Section 404 permit conditions. Section 404(b)(1) guidelines restrict the discharge of dredged or fill material into wetland areas where a less environmentally damaging practicable alternative exists.

The larger river crossings, such as the Missouri and Mississippi rivers, will be horizontally directionally drilled. Streamside wetlands or floodplain forests associated with these areas will not be affected. Smaller streams and ephemeral or intermittent drainages will likely be open cut and wetlands located in these areas will be crossed by trenching. No permanent loss of wetlands will occur as a result of this project; however, approximately 55 acres of forested wetland will be permanently converted to herbaceous wetland. Herbaceous vegetation in palustrine emergent wetlands is expected to reestablish to pre-construction levels within three to five years following the completion of reclamation, resulting in a short-term loss of vegetation and available habitat for some wildlife species. Trees in forested wetlands will recover in 20 to 50 years.

As described in the Plan, specific construction techniques will be used to retain the hydrological and vegetation characteristics of wetlands that will be disturbed by construction. These techniques will include segregation and replacement of wetland soils (except in areas of standing water, saturated wetlands, or where no topsoil is evident) so that soil profiles and native vegetation seed and rootstock will be reestablished to help ensure successful restoration and reestablishment of local drainage patterns to restore existing surface and subsurface water flow patterns.

Operation

Woody vegetation in forested wetlands will be removed periodically above the pipeline (approximately 15 feet on each side of the centerline) to maintain visibility of the area above the pipeline for aerial pipeline observation and to permit access to all areas along the pipeline in the event of an emergency

4.2.4.4 Vegetation

Issues

- Removal of vegetation from the ROW and ancillary facility areas during construction (with a consequent reduction in wildlife habitat and forage productivity and an increased risk of soil erosion and weed invasion);
- Alteration of existing vegetative communities as a result of ROW maintenance (e.g., removal of trees from wooded areas);
- Loss of sensitive plant individuals and habitat as a result of construction clearing and grading; and
- A potential expansion of invasive and noxious weed populations along the pipeline ROW as a result of construction.

Construction

Vegetation Communities

During construction of the Keystone Pipeline Project, vegetation will be cleared from the construction ROW and re-established following construction. Sites for ancillary facilities (e.g., pump stations) that will remain cleared for the life of the project. Approximately 62 percent of the disturbance associated with project construction will occur on agricultural lands, which typically are disturbed annually during planting operations (see Section 4.2.6, **Tables 4.2-4** and **4.2-5**). Other affected vegetation communities include rangeland (consisting of native prairie and seeded pastureland-19 percent), forested woodlands (four percent), and wetlands (five percent). Potential impacts to wetlands are discussed under Section 4.2.4, Water Resources.

Pipeline construction will involve both the temporary and permanent alteration of vegetation through ROW preparation and excavation, high traffic activity, and the clearing of shrubs and trees. There will be minimal change to agricultural lands since these areas will be revegetated and maintained in vegetative cover similar to that found before construction.

Vegetation recovery rates are estimated to be one to five years for herbaceous components, five to 15 years for low shrubs, and 20 or more years for woodlands (depending on their age and species). The reestablishment of pastures, rotated croplands, and open grassland range following construction is expected to take approximately one to five years.

Reclamation, native species revegetation, and revegetation success monitoring, as outlined in the Plan, will be completed for disturbed areas within the construction ROW after pipeline construction activities are completed. Under normal to above-normal precipitation conditions, vegetative cover in the reclaimed areas will consist primarily of herbaceous planted and weedy species after one to three years. Approximately three to five years after reclamation, vegetative cover in reclaimed areas will consist primarily of desirable species (i.e., species in the reclamation seed mixture), with a minor component of weedy species. Reclamation success is dependent upon several variables including soil preparation, season of seed application, and precipitation levels after seed application.

Long-term impacts to vegetation include the loss of woody species (i.e., evergreen and deciduous trees and shrub species) during clearing activities. The permanent ROW will be maintained free of trees for the life of the project. Within that permanent ROW, a 30-foot-wide corridor, centered on the pipeline, will be maintained solely in a herbaceous condition. Trees and shrubs will be removed during clearing activities and converted to early successional herbaceous and grassland communities. Trees and shrubs eventually will reinvade the temporary easement area after construction. However, shrubs will not become reestablished in the temporary easement area naturally for approximately five years or more and trees will require a minimum of 20 years or more, depending on species and age of woodlands cleared.

Based on the Plan, Keystone will monitor revegetation success along the pipeline ROW until revegetation is successful. Revegetation will be considered successful if, upon visual survey, the density and cover of non-nuisance vegetation are similar in density and cover to adjacent undisturbed lands. In agricultural areas, revegetation will be considered successful if crop yields are similar to adjacent undisturbed portions of the same field. Reseeding will be based upon reclamation success and natural rainfall amounts received in the years following revegetation efforts.

Keystone will use seed mixtures approved by the NRCS in each affected county. On federal lands, Keystone will use seed mixtures approved by the appropriate agencies. Consequently, the various vegetation types altered by the proposed pipeline, other than forested communities, are expected to return rapidly to near pre-project conditions. Impacts that may occur if desirable plant species are not established in the ROW within a short period of time include higher soil erosion rates, increases in weedy species, and reduced forage production.

Sensitive Plant Species

A total of 63 plant species (nine special status species and 54 species of special concern) have been identified as potentially occurring within the project area, based on preliminary response from state and federal agencies. Of these, five are federally listed threatened and endangered plant species (Decurrent false aster, eastern prairie fringed orchid, western prairie fringed orchid, prairie bush-clover, running buffalo clover). The federally listed species are generally associated with native prairie or wetland/riparian habitats.

Decurrent false aster is known to grow in the Mississippi River floodplain in the eastern half of St. Charles County, Missouri. Clearance surveys will be conducted during the August-to-October flowering period to ensure its lack of presence prior to construction. If a population were located within the construction ROW, suitable mitigation measures will be developed in consultation with the USFWS.

A number of occurrences of state-listed threatened or endangered species or species of special concern have been identified by state NHPs as occurring near or within the proposed route. For plants, most of these species are state-listed as threatened or endangered or species of concern that may be rare within a given state but have relatively secure populations elsewhere. However, some species also may be globally rare, such that disturbance of a local population through construction could result in extirpation of a remnant population and contribute to a trend toward listing as federal threatened and endangered. The required level of field survey for state-listed species and recommendations for their protection have not yet been determined.

Noxious and Invasive Plant Species

Construction surface disturbance could contribute to the introduction of noxious and invasive weed species and other undesirable plant species. These species are fast-growing and could displace native species and inhibit the establishment of native grass, forb, and shrub species. Increases in noxious and invasive weed species are particularly serious within wetland areas and other sensitive plant communities. Typical locations for noxious weed infestations are riparian zones, livestock concentration areas, roads and highways, and disturbed soils.

Despite efforts to prevent the spread of noxious weeds, it is possible that pipeline construction, operation, and maintenance activities will increase the prevalence of noxious weeds along the pipeline ROW or that weeds will be transported into areas that are relatively weed-free. Over the long-term, it is expected that noxious weeds will continue to spread within previously disturbed areas due to grazing, seed dispersion by livestock, and the overall competitive advantages of weeds over native species.

The Plan provides weed control measures that the project will implement throughout the project areas to minimize the spread and establishment of noxious and invasive species.

