4.7 FISHERIES

4.7.1 Introduction

This section describes potential impacts to Fisheries resources associated with the construction and operation of the proposed Project and connected actions and discusses potential mitigation measures that would avoid or minimize those impacts. The information, data, methods, and/or analyses used in this discussion are based on information provided in the 2011 Final Environmental Impact Statement (Final EIS) as well as new circumstances or information relevant to environmental concerns that have become available since the publication of the Final EIS, including the proposed reroute in Nebraska. The information that is provided here builds on the information provided in the Final EIS, and in many instances replicates that information with relatively minor changes and updates. Other information is entirely new or substantially altered from that presented in the Final EIS. Specifically, the following items have been substantially updated from the 2011 document related to impacts to Fisheries resources:

- A new section (Section 4.7.2, Impact Assessment Methodology) was added to explain the assessment methodology used to evaluate potential fisheries impacts associated with the proposed Project;
- The number and type of stream crossings and stream crossing methods have changed due to changes in the proposed Project route as well updated field survey information provided by Keystone. The Supplemental Environmental Impact Statement (Supplemental EIS) stream crossing assessment is comprised of a desktop analysis based on National Hydrologic Dataset (NHD) information and supplemented by Keystone field survey descriptions where available;
- A discussion of the potential impacts of the installation of culverts or bridges for newly constructed access roads was included;
- A discussion of the impacts associated with the potential increase in stream water temperature associated with the elevated temperature of the oil in the proposed pipeline was included; and
- Section 4.7.4, Recommended Additional Mitigation, provides a list of additional mitigation measures to further reduce impacts to fisheries.

4.7.2 Impact Assessment Methodology

The impacts of the proposed Project on fisheries, aquatic resources, and protected species have been evaluated using a qualitative assessment of the potential direct and indirect impacts to species and their habitat through literature review and consultation with regional biologists. Field studies continue to be conducted along the proposed Project route, the results of which will be reported in fall 2012 and spring 2013. The potential impacts would result from the construction and operation of the proposed Project.

4.7.3 Potential Impacts

Potential impacts to fisheries resources associated with construction and operation of the proposed pipeline are addressed in this section. Impacts associated with potential spills of oil or other hazardous substances are addressed in Section 4.13, Potential Releases.

The proposed Project has the potential to impact special-status fish including threatened and endangered species under the Endangered Species Act, BLM sensitive species, and individual states' species of conservation concern. The potential impacts to these species are discussed in Section 4.8, Threatened and Endangered Species and Species of Conservation Concern.

Disturbance to upland plant communities and soil could have indirect impacts on aquatic habitats through increased sedimentation due to wind and water erosion and a reduction in filtering capacity and infiltration of runoff due to reduced vegetative cover. Impacts to upland areas and measures to minimize erosion associated with disturbance of upland areas are discussed in Section 4.3, Water Resources, and Section 4.5, Terrestrial Vegetation.

To minimize potential impacts to fisheries resources, TransCanada Keystone Pipeline, LP (Keystone) would implement a Construction, Mitigation, and Reclamation Plan (CMRP) (see Appendix G), which contains measures for use at and near waterbody crossings to reduce potential effects on fish and aquatic/stream bank habitat.

4.7.3.1 Introduction of Invasive/Non-Native Species

Introduced non-native species can compete with native species and transmit diseases (e.g., whirling disease) that could adversely impact sensitive fish species. Invasive aquatic species (either plant or animal) can be introduced into waterways and wetlands and can be spread by improperly cleaned vehicles and equipment operating in water, stream channels, or wetlands (Cowie and Robinson 2003, Fuller 2003). Some invasive organisms can live in dry equipment for several days. Whirling disease in salmonids is caused by a protozoan parasite (*Myxobolus cerebralis*) that has a resistant myxospore stage. The disease causes skeletal deformation and neurological damage in juvenile fish. Myxospores can be transmitted in mud from infected streams on equipment used in water and on vehicles between watersheds. Whirling disease occurs in over 100 different streams with only a few major river drainages uninfected in Montana (Montana Aquatic Nuisance Species Technical Committee 2002). New Zealand mudsnails (*Potamopyrgus antipodarum*) have been reported from the Big Horn River drainage, a tributary to the Yellowstone River in Montana (Benson 2009a), which is over 160 river miles upstream of the proposed Project area. Quagga mussels (*Dreissena rostriformis bugensis*) have been reported from the South Platte River, a tributary to the Platte River in Nebraska (Benson 2009b), which is over 150 river miles upstream of the proposed Project area.

To reduce the potential for transfer of aquatic pathogens, temporary vehicle bridges would be used to cross waterbodies to limit vehicle contact with surface waters and sediments. During open-cut pipeline installation, in-stream activities would be conducted outside of the waterbody channel as much as practical and would limit the use of equipment within waterbodies. Workspaces would be located at least 10 feet from waterbodies and would implement erosion-control measures to reduce suspended sediment loading in waterbodies. These measures would also limit waterbody contact with vehicles and mud that could potentially serve as vectors for invasive species and whirling disease. Construction vehicles would be washed to remove mud and dirt that may collect on equipment. Washing would be accomplished in specified areas as described in the CMRP (Appendix G).

4.7.3.2 Construction Impacts

The degree of construction-related impacts to fisheries resources within waterbodies that would be crossed by the proposed Project route would depend on the crossing method, site-specific streambed conditions at each crossing, the duration of instream activity, and application of impact reduction measures. Crossing techniques for waterbodies would depend on stream size, the presence of sensitive resources, protection status, classification of the waterbody, and permit requirements (see Section 2.1, Overview of the Proposed Project, for construction method details). The proposed Project would cross waterbodies along the Project route using one of the following techniques:

- Non-flowing open-cut crossing method;
- Flowing open-cut crossing method;
- Dry flume open-cut crossing method;
- Dry dam-and-pump open-cut crossing method; and
- Horizontal directional drilling (HDD) crossing method.

Crossing methods for each waterbody potentially containing fishery resources are identified in Table 4.7-1. Keystone proposes to use HDD techniques at 13 of the perennial waterbody crossings and various open-cut methods at the remaining 43 perennial stream crossings. In addition, the HDD method would be used to cross one intermittent waterbody, Bridger Creek (MP 433.6). Aquatic surveys in those waterbodies where open-cut methods have been proposed have been conducted since 2008, and surveys for the proposed Nebraska reroute were conducted in summer 2012 and will continue into fall 2012 and summer 2013. In accordance with the CMRP (Appendix G) and based on field survey results, site-specific crossing plans would be developed for each waterbody that would be crossed by the proposed pipeline. Several site-specific crossing plans for HDD crossings have been developed and are presented in the CMRP. Further, state agencies would be consulted and relevant U.S. Army Corps of Engineers and U.S. Fish and Wildlife Service (USFWS) permitting and consultation would be completed to determine specific open-cut crossing and construction methods to reduce proposed Project impacts to fishery resources. As an example, the State of Montana noted in their proposed Environmental Specifications (Appendix N, Supplemental Information for Compliance with MEPA) that no flowing open-cut crossing methods would be allowed in Montana.

To minimize the amount of sediment from stream bank and upland erosion entering waterbodies, the Best Management Practices (BMPs) described in the CMRP (Appendix G) would be implemented, as well as any additional measures mandated within stream crossing permits issued by state and federal regulatory agencies. Measures specified in the CMRP include the following:

- Installation of sediment barriers immediately after initial disturbance of waterbodies or adjacent uplands;
- Minimization of grading and grubbing along stream banks; and
- Prompt removal of plant debris or soil inadvertently deposited at or below the high water mark.

Implementation of these and other similar measures to reduce suspended sediment loads would result in proposed Project impacts to fisheries resources that would be short term and temporary.

Table 4.7-1 Proposed Perennial Stream Crossings along the Proposed Project Route

County	Approximate Milepost	Waterbody Name	Proposed Crossing Technique[a,b,c]	Relevant Surface Water or Fishery Class/Rating[d]
Montana				
Phillips	25.3	Frenchman River	HDD	Non-Salmonid
Valley	39.0	Rock Creek	Open Cut	Non-Salmonid
Valley	40.4	Willow Creek	Open Cut	Non-Salmonid
Valley	83.4	Milk River	HDD	Non-Salmonid
Valley/ McCone	89.7	Missouri River	HDD	Marginal Salmonid/Red Ribbon, Class II Recreational Fishery
Dawson	198.1	Yellowstone River	HDD	Non-Salmonid/Blue Ribbon, Class I Recreational Fishery
Fallon	247.1	Sandstone Creek	Open Cut	Non-Salmonid
Fallon	265.3	Little Beaver Creek	Open Cut	Non-Salmonid
Fallon	284.5	Boxelder Creek	Open Cut	Non-Salmonid
South Dakota				
Harding	292.6	Shaw Creek	Open Cut	Fish Propagation
Harding	295.0	Little Missouri River	HDD	WW Semi-permanent
Harding	300.4	Kimble Creek	Open Cut	Fish Propagation
Harding	303.5	Unnamed Tributary to Dry House Creek	Open Cut	Fish Propagation
Harding	321.6	South Fork Grand River	Open Cut	WW Semi-permanent
Harding	326.4	Clarks Fork Creek	Open Cut	WW Marginal
Butte	361.0	North Fork Moreau River	Open Cut	WW Marginal
Perkins	368.9	South Fork Moreau River	Open Cut	WW Marginal
Meade	387.8	Pine Creek	Open Cut	WW Marginal
Meade	428.1	Narcelle Creek	Open Cut	Fish Propagation
Meade	430.1	Cheyenne River	HDD	WW Permanent
Haakon	486.0	Bad River	HDD	WW Marginal
Jones	498.3	Dry Creek	Open Cut	Fish Propagation
Tripp	541.3	White River	HDD	WW Semi-permanent
Tripp	547.3	Cottonwood Creek	Open Cut	Fish Propagation
Tripp	600.0	Buffalo Creek	Open Cut	Fish Propagation
Nebraska				
Keya Paha	602.1	Unnamed Tributary to Buffalo Creek	Open Cut	Class B Warmwater
Keya Paha	610.6	Wolf Creek	Open Cut	Class B Coldwater