Operation

Pipeline operation and maintenance will have minimal impact to revegetated areas. Maintenance impacts will be limited to infrequent traffic along the pipeline ROW. Routine vegetation clearing generally will not occur more frequently than every three years.

The USDOT prescribes pipeline design and operational requirements that limit the risk of accidental crude oil releases (leaks or spills) from pipelines. Over the operational life of the Keystone pipeline, there will be a very low likelihood of a crude oil release from the pipeline which could injure terrestrial vegetation. On July 1, 2006, Keystone submitted two key documents to the Department of State: a preliminary ERP and a preliminary pipeline risk assessment. The ERP outlines the measures that Keystone will implement in the event of an accident. The preliminary risk assessment evaluates accidental release of crude oil from the pipeline. The assessment included the likelihood of crude oil releases and potential for environmental affects, depending upon release volumes and locations. Based on refinements of the route, hydraulic models, and additional

engineering information, an updated risk assessment will be submitted to the Department of State by the first quarter of 2007.

4.2.5 Wildlife, Aquatic Resources, and Sensitive Species

4.2.5.1 Terrestrial Wildlife

Issues

- Habitat loss or alteration and incremental habitat fragmentation;
- Loss of breeding success from exposure to construction and operational noise and from higher levels of human activity;
- Limited direct mortalities from project construction and operation; and
- The potential loss of individuals from exposures to accidental crude oil releases.

Construction

Wildlife Habitat

About 62 percent of the approximately 21,000 acres necessary for construction of the pipeline and ancillary facilities will consist of agricultural land that is tilled annually (see Section 4.2.6, **Tables 4.2-3**). Rangeland, forestland, and wetlands together constitute about 28 percent of the total disturbance. Due to the linear nature of the project over a large geographic area (approximately 1,350 linear miles), these acreages will represent far less than one percent of available wildlife habitat on a regional basis. In addition, the effects of long-term habitat loss on native wildlife populations will be relatively small since the majority of habitat disturbance will be located in agricultural habitats.

Agricultural lands will continue to be used for pre-construction uses while native habitats will be reclaimed to primarily herbaceous communities using appropriate seed mixes prescribed by local, state and federal agencies. Loss of shrub communities will be long-term (five to 20 years or more) within reclaimed areas of the construction ROW since these communities will become reestablished through the natural reinvasion of woody species. Loss of woodland vegetation will be permanent since trees will not be allowed to reestablish above the pipeline centerline. Habitat losses also will be long term at permanent aboveground pipeline facility locations such as pump stations and access roads.

Pipeline construction will result in the short-term disturbance and long-term habitat modification of 11 acres in the Pigeon Hill State Wildlife Area in Buchanan County, Missouri, and 33 acres in the Carlyle Wildlife Management Area in Fayette County, Illinois. Long-term conversion of wooded habitats to herbaceous communities will result in an incremental increase in habitat fragmentation in these state wildlife management areas but habitat conversion also could increase habitat diversity, depending on the extent of habitats affected and the extent and distribution of undisturbed habitats remaining in the state wildlife areas. Construction during the fall hunting seasons will create conflicts with hunter use of these areas.

Big Game Species

Project construction will affect only a single big game species, white-tailed deer, since the ranges of other potential big game species are very peripheral to the project area and impacts to these wide-ranging species will be negligible or non-existent. Impacts to white-tailed deer will include the incremental loss of potential forage (native vegetation and croplands) and will result in an incremental increase in habitat fragmentation within the proposed surface disturbance areas. However, these incremental losses of vegetation will represent a small percentage (far less than one percent) of the overall available habitat within the project region. No sensitive habitats for white-tailed deer have been identified along the proposed route.

Indirect impacts will result from increased noise levels and human presence during surface disturbance activities. Because white-tailed deer have adapted to human activities and land uses, displacement from construction areas are likely to be short-term.

Small Game Species

Potential direct impacts to small game species could include nest or burrow abandonment or loss of eggs or young where construction occurs during the breeding season. Of greatest concern is the potential for loss of waterfowl nests if pipeline construction occurs in or near wetlands or surface water during the nesting and brood rearing season (approximately March 1 through August 31). Loss of an active nest, incubating adults, eggs, or young of a waterfowl species will constitute a loss under the MBTA.

Potential impacts to small game from the Keystone Pipeline Project will result in the incremental loss of habitat and increased habitat fragmentation until vegetation is reestablished. Indirect impacts could include the temporary displacement of small game from the disturbance areas as a result of increased noise and human presence. Although habitats adjacent to the proposed route and other disturbance areas may support some displaced animals, species that are at or near carrying capacity could suffer some increased mortalities due to displacement. Displacement or loss of small game animals from disturbance areas will be short-term because of their generally high reproductive potentials and the fact that animals will return to the disturbance areas following completion of construction and reclamation activities. Overall, losses of small game species and their habitats will be relatively small since most habitat loss will occur within agricultural habitats. However, if disturbance were to involve important habitat, such as greater prairie chicken leks, loss of this habitat could have a significant effect on local related populations.

Non-game Species

Direct impacts to non-game species from surface disturbance activities will result from the incremental long-term loss of habitat and increased fragmentation until vegetation is reestablished. Potential impacts also will result in mortalities of less mobile or burrowing non-game species (e.g., small mammals, birds, reptiles, amphibians, invertebrates) due to exposure to vehicles and construction equipment traffic. Potential direct impacts could also include nest or burrow abandonment or loss of eggs or young where construction occurs during the breeding season. Other impacts will include the short-term displacement of some of the more mobile species (e.g., medium-sized mammals, adult birds) as a result of surface disturbance. Although the habitats adjacent to the proposed disturbance area may support some displaced animals, species that are at or near carrying capacity could suffer some increased mortalities. Displacement or loss of non-game species from disturbance areas will be short-term because of their generally high reproductive potentials and the fact that animals will return to the disturbance areas following completion of construction and reclamation activities. Overall, losses of non-game species and their habitats will be relatively small since most habitat loss will occur within agricultural habitats.

If surface disturbance activities occur during the breeding season for passerines, raptors, and other summer avian residents (approximately March 1 through August 31), nest or territory abandonment or the loss of eggs or young (loss of productivity) for the breeding season could result. Loss of an active nest, incubating adults, eggs, or young of a migratory bird species will constitute a loss under the MBTA. Impacts to nesting birds will depend on the nest location relative to the proposed disturbance area, the phase of the breeding period, and the level and duration of the disturbance.

Of the 116 active nest sites that were documented during the 2006 raptor surveys, 108 (93 percent) were occupied by red-tailed hawks, Swainson's hawks, and great-horned owls. These species are known to be relatively tolerant of human activity and development (Call 1978; Johnsgard 1988, 1990; Kingery 1998). As a result, direct impacts to nesting raptors would be limited primarily to the incremental loss of potential nest structures within the construction ROW. Since the projects include very minimal tree clearing, this potential is minor. Impacts resulting from increased noise and human presence are expected to be minor.

Operation

Normal pipeline operations will have negligible effects on terrestrial wildlife resources. Direct impacts to wildlife species populations and habitats from extensive maintenance activities such as physical pipe inspections or ROW repair will be the same as those discussed above for construction. In order to reduce potential impacts to important wildlife resources as a result of maintenance activities, Keystone will consult with the appropriate state wildlife agencies prior to the initiation of maintenance activities beyond standard inspection measures.