County	Approximate Milepost	Waterbody Name	Proposed Crossing Technique[a,b,c]	Relevant Surface Water or Fishery Class/Rating[d]
Keya Paha	612.5	Unnamed Tributary to Keya Paha River	Open Cut	None
Keya Paha	613.7	Spotted Tail Creek	Open Cut	Class B Coldwater
Keya Paha	614.1	Unnamed Tributary to Spotted Tail Creek	Open Cut	None
Keya Paha	617.0	Alkali Creek	Open Cut	Class B Warmwater
Boyd	618.1	Keya Paha River	HDD	Class A Warmwater
Holt	626.1	Niobrara River	HDD	Class A Warmwater
Holt	626.9	Beaver Creek	Open Cut	Class B Coldwater
Holt	632.7	Big Sandy Creek	Open Cut	Class A Warmwater
Holt	640.0	Unnamed Tributary to Brush Creek	Open Cut	Class B Coldwater
Holt	640.3	Unnamed Tributary to Brush Creek	Open Cut	Class B Coldwater
Holt	646.8	North Branch Eagle Creek	Open Cut	Class B Coldwater
Holt	649.3	Middle Branch Eagle Creek	Open Cut	Class B Coldwater
Holt	653.1	East Branch Eagle Creek	Open Cut	Class B Coldwater
Holt	663.0	Redbird Creek	Open Cut	Class B Warmwater
Holt	680.0	South Branch Verdigre Creek	Open Cut	Class B Coldwater
Antelope	683.1	Big Springs Creek	Open Cut	Class B Coldwater
Antelope	713.3	Elkhorn River	HDD	Class A Warmwater
Boone	743.8	Beaver Creek	Open Cut	Class A Warmwater
Nance	759.6	Plum Creek	Open Cut	Class B Warmwater
Nance	761.7	Loup River	HDD	Class A Warmwater
Nance	766.7	Prairie Creek	Open Cut	Class B Warmwater
Polk	775.1	Platte River	HDD	Class A Warmwater
York	803.4	Beaver Creek	Open Cut	Class B Warmwater
York	812.8	West Fork Big Blue River	Open Cut	Class A Warmwater
Fillmore	831.8	Turkey Creek	Open Cut	Class B Warmwater

Sources: Geographic Information System data source for waterbody name—U.S. Geological Survey National Hydrography Dataset (USGS 2012); data source for Montana—Montana Department of Environmental Quality 2012; data source for South Dakota—South Dakota Department of Environment and Natural Resources 2012 and South Dakota Legislature 2012; data source for Nebraska—Nebraska Department of Environmental Quality 2012.

[a] Open cut—One of the four open-cut methods (non-flowing, flowing, dry flume, or dry dam-and-pump) to be used for these crossings.
[b] HDD = horizontal directional drilling.
[c] The HDD method would also be used to cross one intermittent waterbody, Bridger Creek (MP 433.6).
[d] WW = warmwater.

To further reduce the potential impacts to fisheries habitat caused by removal of riparian cover, grading and grubbing of waterbody banks would be minimized. For the most part, grubbing would be limited to the proposed pipeline trench and vehicle access areas. Additional workspace would be located at least 10 feet from waterbodies to minimize riparian disturbance. The banks of the waterbodies would be stabilized with temporary sediment barriers within 24 hours of completing proposed construction activities and most minor and intermediate waterbody crossings would be completed within 2 to 3 days. Where conditions allow, riparian vegetation would be restored with native plants; reclamation seed mixes would be determined through consultation with the local Natural Resources Conservation Service and relevant state and local agencies. In the event that a waterbody crossing would be located within or adjacent to a wetland crossing, wetland crossing impact reduction measures would be implemented to the extent practicable.

Compliance with mitigation measures mandated in permit conditions established by state and federal agencies would occur in addition to the measures included in the CMRP (Appendix G) to protect fisheries resources. In Montana, compliance with fisheries and waterbody protection measures (as described in Appendix N, Supplemental Information for Compliance with MEPA) would be required. On BLM lands in Montana, consistency with fisheries mitigation measures attached to the federal grant of right-of-way (ROW) would be required. Also required would be compliance with conditions in South Dakota that were developed by the South Dakota Public Utility Commission and attached to its Amended Final Decision and Order, Notice of Entry HP09-001.

Impacts and mitigation measures for specific waterbody crossing methods are described in the following sections. As required by the Montana Department of Environmental Quality (MDEQ) for Nationwide Permits, water must be diverted, pumped or flumed around the trench at pipeline crossings where water is present. Therefore, the non-flowing open-cut and flowing open-cut crossing methods may not meet the Section 401 requirements of the MDEQ for Nationwide Permits. For Standard Permits, separate Section 401 verification from the MDEQ would be required.

Potential Impacts Associated with Open-Cut Crossings

Potential impacts resulting from all open-cut crossing methods include disturbance of the streambed, resulting in impacts to subsurface macroinvertebrates (invertebrates that can be seen without the use of a microscope) and potential interference with hyporheic flows (mixing of shallow groundwater and surface water). Construction would result in a potential reduction of habitat, alteration of habitat structure, alteration of substrate and bank structure, and changes in the benthic invertebrate community (Levesque and Dube 2007, Brown et al. 2002, Chutter 1969, Cordone and Kelley 1961).

Open-cut methods could potentially increase the amount of sediment entering waterbodies during construction due to erosion of the excavated bank and streambed. The level of temporary elevated suspended sediment loading would depend upon the open-cut method selected and characteristics of the stream and adjacent uplands. Excessive suspended sediment can interfere with respiration in fish and invertebrates, leading to mortality or reduced productivity in rearing and spawning (Newcombe and Jensen 1996, Sutherland 2007, Wood and Armitage 1997). Suspended sediment could result in short-term impairment of foraging efficiency for species that are visual predators. Longer-term effects could occur if sediment covers spawning gravels, preventing water exchange and oxygen to developing eggs or young fish (sack or emerging fry), causing increased mortality, and reducing recruitment to the population (Newcomb and MacDonald 1991).

The quantity, cover, and type of riparian bank vegetation vary depending upon site-specific waterbody conditions and locations. Removal of bank vegetation (including overhead cover) could lead to bank instability and erosion. Loss of riparian vegetation reduces shading, causing an increase in water temperature and a reduction in dissolved oxygen, nutrient input, food input, and hiding cover (Brown et al. 2002, Ohmart and Anderson 1988). A reduction in escape cover can increase vulnerability of certain species to predation. Loss of riparian vegetation and disturbance to the bank and substrate can alter benthic communities and change food availability (Brown et al. 2002). Trenching in the stream could cause a local increase in water temperature due to increased turbidity; the increased temperature as well as the turbidity could result in a temporary reduction in water quality and short-term impacts to fish and macroinvertebrates.

Planned mitigation measures include revegetation of riparian areas upon construction completion (as described in Section 4.5, Terrestrial Vegetation), limiting the extent of riparian vegetation loss during construction, maintaining a narrow ROW width, and timing the crossing of intermittent or ephemeral streams for when they are dry (to the extent reasonably practicable). These mitigation measures would reduce the potential impacts associated with all open crossing methods.

Non-Flowing Open-Cut Crossings

The non-flowing open-cut method would be used in dry washes, swales, ephemeral streams, and other drainages when there is no flowing water. Impacts to aquatic resources would be minimal during construction activities as few, if any, aquatic resources would be present. There may be viable benthic organisms if the moisture content of the streambed is sufficient in the area being trenched, resulting in a short-term, direct impact to these animals. Once water returns to the crossing site, sediment loosened by trenching activities, bank erosion, and wind-driven erosion could wash sediments downstream, causing an increase in sediment deposition downstream. This could affect fish and benthic communities, if any are present, downstream of the crossing.

Typical mitigation measures would include installation of sediment barriers, temporary slope breakers (water bars), mulching, stabilization of slopes including initiation of revegetation of disturbed soils within 24 hours of completion of the pipeline crossing, at steep slopes the installation of rip rap or rock gabions, grading to keep sediments from entering the water course, and restoration of the banks to as close to the original slope and contours as practicable. In addition, each crossing would have a specific crossing plan that will outline the appropriate mitigation to be employed. These mitigation measures are discussed in greater detail in the CMRP (Appendix G).

Implementation of the mitigation measures would result in temporary impacts to fisheries and aquatic organisms associated with this crossing technique. The primary potential impact would be an increase in sedimentation to downstream habitats. As water returns to the dry streambed, however, a naturally occurring increase in sedimentation would be expected as dry sediments are re-suspended and carried downstream with the flow. The potential increase in sediment load from the trenching activities would likely be negligible as it mixes with natural streambed materials, provided that bank stabilization methods have been employed such that there is not a significant increase in bank erosion.