The USDOT prescribes pipeline design and operational requirements that limit the risk of accidental crude oil releases (leaks or spills) from pipelines. Over the operational life of the Keystone Pipeline there will be a very low likelihood of a crude oil release from the pipeline, which could injure wildlife individuals and habitat. On July 1, 2006, Keystone submitted two key documents to the Department of State: a preliminary ERP and a preliminary pipeline risk assessment. The ERP outlines the measures that Keystone will implement in the event of an accident. The preliminary risk assessment evaluates accidental release of crude oil from the pipeline. The assessment included the likelihood of crude oil releases and potential for environmental affects, depending upon release volumes and locations. Based on refinements of the route, hydraulic models, and additional engineering information, an updated risk assessment will be submitted to the Department of State by the first quarter of 2007.

4.2.5.2 Aquatic Resources

Issues

- Short-term physical disturbance to stream channels;
- Short-term increases in suspended solids concentrations from in-stream activities and erosion from adjacent disturbed lands;
- One-time increases in downstream sedimentation from in-stream activities and erosion from adjacent disturbed lands;
- Potential fuel spills from equipment and toxicity to aquatic biota if fuel reached a waterbody;
- Local short-term reductions in habitat if surface water is used for hydrostatic testing and loss of individuals during pumping; and
- Loss of individuals as a result of acute and chronic toxicity from exposure to accidental crude oil releases.

Construction

Crossings

Since Keystone has committed to directional drilling at nine crossings (two Missouri River, one Platte River, one Chariton River, two Cuivre River, one Mississippi River, one Hurricane Creek, and one Kaskaskia River), construction-related impacts on aquatic biota and their habitat will be minor at these rivers. Drilling at these rivers will aid in minimizing impacts to important game and commercial fish species and special status species. Directional drilling will not alter or remove habitat because construction within the channel will not be required. It is possible that mud from the directional drilling could inadvertently enter the active stream along the drilling route. However, if mud seepage is detected, the drilling operation will be stopped immediately to reduce pressure within the bore hole. Corrective measures will be implemented to eliminate or minimize seepage. If any seepage enters the stream, increased turbidity or physical impact to the covering substrate will be localized and short-term (less than one day).

Open-cut trenching will be used at the other perennial streams, all of which contain at least one or more game fish species. Open cut crossing can have the following impacts:

- Loss of in-stream habitat through direct disturbance
- Loss of bank cover
- Disruption of fish movement
- Direct disturbance to spawning
- Water Quality effects
- Sedimentation Effects

In-stream Habitat

In the vicinity of the trenchline, trenching and backfilling can result in alteration of in-stream habitat and the mortality of benthic invertebrates inhabiting that reach of the watercourse.

Studies done to monitor the effects on benthic invertebrates have indicated that the impacts are short term. The disturbed area typically is recolonized by benthic invertebrates to near pre-construction levels by the spring or summer following construction (Tsui and McCart 1981; Schubert and Vinikour 1987).

Backfilling the in-stream trench can either improve or lessen the quality of habitat available. This habitat quality change will depend largely on the nature of the soil materials from the lower depths of the trench with respect to those near the surface. If backfilling results in a different material on the stream bed surface than the adjacent areas, a local habitat modification may have occurred. However, the limited extent of the disturbed area and the active bottom substrate sorting by a river suggest any such habitat modification will be small and of short duration in most stream environments.

Bank Cover

Vegetative cover along the stream banks of a waterbody provides cover for fish, shading, bank stability, erosion control and an increased food and nutrient supply due to the deposition of insects and vegetative matter into the watercourse. Loss of bank cover may result in increased water temperatures, reduced food supply, impaired aesthetics, and reduced productivity. The potential for channel migration also can be increased since the removal of vegetation destabilizes the banks at discrete locations. Given the relatively small width of disturbance associated with a pipeline crossing, the above impacts tend to be negligible relative to an entire stream system. The Plan provides bank restoration measures that will insure short-term bank stability (temporary erosion control structures) and rapid vegetation recovery (replanting woody species where appropriate).

Interruption of Fish Movement

Most water crossing methods allow movement of fish across the ROW, however, some techniques such as dry crossing procedures, may block or delay normal movements. Long-term interruption of fish movement in a watercourse or a relatively short-term delay in spawning migration can have adverse impacts. Interruptions during sensitive periods typically are not a concern since in-stream construction generally can be performed outside of sensitive periods. Blockage of non-spawning related fish movement for limited periods (less than seven days) should not affect fish growth and behavior. Delays of less than three days will not adversely affect spawning migrations (Dryden and Stein 1975).

Direct Disturbance of Spawning

In-stream construction activities can displace spawning fish from preferred habitat and result in the utilization of lower quality spawning habitat. Generally, this is of limited concern for water crossing construction since in-stream activities generally are not scheduled during spawning period. Keystone will work with agencies as necessary to further define spawning periods and to refine construction schedules to avoid, where possible,

in-stream activities during sensitive periods. As shown in **Table 3.7-4**, spawning periods for most fish species extend from April through June.

Water Quality Effects

It is widely recognized that in-stream excavation activities result in short-term increases in TSS levels and turbidity. These levels decrease with distance from the source as particles settle. The levels also decrease with time following cessation of in-stream activities. Prolonged increase in TSS can adversely affect aquatic systems in the following ways:

- Triggering the drift of benthic organisms
- Reducing the abundance of insect larvae
- Damaging benthos through abrasion
- Clogging fish gills
- Damaging gill membranes
- Altering fish behaviors
- Reducing the ability of fish to feed by sight
- Making the fish susceptible to disease by the added stress of a turbid environment

The damage to aquatic organisms by increase in suspended solids levels is a function of the duration of exposure and the concentration of suspended solids. While relatively high levels of TSS can occur immediately downstream of a crossing, the effects are very short-term with construction across most streams being completed in one day. Additionally, the waterbodies in the project area experience wide ranges in seasonal flow rates, large peak flows due to precipitation events, and drain through areas with relatively fine-grained soils. These factors cause sudden natural peaks in suspended solids concentrations. The aquatic systems supported by these waterbodies are adapted to such increases.

The extent of the increase in TSS levels will be mitigated by Keystone through the use of BMPs described in the Plan. These BMP's include measures to reduce the period of in-stream activity, spoil handling techniques, equipment access installation procedures and dry crossing techniques, where warranted. The BMP's also address upland erosion and sediment control procedures to limit the potential for runoff from disturbed areas to contribute to increased in-stream TSS levels.

Sedimentation Effects

Solids introduced into suspension in a waterbody ultimately will settle on the streambed downstream of the crossing. The distance from the crossing is dependent upon the depth flow, flow velocity, particle diameter and flow characteristics. Coarser materials (sands and gravels) tend to settle relatively close to the crossing location and tend to be distributed uniformly across the stream section. Fine silts and clays can stay in suspension for considerable periods of time and will tend to settle in natural depositional areas downstream of the crossing.

Sedimentation can have the following impacts

- Covers or alters fish habitat
- Covers fish eggs
- Covers benthic organisms

The channel substrates of the streams and rivers that will be crossed by the project consist primarily of fine-grained materials (clay, silt, and sand). Fine-grained excavated material that is deposited downstream is expected to be similar to the existing substrate. Stream flows will suspend and re-deposit excavated materials during higher flow periods.