Flowing Open-Cut Crossings

The typical flowing open-cut crossing method allows the construction spread to move more quickly and reduces the amount of time the waterbody is subjected to construction disturbance. It is generally the preferred construction crossing method to reduce construction time and expense. However, it is not always practicable and construction of flowing open-cut crossings may result in additional short-term impacts, including direct mortality to fishery and aquatic resources from direct in-stream trenching and backfilling. Sediment released during trenching of the proposed pipeline crossings would be transported by the water flowing through the trench and has the potential to affect downstream aquatic life and habitat through either direct exposure or sediment deposition (Schubert et al. 1985, Anderson et al. 1996, Reid et al. 2004). Biological effects associated with fine sediment on fishes can vary and include gill irritation, avoidance behaviors, stress, and in extreme cases, long durations of exposure to suspended sediments, which can have lethal effects on individuals (Newcombe and MacDonald 1991, Wood and Armitage 1997, Waters 1995).

The length and extent of direct elevated suspended sediment plumes (and associated biological impacts) would depend upon the waterbody flow, disturbed sediment particle size, implementation of BMPs, type of installation activity, and duration of instream disturbance (Reid and Anderson 1998, Levesque and Dube 2007). Sediment deposition and elevated suspended sediment from open-cut trenching and backfilling have been shown to have effects on waterbody substrates and benthic invertebrate communities that can last from hours to years depending on site-specific conditions and installation activities (Levesque and Dube 2007). The highest rate of suspended sediment elevation (and associated potential impacts on aquatic resources) from open-cut installation typically occurs during instream trenching. Typically, the sedimentation effects from instream trenching on aquatic biological resources are minor and elevated suspended sediment in the water column returns to background levels within hours to days of instream disturbance (Levesque and Dube 2007).

As described in the CMRP (Appendix G), instream trenching and backfill work periods would be carried out quickly (24 hours for minor, 48 hours for intermediate, and in accordance with site-specific plan for major waterbodies, as practical) to minimize the time period in which sediment could be suspended by construction activities. BMPs would be implemented, as described in the CMRP, to minimize sediment from stream bank and upland erosion entering waterbodies. Based on the implementation of the measures described in the CMRP and additional measures mandated by state and federal permit agencies, elevated suspended sediment from proposed Project construction would be short term and temporary. To minimize effects of suspended sediment on eggs and young fish, appropriate construction windows would be determined for each crossing. As indicated in Table 3.7-2, the majority of fish associated with the proposed Project spawn in April, May, June, and July. Not all fish spawn in all those months. This would allow installation of the proposed pipeline during much of the year when no spawning fish are present and would reduce potential impacts during this critical life stage. Potential longer-term impacts after construction could include scouring of downstream areas or streambed disturbance if streambed modifications occur.

Dry Flume and Dry Dam-and-Pump Open-Cut Crossings

The dry flume or dry dam-and-pump open-cut methods would be used when crossing selected environmentally sensitive waterbodies. These methods have a potential to temporarily affect fishery resources, possibly resulting in behavioral changes such as avoidance or stress on individuals. Pump failure during flowing open-cut dam-and-pump crossings may result in overtopping of the coffer dam, causing erosion and subsequent transport of suspended and fine sediment. To address this potential impact, a pump capable of maintaining 1.5 times the ambient flow rate at the time of construction would be used (see Appendix G, CMRP). Additionally, at least one backup pump would be available on site and coffer dams would be constructed with materials that prevent sediment and other pollutants from entering the waterbody (e.g., sandbags or clean gravel with plastic liner). Intake hoses would be screened to prevent entrainment of fish, although microinvertebrates (invertebrates of microscopic size, too small to be seen with the naked eye) may be transferred through the pump. In summary, the dam-and-pump open-cut crossings have a potential to temporarily affect fishery resources. Dam-and-pump crossings may block or delay normal fish movements. Short-term delays in movements of spawning migrations could have adverse impacts on fisheries; however, most crossings of streams less than 100 feet (minor and intermediate waterbodies) would be completed in less than 48 hours and potential impacts would be temporary.

HDD Crossings

The HDD method for crossing waterbodies would be used to minimize disturbance to aquatic habitat, stream banks, and recreational or commercial fisheries. Impacts could occur if there is an unintended release of drilling fluids (i.e., a *frac out*) during the HDD operation. A frac out could release bentonitic drilling mud into the aquatic environment. The released drilling mud would readily disperse in flowing water or eventually settle in standing water. Although bentonite is non-toxic, suspended bentonite may produce short-term impacts to the respiration of fish and aquatic invertebrates due to fouled gills. Longer-term effects could result if larval fish are covered and suffocate due to fouled gills and/or lack of oxygen. If the frac out occurred during a spawning period, egg masses of fish could be covered, thus inhibiting the flow of dissolved oxygen to the egg masses. Benthic invertebrates and the larval stages of pelagic organisms could also be covered and suffocate.

To minimize the potential for these impacts to occur, a contingency plan would be implemented to address an HDD frac out. This plan would include preventive and response measures to control the inadvertent release of drilling fluids. The contingency plan would also include instructions for downstream monitoring for any signs of drilling fluid during drilling operations and would describe the response plan and impact reduction measures in the event that a release of drilling fluids occurred. Drill cuttings and drilling mud would be disposed of according to applicable regulations; disposal/management options may include spreading over the construction ROW in an upland location or hauling to an approved off-site, licensed landfill or other approved sites.

Water Withdrawals

Water would be withdrawn for hydrostatic testing, HDD operations (drilling mud) and dust control from nearby rivers and streams, privately owned reservoirs, and/or municipal sources. These withdrawals would avoid spawning periods for most recreational important fishers. At this time, Keystone has identified the following waterbodies for potential water withdrawal sources:

- Frenchmen River
- Milk River
- Missouri River
- Yellowstone River
- Little Missouri River
- Gardner Lake
- North Fork Moreau River
- Cheyenne River
- Bad River
- White River
- Keya Paha River
- Niobrara River
- Elk Horn River
- Loup River
- Platte River

Water withdrawal rates would be controlled to be less than 10 percent of the base flow of the source waterbody at the time of testing. Minor waterbodies generally would not contain sufficient water for use in hydrostatic testing. Surface water withdrawal permits from larger rivers with existing water rights would be regulated by state regulatory agencies to preserve existing water rights and environmental requirements. If inadequate water is available from rivers, Keystone would use alternative water sources nearby such as local private wells or municipal sources for HDD operations, hydrostatic testing the mainline, and dust control, as allowed by regulatory agencies. Keystone has indicated that in the event surface water is unavailable, groundwater would be used for HDD operations, hydrostatic testing, and dust control. Water would be purchased from nearby willing sellers with available water rights and would not increase overall groundwater use. Additional discussion of water sources is provided in Section 4.3.3.2, Surface Water.

Water withdrawal from well sources adjacent to stream and river can influence stream flows. This would only occur in if the well is hydraulically connected to the stream or river and associated with a shallow aquifer. Reductions in streamflows can reduce aquatic habitat quantity and quality. It can cause an increase in temperature, reduce juvenile rearing habitats, elevate suspended sediment concentrations and reduce spawning and egg development habitats. Mitigation for this potential impact include limiting water withdrawals to wells that are not hydraulically connected to the adjacent stream or river and limiting the water withdrawal such that less than 10% of the flow of the stream is effected (this is only applicable to rivers with substantial flows). Further, aquatic resources would be protected as withdrawal rates could be limited by conditions mandated by applicable local, state and federal permits.

If water is withdrawn from a surface water source during a low-flow period or at a time when particular flow ranges are needed for other uses, habitat reductions for fisheries and aquatic invertebrates could occur. This potential impact could be mitigated though proper timing of water withdrawal or the selection of an alternative water source. Keystone proposes to equip the hydrostatic test water intake structure (often a large box-type structure) with 500 mesh (0.001 inch, 0.025 millimeter, 25 microns) screens to prevent the entrainment of fish and macroinvertebrates. Although some eggs, ichthyoplankton (drifting fish eggs and larvae), and drifting microinvertebrates could still be entrained, eggs would not be captured if water is withdrawn outside of the spawning and egg development timing window, and the abundance and rapid reproduction rate of microinvertebrates would limit impacts to these species.

To reduce the potential for the transfer of aquatic invasive species resulting from hydrostatic testing, hydrostatic test waters would not be discharged to watersheds outside of the withdrawal basins (i.e., no inter-basin transfers). In some locations, hydrostatic test water would be discharged to upland locations within the same basin, relying on infiltration for eventual return to the basin. In other locations, water would be returned to its waterbody of origin. Proportionally high discharge volumes to source areas could displace fish or disrupt spawning, rearing, or foraging behavior (Manny 1984). Discharged water may dislodge sediment, leading to an increase in suspended sediment. The discharge of large volumes of hydrostatic test waters into surface waters could temporarily cause a change in the water temperature and dissolved oxygen levels, could increase downstream flows, and could increase stream bank and substrate scour. Energy dissipating devices and dewatering structures would be used to dissipate and remove sediment from hydrostatic test water discharges. Guidelines for water discharge in overland areas and absorption back through the ground would allow water temperatures to reach pre-withdrawal conditions prior to entering streams. No chemicals would be used in hydrostatic test water.