Young and Mackie (1991) found that benthic invertebrates inhabiting the upper surface of the substrate may be more adaptable to sedimentation than are taxa occupying the interstitial spaces of the substrate. Post-construction studies have shown that benthic invertebrate population generally have recovered to normal within one to two months of construction. Tsui and McCart (1981) reported benthic invertebrate populations downstream of a water crossing had recovered to near pre-construction levels shortly after construction.

Suspended sediment can prevent the successful incubation and hatching of fish eggs or the emergence of fry. This is an issue only when construction occurs during a spawning period.

The BMPs adopted for the Keystone Pipeline Project as described in the Plan will mitigate the short-term effects of downstream sedimentation, as discussed under Water Quality Effects.

Hydrostatic Testing

The Plan lists 26 streams or rivers and three impoundments as water sources for hydrostatic testing on the Keystone Mainline. A further 12 water sources have been identified on the Cushing Extension. The water sources are located throughout the length of the proposed route. The water is likely to be withdrawn from water sources during summer and fall months. Relatively small one-time withdrawals will occur from the streams or rivers designated for hydrostatic test water in accordance with withdrawal permits.

Water used for hydrostatic testing of the pipeline will be obtained from surface water resources. The volume for a 50-mile test section of 30-inch pipeline is approximately nine million gallons. Withdrawal rates and volumes will be designed to avoid impacts to aquatic life and downstream water users. Hydrostatic test water will be discharged to the land surface at an approved location. Discharged water may evaporate or infiltrate into the soil or drainage where the water is released.

Water withdrawal could entrain small fish and drifting macroinvertebrates. The expected numbers of organisms removed during entrainment is considered to be relatively small in relation to the overall numbers in the stream or river. In summary, hydrostatic testing will result in minor impacts to aquatic biota. The discharge of hydrostatic test water will follow state permit requirements, which will reduce potential effects on water quality or aquatic organisms. Energy dissipaters also will be used to prevent erosion at discharge locations.

Operation

Routine maintenance of the pipeline ROW will consist of periodic vegetation clearance. Vegetation removal adjacent to waterbodies will be limited to the removal of trees encroaching on the 50-foot operational ROW. As a result, maintenance activities will not affect aquatic biota or their habitat.

The USDOT prescribes pipeline design and operational requirements that limit the risk of accidental crude oil releases (leaks or spills) from pipelines. Over the operational life of the Keystone pipeline there will be a very low likelihood of a crude oil release from the pipeline that could injure aquatic biota and habitats. On July 1, 2006, Keystone submitted two key documents to the Department of State: a preliminary ERP and a preliminary pipeline risk assessment. The ERP outlines the measures that Keystone will implement in the event of an accident. The preliminary risk assessment evaluates accidental release of crude oil from the pipeline. The assessment included the likelihood of crude oil releases and potential for environmental affects, depending upon release volumes and locations. Based on refinements of the route, hydraulic models, and additional engineering information, an updated risk assessment will be submitted to the Department of State by the first quarter of 2007.

4.2.5.3 Sensitive Wildlife and Aquatic Species

Issues

The issues will be the same identified for general wildlife species in Section 4.2.5.1 and aquatic resources in Section 4.2.5.2.

Construction

Terrestrial Wildlife Species

As discussed in Section 3.7.3, Sensitive Terrestrial and Aquatic Wildlife Species, a total of 61 terrestrial wildlife species (24 special status species and 37 species of special concern) could potentially occur within the project area (see **Tables 3.7-5** and **3.7-6**). Six of these species are federally listed as threatened and endangered (Indiana bat, gray wolf, bald eagle, whooping crane, piping plover, and interior least tern, Eskimo curlew, American burying beetle). Two of the species are federal candidates (massasauga and Dakota skipper).

Potential impacts to sensitive wildlife resources will parallel those discussed in Section 4.2.5.1, Terrestrial Wildlife. Direct impacts to sensitive species from surface disturbance activities include the incremental long-term loss or alteration of potential breeding and/or foraging habitats and increased incremental habitat fragmentation until native vegetation has become reestablished. Potential impacts also could include mortalities of less mobile species as the result of exposure to vehicle and construction equipment traffic, and the potential abandonment of a nest site or territory, including the loss of eggs or young (e.g., piping plover, interior least tern). Other impacts will include short-term displacement of some of the more mobile species from the disturbance areas as a result of increased noise and human presence.

Removal of snags and trees from the ROW during construction could result in the loss of maternity roosts for the Indiana bat. No construction-related disturbance to maternity roosts, bachelor roosts, or hibernacula is anticipated from project activities.

Removal of large trees or snags along rivers, streams, or in wetlands, particularly in the vicinity of the Missouri and Mississippi rivers, could result in the loss of wintering bald eagle roosts or nesting habitat.

A number of occurrences of state-listed threatened or endangered species or species of special concern have been identified by the various state NHP's as occurring near or within the proposed route. For terrestrial wildlife, most of these species are state-listed as threatened or endangered or species of concern that may be rare within a given state but their populations are relatively secure elsewhere. In addition, most are relatively mobile species that could avoid short-term construction disturbance with no resulting long-term adverse effects on local populations. Increased mortality rates could occur in species that are less mobile as the result of exposure to vehicles and construction traffic. This will result in the loss of some individuals but the relatively narrow and linear disturbance area that will be associated with pipeline construction is unlikely to have measurable adverse effects on local populations of sensitive species. For a few species, however, such as the greater prairie chicken, construction through an important habitat feature, such as a lek, may result in the loss of a local breeding population. This could result in extirpation of a remnant population and contribute to a trend toward listing as federal threatened and endangered without the implementation of appropriate mitigation. As mentioned earlier, greater prairie chickens are listed as endangered in Missouri.

The majority of construction disturbance will occur within agricultural lands and these disturbances will be unlikely to affect populations of sensitive species. Surface disturbance activities along the pipeline ROW will, however, result in the incremental long-term disturbance of portions of native tall-grass prairie, wetland, and woodland habitats which may contain potentially suitable habitat for a number of sensitive species. Preconstruction surveys for federally listed and state listed threatened and endangered species, which will be completed prior to surface disturbance activities, are still to be determined through consultation with the USFWS and state wildlife agencies. Once these surveys are complete and if important habitat or populations

are identified, appropriate protection measures will be implemented in order to minimize potential impacts to these species.

Aquatic Species

The Keystone Mainline route will cross 17 streams or rivers that contain known or potential habitat for special status (federal and state-listed) fish and mussel species. These include the Sheyenne River (North Dakota); James River (South Dakota); Foster Creek (South Dakota); South Pearl Creek (South Dakota); Redstone Creek (South Dakota); Rock Creek (South Dakota); Wolf Creek (South Dakota); Platte River (Nebraska); Elkhorn River (Nebraska); Missouri River (South Dakota, Nebraska, Kansas, and Missouri); North Fork Elm Creek (Kansas); South Fork Big Nemaha River (Kansas); Rock Creek (Kansas); Little Platte River (Missouri); Shoal Creek (Missouri); Kaskaskia River (Illinois); and the Mississippi River (Missouri and Illinois). Many of the streams listed above also contain habitat for special concern fish and mussel species. Other streams crossed by the Keystone Mainline route that contain special concern fish and mussel species include the Forest River and Pembina River in North Dakota, and numerous smaller streams in Kansas counties such as Marshal, Nemaha, and Doniphan, as well as Missouri counties such as Lincoln, Audrain, Montgomery, Clinton, and St. Charles.

The types of impacts that could affect sensitive fish and mussel species are similar to those discussed for game fish species. Construction-related impacts on sensitive species occurring at the Platte River, Missouri River (two crossings), Chariton River, Cuivre River (two crossings), Mississippi River, Hurricane Creek, and Kaskaskia River will be minor, since directional drilling will eliminate disturbance within the channel. In contrast, open-cut trenching at other streams listed above will result in alteration of bottom substrates, temporary increased sedimentation, and possible removal of riparian vegetation. The degree of impact will depend upon whether important fish spawning or rearing habitat is altered. For streams containing suitable or marginal habitat for Topeka shiner in Kansas and Missouri, fish surveys indicated that it is unlikely that this species is present at the proposed crossings (Stark 2006b). State critical habitat for Topeka shiner is an issue for North Fork Elm Creek in Kansas. If mussels are present within the trenched area, mortalities could occur. Based on a field survey conducted in the James River in South Dakota, no federally listed mussels are present at the crossing (Perkins 2006). Adult fish are likely to move away from the construction area. Generally, impacts could range from several weeks to several years, depending on the life stages that are affected and whether future spawning will be affected.

Potential sources for hydrostatic testing and dust control water could include the following streams that contain sensitive fish and mussel species: Pembina River, Sheyenne River, Rock Creek, Wolf Creek, James River, Missouri River, Platte River, and the Mississippi River. Specific water volumes that will be withdrawn from these streams are not known at this time but will be quantified as details of the hydrostatic test plan are finalized. Nevertheless, water use from any of these streams will result in a relatively small one-time flow reduction. Water withdrawal is expected to represent a relatively small percentage of base flow conditions. Therefore, impacts on fish or mussel habitat will be considered minor in the mid-size to large streams. A low level impact could occur in the smaller streams such as Rock and Wolf creeks. The discharge of hydrostatic test water will follow state permit requirements, which will eliminate potential water quality effects on sensitive species. As part of the consultation with the USFWS for threatened and endangered species in the Platte River, water use (in acre-feet) must be identified. The depletion is determined by dividing the consumptive use by the duration of the project in years. Depletions are considered minor if the volume is less than 25 acre-feet.

Operation

In order to reduce potential impacts to sensitive wildlife species as a result of maintenance activities, Keystone will consult with the appropriate state wildlife or land management agency prior to the initiation of maintenance activities beyond standard inspection measures.

The USDOT prescribes pipeline design and operational requirements that limit the risk of accidental crude oil releases (leaks or spills) from pipelines. Over the operational life of the Keystone pipeline there will be a very low likelihood of a crude oil release from the pipeline that could injure sensitive wildlife and aquatic species and habitats. On July 1, 2006, Keystone submitted two key documents to the Department of State: a preliminary ERP and a preliminary pipeline risk assessment. The ERP outlines the measures that Keystone will implement in the event of an accident. The preliminary risk assessment evaluates accidental release of crude oil from the pipeline. The assessment included the likelihood of crude oil releases and potential for environmental affects, depending upon release volumes and locations. Based on refinements of the route, hydraulic models, and additional engineering information, an updated risk assessment will be submitted to the Department of State by the first quarter of 2007.

4.2.6 Land Use and Aesthetics

Issues

- Establishment of a new pipeline ROW;
- Damage to agricultural equipment or features (e.g., drainage tiles and irrigation systems) during construction;
- Temporary loss of agricultural productivity during the construction period;
- Visual impacts associated with the construction ROW which include removal of existing vegetation, exposure of bare soils, and earthwork and grading scars;
- Increased noise and dust to nearby residential and commercial areas from pipeline construction activities; and
- Increased noise to nearby residential and commercial areas as a result of pump station operations.

Construction

Private lands make up 99 percent of the lands affected by construction of the proposed Keystone Mainline and Cushing Extension. **Table 4.2-2** summarize the acreage of federal, state, and private land temporarily disturbed by construction of the Keystone Pipeline Project.

Table 4.2-2 Acreage Summary of Federal, State, and Private Lands Affected by Construction of the Keystone Project

	Federal	State	Private	Total
KEYSTONE MAINLINE				
North Dakota	0	13	3,340	3,353
South Dakota	0	8	3,491	3,499
Nebraska	0	0	3,262	3,262
Kansas	0	0	1,497	1,497
Missouri	0	28	4,183	4,211
Illinois	37	0	789	826
Keystone Mainline Subtotal	37	49	16,562	16,648

Table 4.2-2 Acreage Summary of Federal, State, and Private Lands Affected by Construction of the Keystone Project

	Federal	State	Private	Total
CUSHING EXTENSION				
Nebraska	0	0	50	50
Kansas	0	52	3,211	3,263
Oklahoma	0	73	1,187	1,260
Cushing Extension Subtotal	0	125	4,448	4,573
Project Total	37	174	20,020	21,221

Note: Acreage does not include 1,820 acres of disturbance associated with pipe storage/contractor yards or disturbance associated with transmission lines.

The principal land use affected by the Keystone Pipeline Project is agriculture. The proposed Keystone Mainline and Cushing Extension routes cross land that is comprised of approximately 64 percent and 51 percent crop production and land use, respectively. Other land use categories affected by construction of the Keystone Pipeline Project include rangeland, forest, wetland/riparian, water, developed, and barren.

Surface disturbance to various land uses caused by construction of the Keystone Pipeline Project are summarized in **Table 4.2-3**. A relatively small temporary loss of crops and forage land will occur in many agricultural and rangelands during construction. In areas where drainage tile is present, the tiles could be damaged by the installation of the pipeline. Keystone will repair or restore drain tiles, fences, and land productivity, which are temporarily disturbed during pipeline construction, as described in the Plan. The Plan also describes topsoil handling and reclamation practices designed to restore land productivity to its prior use.

Table 4.2-3 Acres of Land Uses Affected by Construction of the Keystone Project

	Developed	Agriculture/ Cropland	Grassland/ Rangeland	Forest	Water	Wetland/ Riparian	Total
KEYSTONE MAINLINE							
North Dakota	348	2,314	379	45	9	258	3,353
South Dakota	447	2,226	544	4	10	268	3,499
Nebraska	280	2,539	652	34	18	39	3,262
Kansas	97	984	570	113	20	113	1,497
Missouri	398	2,102	1,032	538	62	79	4,211
Illinois	131	567	20	63	14	31	826
Keystone Mainline Subtotal	*1,701*	*10,732*	*2,597*	*797*	*133*	*688*	*16,648*
CUSHING EXTENSION							
Nebraska	15	13	16	5	<1	0	50
Kansas	333	1,928	819	94	8	81	3,263
Oklahoma	169	396	591	34	3	67	1,260
Cushing Extension Subtotal	*517*	*2,336*	*1,427*	*133*	*11*	*149*	*4,573*
Project Total	2,218	13,068	4,024	920	144	837	21,221

Note: Acreage does not include 1,820 acres of disturbance associated with pipe storage/contractor yards or disturbance associated with transmission lines.

Residences within 500 feet of the Keystone Mainline and Cushing Extension ROW (see Section 3.8) will experience short-term inconvenience from construction equipment noise and dust for a period of one week to 30 days. During construction, Keystone will be required to comply with any local construction noise requirements. In addition, Keystone has agreed to limit construction activities primarily to daylight hours. Noise and dust impacts from construction activities will be mitigated according to the Plan.