All permits required by federal, state, and local agencies for procurement of water and for the discharge of water used in the hydrostatic testing operation would be acquired prior to hydrostatic testing. Any water withdrawal or discharge would be performed consistent with permit notice requirements and with sufficient notice to make water sample arrangements prior to obtaining or discharging water. Water samples for analysis would be obtained from each source before filling the pipeline. In addition, water samples would be taken prior to discharge of the water, as required by state and federal permits. National Pollutant Discharge Elimination System (NPDES) permits are required for the discharge of both hydrostatic testing fluids and any water obtained during construction dewatering. Both of these activities can be authorized under an NPDES General Permit for Hydrostatic Testing and an NDPES General Permit for Dewatering. U.S. Environmental Protection Agency Regions 7 and 8 would issue a Section 402, Clean Water Act NPDES permit for the discharge of hydrostatic test water.

The U.S. Fish and Wildlife Service (USFWS) has expressed concerns about any water withdrawals from the Platte River. They were requested to provide informal section 7 consultation and technical assistance for the Project. In their response letter dated September 4, 2012 (FWS NE: 2013-013) from Michael D. George to K. Nicole Gibson, Ph.D., they state: “Since 1978, the USFWS has concluded in all of its section 7 consultations on water projects in the Platte River basin that the Platte River ecosystem is in a state of jeopardy, and any federal action resulting in a water depletion to the Platte River System will further or continue the deterioration of the stressed habitat conditions." They go on the say that any depletion of flows, either direct or indirect, from the Platte River System would be considered significant and they consider the river and associated wetland habitats to be "resources of national and international importance." To mitigate any impacts to the Platte River ecosystem, Keystone would coordinate with the USFWS before any water withdrawals.

During construction activities, there is also the potential for spills of fuel or other hazardous liquids. Impacts from fuel spills are assessed in Section 4.13, Potential Releases.

Access Roads

The proposed construction of new access roads could cross waterbodies that contain fish species of recreational or commercial significance. Depending on site-specific conditions, bridges or culverts may need to be installed to cross the waterbodies. Construction of these structures would cause an increase in sediment load due to work directly in the waterbody (culvert placement) or disturbance to the banks (bridge installation). Impacts to the aquatic resources from these activities would be similar to those described above for open-cut crossings. Potential impacts to the resources would be short term and minor if similar mitigation measures for open-cut crossings, including implementation of the mitigation measures outlined in the CMRP, are used. Furthermore, all bridge and culvert installations would require specific permits from respective state agencies, with each permit containing specific stipulations to protect aquatic resources. Most access to the proposed Project ROW is along existing roads where waterbody crossings are established. The proposed Project would cause an increase in traffic along existing roads, but impacts from increased traffic would not add to impacts on aquatic resources.

4.7.3.3 Proposed Project Operational Impacts

During operation of the proposed Project, non-forested vegetation would be maintained along the permanent ROW. The reduction of trees in the permanent ROW could result in a permanent loss of shading, nutrients, and habitat enrichment features for fish at some waterbody crossings. Impacts associated with the permanent removal of riparian vegetation would be similar to those described in Section 4.7.3.2, Construction Impacts. A permanent ROW would not be maintained in those areas that would be crossed using the HDD method; therefore, no permanent riparian vegetation impacts are anticipated in these areas. Herbicides would be used to control vegetation within the permanent ROW during proposed Project operation. The use of herbicides near a waterbody could harm aquatic organisms, including fish. Herbicides could enter a waterbody through runoff, seepage through the soil, and direct introduction to water during application through overspray or wind drift. In accordance with the CMRP, no herbicides would be used within 100 feet of a wetland or waterbody and all herbicide application would be performed by a state-licensed pesticide applicator.

Restored stream banks could be vulnerable to erosion during the first few years after revegetation and stabilization, potentially leading to sediment entering waterbodies and impacting fisheries habitat. The restoration and revegetation measures presented in the CMRP would be implemented to minimize soil erosion including in riparian areas.

Routine aerial and ground surveillance inspections would be used to identify areas of erosion, exposed pipeline, and nearby construction activities. These practices would allow for early identification of bank stability problems and would minimize the potential for continuing environmental effects during proposed pipeline operation.

To reduce potential impacts to sensitive aquatic resources as a result of maintenance activities, the appropriate state agency would be consulted prior to initiation of maintenance activities beyond standard inspection measures.

Due to the elevated temperature of the oil in the proposed pipeline, water temperatures at stream crossings could potentially increase. Appendix S presents a pipeline temperature effects study. This study focused on the potential effects to soil temperatures as a result of the buried pipeline. The study concluded that the proposed pipeline would increase soil temperature. Given this, it is reasonable to conclude that the proposed pipeline could also elevate stream temperatures. Studies along the Trans-Alaska Pipeline System (BLM 2002) indicate that groundwater temperatures are elevated by the heat from the pipeline (the Trans-Alaska Pipeline System is also a heated pipeline that is buried in several river drainages).