Structures located within 25 feet of the Keystone Mainline construction ROW are summarized in **Table 2.1-6**. The majority of the structures located within 25 feet of the construction ROW are where the Keystone Mainline is co-located with the Platte Pipeline in Missouri.

A total of nine existing recreation and special interest areas are crossed by the proposed Keystone Mainline (**Table 3.8-4**). The Milford State Wildlife Area in the vicinity of MP 50 to MP 54 in Kansas is the only recreation and special interest area crossed by the proposed Cushing Extension route. A total of 50 USFWS wetland easements in North and South Dakota are crossed by the Keystone Mainline (**Table 3.8-5**). Mitigation measures outlined in the Plan will minimize impacts to these areas.

The pipeline will cross Carlyle Lake (a flood control impoundment on the Kaskaskia River) in Fayette County, Illinois. The pipeline will be co-located with other pipelines in the same corridor. Seasonal flooded waterfowl habitats have been created by a series of impoundments surrounded by levees that will be crossed by the pipeline. This area is administered by Illinois Department of Wildlife. Public access for hunting and other recreational uses is provided on the west side of the lake. The public parking lot is located adjacent to the existing pipeline corridor. It is anticipated that public access to this area will be restricted during pipeline construction and special construction measures may be required to cross under the impoundments. Keystone will continue to consult with the USACE and the Illinois Department of Wildlife to determine the best methods for maintaining public access to this recreational area. Keystone has prepared a site-specific crossing plan for the Carlyle Lake Crossing (Appendix D), which will be included in the project's USACE 404 application.

Keystone's preliminary HDD plan will avoid direct land disturbance within the NPS WSR administrative boundary associated with the Missouri River crossing near Yankton, South Dakota. The NPS administers, but does not own, land at the proposed crossing location. The HDD entry point will be located on City of Yankton land on the north shore; the HDD exit point will be located on private land on the south shore. Keystone conducted preliminary discussions with the NPS and the City of Yankton in February 2006. A meeting was held in Yankton on May 19, 2006, to discuss the proposed directional drill under the Missouri River. Preliminary crossing drawings were provided. A Special Use Permit will be required from the NPS to conduct geotechnical drilling near the banks of the river. Keystone filed a Special Use Permit Application to the NPS on August 17, 2006. Approval of this plan by the National Park Service is pending. Keystone submitted copies of NPS consultation documents to the Department of State in the September 15, 2006 filing. A site-specific crossing plan utilizing HDD methods has been developed (Appendix D), which will maintain public access to the river, and avoid disturbance of existing land uses and designations.

Construction of the Keystone Pipeline Project will have temporary impacts on recreational traffic and use patterns during construction activities in special management areas and recreational areas. Sightseers, hikers, wildlife viewers, hunters, etc. will be displaced from the immediate area during construction. Keystone will continue to coordinate with agency managers to minimize conflicts between construction activities and recreational uses for which these special areas were established. These impacts will be of short duration with no long-term impacts.

Visual resource impacts associated with construction of the Keystone Pipeline include removal of existing vegetation, exposure of bare soils, earthwork and grading scars, and landform changes that introduce contrasts. Keystone has aligned the pipeline route to avoid aesthetic features to the extent possible. Visual resource impacts from construction activities will be of short duration with no significant long-term impacts due to implementation of Keystone's mitigation measures outlined in the Plan.

Operation

Certain existing land uses will be converted to long-term utility use for the duration of the pipeline's operation. This conversion represents a long-term future constraint on development of private land because dwellings cannot be placed on the permanent pipeline ROW for the entirety of the ROW lease period. The 50-foot-wide operational ROW will be maintained in an open condition for the life of the pipeline facilities. No other operational impacts are anticipated to agriculture and rangeland or special management areas. If there are to be surface disturbances due to future maintenance activities, these will be reclaimed after the disturbance, utilizing measures described in the Plan. Recreational use access will not be affected by pipeline operations within special management areas.

The impacts of aboveground facilities on visual resources will depend on the location of each individual facility and its visibility from the surrounding area. Keystone has located the pump stations based on hydraulic and engineering design considerations but also has considered impacts on aesthetics and sensitive environmental resources in determining the facility locations. Pump stations are located on private range or agricultural lands. To minimize visual resource impacts from pump stations, Keystone will landscape these areas to provide a visual screen where appropriate.

During operation of the pipeline, the noise impact associated with the electrically driven pump stations will be limited to the vicinity of the facilities. **Table 4.2-4** summarizes the nearest noise sensitive area (NSA) and the number of residences / structures within one mile of each proposed pump station. The proximity of the NSA's ranges from 18 feet at PS 35 to 1,389 feet at PS 31.

Table 4.2-4 Structures within 1 Mile of Pump Stations

State/County	Pump Station	Milepost of Pump Station	Distance to NSA (feet)	Direction from Pump Station	Number of Structures Within 1 Mile of Pump Stations
NORTH DAKOTA					
Walsh	PS15	33.0	1,200	SE	7
Nelson	PS16	75.9	3,523	S-SE	4
Steele	PS17	123.4	2,257	NNW	3
Ransom	PS18	170.2	650	E	10
Dickey	PS19	216.8	1,148	NE	1
Sargent	PS19	216.8	--	--	5
SOUTH DAKOTA					
Brown	PS19	216.8	--	--	5
Day	PS20	262.1	--	--	0
Clark	PS21	308.9	2,700	NE	6
Miner	PS22	356.8	--	--	0
Hutchinson	PS23	404.8	2,650	SE	11
NEBRASKA					
Cedar	PS24	452.7	354	NE	16
Stanton	PS25	499.1	846	NNW	12

Table 4.2-4 Structures within 1 Mile of Pump Stations

State/County	Pump Station	Milepost of Pump Station	Distance to NSA (feet)	Direction from Pump Station	Number of Structures Within 1 Mile of Pump Stations
Butler	PS26	549.5	240	NW	10
Saline	PS27	601.8	1,342	WSW	4
Jefferson	PS28	637.3	2,142	N	6
KANSAS					
Nemaha	PS29	688.2	850	S	19
Doniphan	PS30	736.7	1,043	SW	13
MISSOURI					
Clinton	PS31	782.3	3,400	W	31
Carroll	PS32	829.8	920	SE	17
Chariton	PS33	864.6	813	NW	12
Audrain	PS34	903.8	1,300	S	14
Montgomery	PS35	947.5	1,930	NE	18
St. Charles	PS36	984.8	500	S	17
ILLINOIS					
Madison	PS37	1022.75	253	E	4
Fayette	PS38	1049.8	545	N	7
Kansas					
Dickinson	C30	CE 94.4	1,112	E	8
Cowley	C32	CE 183.4	289	NE	17
Oklahoma					
Kay	C33	CE 228.4	272	SE	37

Note: Manual count from aerial drawings and numbers may differ in actuality due to features that appear to lead to buildings.

Keystone will perform a noise assessment for the proposed pump stations. The assessment will estimate the level of noise reduction over the distances to the listed NSAs.

Noise impacts from the electrically powered pump stations are anticipated to be minor. Noise mitigation measures will be applied if needed to meet noise regulations. The pump stations will be constructed in a manner to minimize potential impacts from noise. Noise mitigation may include construction of berms around the facilities or planting of vegetation screens.

4.2.7 Cultural Resources

Issue

- Construction and operation of the Keystone Pipeline Project and associated facilities potentially could affect NRHP-eligible historic properties such as prehistoric or historic archaeological sites, districts, buildings, structures, and objects.

Construction

Those areas in which impacts are planned or are likely to occur are referred to as the "area of potential effect" or APE. Specifically, the APE is defined as the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of NRHP-eligible sites, if any such sites exist.

Only those cultural resources located in the APE were reviewed to determine if any would be subject to impacts that could affect their eligibility for the NRHP based on NRHP criteria for evaluation. For the proposed Keystone pipeline project, the APE is the 200-foot-wide survey corridor in areas where the proposed pipeline parallels an existing pipeline, the 300-foot-wide survey corridor in greenfield areas, and the footprint of proposed pump stations, plus a 50-foot buffer.

Cultural resources field surveys along selected segments of the pipeline corridor have been ongoing since spring 2006. As a result of the field surveys, several potentially eligible sites were located within the project APE. Avoidance or evaluative testing in order to definitely determine NRHP eligibility was recommended for these sites. For those sites at which avoidance was not feasible, evaluative testing was started in early September 2006. To date, evaluative testing has been started at 14 sites. One of the 14 sites has been determined eligible for the NRHP, three have been determined not eligible, and the results of testing on the remaining 10 sites are pending.

Construction and operation of the proposed pipeline and associated facilities could potentially affect NRHP-eligible sites. These could include prehistoric or historic archaeological sites, districts, buildings, structures, objects, and locations with traditional cultural value to Native Americans or other groups. Project impacts could include: the physical disturbance during construction of archaeological sites located within the project APE; the demolition, removal, or alteration of historic or architecturally significant structures/features; and the introduction of visual or audible elements (e.g., pump stations) that could alter the site's setting. Impacts to NRHP-eligible sites would be mitigated through SHPO- and Department of State-approved data recovery techniques. Mitigation may include, but would not be limited to, one or more of the following measures: 1) avoidance through the use of realignment of the pipeline centerline, relocation of pump stations, or changes in the construction and/or operational design; 2) data recovery, which may include the systematic professional excavation of an archaeological site or the preparation of photographic and/or measured drawings documenting standing structures; and 3) the use of landscaping or other techniques that would minimize or eliminate effects on the historic setting or ambience of standing structures.

Whenever feasible, Keystone will avoid NRHP-eligible sites identified within the project APE. Keystone will consult with the appropriate SHPO(s) to identify measures to avoid adversely affecting these sites. If adverse effects to any NRHP-eligible sites cannot be avoided, Keystone will develop treatment plans for mitigating those effects. Keystone will file avoidance or treatment plans, as appropriate, with the appropriate SHPO(s) and the Department of State.

Construction activities and associated operations could adversely affect undiscovered archaeological sites. If previously undocumented sites are discovered within the construction corridor during construction activities, all work that might adversely affect the discovery will cease until Keystone, in consultation with the appropriate parties, can evaluate the site's eligibility and the probable effects. If the previously unidentified site is recommended as eligible to the NRHP, impacts will be mitigated through an Unanticipated Discovery Plan, which will be included in the cultural resources survey reports prepared for each state.

If construction or other project personnel discover what they believe to be human remains, funerary objects, or items of cultural patrimony on federal land, construction will cease within the vicinity of the discovery and the appropriate agency will be notified of the find. Treatment of any discovered human remains, funerary objects, or items of cultural patrimony found on federal land will be handled in accordance with NAGPRA. Construction will not resume in the area of the discovery until the authorized agency has issued a notice to proceed.

If human remains and associated funerary objects are discovered on state or private land during construction activities, construction will cease within the vicinity of the discovery and the county coroner or sheriff will be notified of the find. Treatment of any discovered human remains and associated funerary objects found on state or private land will be handled in accordance with the provisions of applicable state laws.

Operation

The primary impact of the operation phase of the Keystone Pipeline Project is the potential introduction of visual or audible elements (e.g., pump stations), which could alter the setting associated with historic properties. Keystone will mitigate these operational impacts to NRHP-eligible sites by the use of landscaping or other techniques that will minimize or eliminate effects on the historic setting or ambience of standing structures.

4.2.8 Native American Consultation

Issue

- Construction of the Keystone Pipeline Project potentially could affect NRHP-eligible historic properties, including locations with traditional cultural value to Native Americans or other groups.

Construction

Tribal consultation has been initiated with 44 tribes that were recognized as having a potential past or present affiliation with the proposed project area. To date, the Three Affiliated Tribes (North Dakota) and Sisseton Wahpeton Oyate (South Dakota) are the only tribes that have responded to the initial consultation letters. The tribes expressed interest in the project, travel expenses, the two rock cairns identified during the field surveys, and requested to possibly monitor the rock cairns during construction. Neither tribe identified any TCPs within the project APE. At this time, follow-up phone calls to the tribes have not been conducted. The Department of State has indicated that it will continue consultation with the tribes from this point forward. Keystone forwarded all information regartding its tribal consultation activities to the Department of State.

Efforts to identify places of traditional or religious importance to Native American tribes will continue throughout the environmental review and construction phase of the project. The consultation process will remain open for any tribe that expresses a desire for participation when a TCP may be affected by the proposed project. Any TCP that may be affected by the proposed pipeline project will be treated in accordance with the NHPA, as amended, and its implementing regulations, and other applicable federal statutes and/or tribal laws and policies, as appropriate. No surface disturbance will occur within or immediately adjacent to the boundary of a TCP prior to completion of all consultation required by law. Any such data recovery or mitigation plan will be reviewed and approved by the Department of State and appropriate SHPOs. Tribal representatives will be asked to participate in the development of any such data recovery or mitigation plan in accordance with federal mandates.

Operation

No impacts are anticipated during the operational phase of the project.

4.2.9 Socioeconomics

Issues

- Compensation to landowners for conveyance of easements and restrictions and damage to land and property;
- Construction workforce demands on local infrastructure;
- Fiscal benefits from goods and services purchased locally and associated tax revenue generated; and
- Tax revenues generated by the pipeline.

Construction

Compensation for Damages to Land Use and Property

The Keystone Pipeline Project will be constructed in predominantly rural, agricultural areas. Keystone will acquire pipeline ROW easements from landowners and will provide landowners with monetary compensation for the conveyance of those easements. Construction activities will create the potential for damage to land and property, including drainage tiles, irrigation systems, and fences. Keystone will restore damage or disturbance to lands. Keystone also will repair or restore drain tiles, irrigation systems, fences, and other items and features that are damaged or temporarily disturbed during pipeline construction. Repair and/or monetary compensation for damage to land and property during construction are discussed in detail in the Plan.

Demands on Local Infrastructure

Construction of the Keystone Pipeline Project is proposed to be completed in five spreads: four spreads on the Keystone Mainline and one on the Cushing Extension (see **Table 4.2-5**). Keystone anticipates that it will require approximately 15 months to complete each spread. Work on the Keystone Mainline is proposed to commence in early 2008 and to be completed by September 2009. Work on the Cushing Extension will begin

Table 4.2-5 Construction Spreads Associated with the Keystone Pipeline Project

Spread Number	Location according to Map	Approximate Distance within Construction Spread (miles)
KEYSTONE MAINLINE		
Spread 1	US/Canada Border (Cavalier County, ND) through Clark County, SD	300
Spread 2	Beadle County, SD through Gage County, NE	330
Spread 3	Marshall County, KS to Salisbury, MO (in Chariton County)	215
Spread 4	Salisbury, MO (in Chariton County) to Patoka, IL (in Marion County)	220
CUSHING EXTENSION		
Spread 5	Jefferson County, NE to Cushing, OK (Payne County)	300

in the fall of 2008. Approximately 500 to 600 construction personnel (Keystone employees, contractor employees, construction inspection staff, and environmental inspection staff) are expected to be associated with each spread for a total workforce of approximately 2,500 to 3,000 construction personnel. Additionally, construction of pump stations and delivery facilities will require an additional 20 workers per station for a total of approximately 150 to 200 workers at the peak, since all pump stations will not be constructed simultaneously. Construction of pump stations and delivery stations is to commence in 2008 and be completed in the third-quarter of 2009.

Keystone proposes to hire temporary construction staff from the local population where possible. It is estimated that approximately 10 to 15 percent of the total construction workforce could be hired locally, with the remaining portion (85 to 90 percent or more) consisting of non-local personnel. Keystone estimates that long-term operation of the pipeline will require a total of approximately 20 permanent employees in the U.S.

The project construction period will be relatively short in any given area and most non-local workers will not be accompanied by their families during their work tenure. Consequently, it is expected that most project workers will use temporary housing, such as hotels/motel, RV parks, and campgrounds. Some workers are likely to rent furnished apartments and homes, due to the constrained availability of other accommodations, though this is generally less preferable because landlords and property management companies prefer extended term commitments. Most of the temporary workers will seek housing in the more populated, service-oriented towns located within a reasonable commuting distance to the work site. As the more convenient options fill, workers will seek alternatives, driving further, looking at smaller communities, even using campgrounds in nearby state parks, which typically have limits on the length of occupancy. Furthermore, some individuals may desire to relocate during the term of the project as the active construction area in each spread moves along the pipeline route. The net effect of these factors is that the temporary housing demand will be dynamic.

In the more northern, rural portions of the proposed project (North Dakota and most of South Dakota, Nebraska, and Kansas) it will be more difficult for local housing markets to fill these temporary housing needs due to the more limited availability of temporary housing in close proximity to construction work sites. Construction workers in these areas are likely to drive further to find housing in nearby small towns or rely more heavily on RV parks and campgrounds. Conversely, in the portions of the route through more populated areas such as most of Missouri and Illinois, the local housing markets will be much more likely to absorb the temporary housing needs of construction workers as they will be more likely to find hotels/motels in towns and cities in close proximity to construction work sites.

Other construction-related impacts on local services may include increased demand for permits for vehicle load and width limits and local police assistance during construction at road crossings to facilitate traffic flow. In more rural sections of the proposed route, particularly in North Dakota and most of South Dakota, response times to highway or construction-related accidents may be lengthy given communication, dispatch, and travel time considerations. In these areas, it may be necessary to provide on-site first responder services, however, Keystone will work with the local law enforcement, fire departments, and emergency medical services to determine the best course of action and coordinate for effective emergency response. Plans to deal with these issues will be addressed in the ERP. The degree of impact will vary from community to community, depending on the number of non-local workers and accompanying family members that temporarily reside in each community, the duration of their stay, and the size of the community. Although these factors are too indeterminate and variable to accurately predict the magnitude of impact, the effects will be short-term and, therefore, are not expected to be significant.

Short-term Fiscal Benefits

Taxes that may apply, other than property taxes levied by various state, county, or local taxing jurisdictions, include taxes on gross receipts from the sales of goods and services. These taxes and fees vary by region or locality and will be received only during the construction period (18 months).

Operation

Demands on Local Infrastructure

The limited number of permanent employees associated with the proposed project will result in negligible long-term impacts on public services.

Long-Term Fiscal Benefits

In the operation phase, the pipeline will increase the tax base in the states, counties, and communities crossed. Keystone has estimated that a total of approximately $30.2 million will be paid in property taxes during the first year of pipeline operation for the Keystone Mainline and an additional $16.5 million for the Cushing Extension. Based on 2005 property assessment and tax rate information for each state/county, the distribution by state for the first year of property taxes will be $5.3 million to North Dakota, $6.5 million to South Dakota, $5.2 million to Nebraska, $4.5 million to Kansas, and $8.7 million to Missouri. The state of Illinois does not levy property tax on oil and gas pipelines. The distribution by state for the Cushing Extension will be an additional $0.7 million in Nebraska, $13.6 million in Kansas, and $2.8 million in Oklahoma.

Environmental Justice

Based on a review of the minority population and income status of communities crossed by and in the proximity of the proposed Keystone Mainline and Cushing Extension routes, Keystone has determined that Yankton, South Dakota, and Alton, Illinois, have the most significantly high minority populations on the Keystone Mainline route, while Winfield, Kansas, and Marland, Oklahoma, have the most significantly high minority populations on the Cushing Extension route. The minority populations of concern in both of the cities on the Keystone Mainline route are black. In Winfield Kansas the minority population is Asian or Pacific Islander, and Marland, Oklahoma, has high populations of both Hispanics and Native American or Alaskan Natives. Additionally, several low income communities have been identified along the Keystone Mainline and Cushing Extension routes. The largest and most significant of these low income populations tend to occur in the more heavily populated states of Missouri and Illinois along the Keystone Mainline route, particularly in communities near the greater St. Louis municipal area. Along the Cushing Extension, the lowest income communities were found throughout Oklahoma where the proposed project route passes just west of the Osage Indian Reservation. Risk analyses need to be conducted for all locations identified as having significant minority populations and low income populations. These analyses determine the specific environmental impacts that may affect these populations, including concerns regarding land use and safety. The overall goal is to ensure that risks to residents of these communities are not disproportionately greater than those to which other residents along the pipeline are exposed.

4.2.10 Public Health and Safety

Issues

- Risk of crude oil releases (leaks and spills) during pipeline operations, including the contribution of natural hazards (seismicity and faults, landslides, and subsidence) to this risk and the subsequent potential effects on humans and other sensitive resources such as populated areas, drinking water sources, and ecologically sensitive areas.

Keystone submitted a preliminary risk assessment for the accidental release of crude oil from the pipeline. The assessment included the likelihood of crude oil releases and potential for environmental affects, depending upon release volumes and locations. Based on refinements of the route, hydraulic models, and additional engineering information, an updated risk assessment will be submitted to the Department of State by the first quarter of 2007.

4.3 No Action Alternative

This Environmental Report supports Keystone's application to the Department of State for a Presidential Permit to construct and operate a crude oil pipeline, which crosses the Canada/U.S. border. The Department of State has three courses of action in processing the application. The Department of State may:

1. Grant the permit without conditions;

2. Grant the permit with conditions; or

3. Deny the permit.

If the Department of State denies Keystone's application for a Presidential Permit (the No Action Alternative), the environmental impacts of the proposed action identified in this ER will not occur and the stated objectives of Keystone's proposal will not be met. The Keystone Pipeline Project will not provide needed pipeline capacity to transport WCSB crude oil supplies. The project will not provide the U.S. with a source of stable, secure, and long-term North American crude oil supplies to the Midwest and Gulf Coast markets, and will not decrease U.S. dependence on foreign offshore oil supply. Denying authorization of the Keystone Pipeline Project also could result in U.S. reliance on more expensive and less reliable crude oil supplies.

The No Action Alternative will not necessarily result in an overall reduction of environmental impacts because crude oil likely will continue to be transported to Midwest and Gulf Coast markets by other pipeline routes or alternative transportation methods.