The degree of heating would be dependent upon river discharge. Temperature impacts would likely only occur in streams with very low flows or isolated pools and would be more likely to occur in spring and fall based on the soil temperature profiles presented in Appendix S, Pipeline Temperature Effects Study. Increases in water temperature can affect fish by decreasing oxygen supply, causing premature movements of juvenile fish, and reduced food supply. Aquatic insects could mature more rapidly and be less available as food for the local fish population outside the immediate vicinity of the crossing.

The burial depth of the proposed pipeline could mitigate these potential temperature impacts. Typical pipeline burial depth is 48 inches; however, Keystone has indicated that burial depth under streams would be a minimum of 60 inches. Additionally, HDD installation would locate the pipeline well below the river bottom, further mitigating potential impacts. If impacts were to occur, they would be expected to be isolated due to the likelihood of few fish in the stream reaches. Larger rivers would not be affected by temperature changes because the volume of water flowing over the proposed pipeline would be great enough to compensate for any increases in the local temperature profile.

4.7.4 Recommended Additional Mitigation

Proposed impact reduction measures would result in the proposed Project having low potential to adversely affect recreationally or commercially important fisheries as a result of construction and normal operation. The combination of fish life history stage timing considerations, construction impact mitigation, site-specific crossing techniques, seasonal conditions, contingency plans, water quality testing, and water quality compliance results in a low potential effect on fisheries resources from proposed Project construction and normal operation.

In addition to the mitigation measures that Keystone would implement as discussed above, the following additional mitigation measures are recommended to minimize adverse impacts to fisheries during the construction and operational phases:

- Construction at open-cut river crossings should be planned to take advantage of non-spawning time frames (August through March), thus reducing impacts during this critical life stage.

- To reduce the potential impacts of hydrostatic water withdrawal on eggs and drifting macroinvertebrates in sensitive surface water sources, water withdrawal should be avoided during any low-flow periods that coincide with the spawning and egg development timing window. This can be achieved through timing of water withdrawal or the selection of an alternative water source.

4.7.5 Connected Actions

4.7.5.1 Bakken Marketlink Project

The Bakken Marketlink Project would include construction of a new, approximately 5-mile pipeline, metering systems, three new storage tanks near Baker, Montana, and two storage tanks in Cushing, Oklahoma. Keystone reported that the property proposed for the Bakken Marketlink Project facilities near Pump Station 14 is currently used as pastureland and hayfields and that a survey of the property indicated that there are no waterbodies or wetlands on the property.

The Bakken Marketlink Project route would cross one perennial stream (Sandstone Creek) which supports several of the same recreational and commercial fish species identified on Table 3.7-1, including black bullhead (*Ameiurus melas*), channel catfish (*Ictalurus punctatus*), common carp (*Cyprinus carpio*), northern pike (*Esox lucius*), and yellow perch (*Perca flavescens*).

The permit applications for the Bakken Marketlink Project would be reviewed and acted on by other agencies. Those agencies would conduct more detailed environmental review of the Bakken Marketlink Project. If the project crosses or disturbs aquatic resources, the potential impacts to sensitive fisheries and aquatic habitat would be evaluated during the environmental reviews. Potential fisheries impacts would be evaluated and avoided, minimized, or mitigated, as appropriate, during state and federal consultation and permitting for the project. Many of the potential impacts of the connected action would be similar to those described above.

4.7.5.2 Big Bend to Witten 230-kV Transmission Line

Upgrades to the power grid in South Dakota to support power requirements for its pump stations would include a new 230-kilovolt transmission line that would be constructed and operated by the Basin Electric Power Cooperative and a new substation that would be constructed by the Western Area Power Administration and owned and operated by Basin Electric Power Cooperative.

The Big Bend to Witten 230-kilovolt (kV) electrical transmission line would cross three perennial streams along the preferred route (Basin Electric Power Cooperative, 2011). Potential impacts to fisheries and aquatic resources would be minimized by spanning them entirely. Project construction would use a span length between 650 and 950 feet. The largest perennial stream crossed is the White River, which has a maximum waterbody width of 570 feet. In addition, the transmission line would run parallel to and within 100 feet of perennial and intermittent streams for a cumulative distance of 28,000 feet. An adequate buffer between the transmission line corridor and adjacent surface waters would be needed to minimize continued impacts to fisheries and aquatic habitat during initial construction and long-term operation and maintenance activities.

In general, transmission line construction impacts are short term and/or negligible to waterbodies and associated fisheries and aquatic habitat because these lines typically span surface water bodies, many lines would parallel existing roadways or ROWs, and power lines would be installed by local providers under local permitting requirements. Compliance with federal, state, and local agency requirements for water crossings would ensure that activities that are the most feasible and of lowest impact are performed at the site.

4.7.5.3 Electrical Distribution Lines and Substations

The proposed Project would require electrical service from local power providers for pump stations and other aboveground facilities in Montana, South Dakota, and Nebraska. At the time this report was prepared, there was no information regarding the planned locations of electrical distribution lines and substations in Nebraska and Kansas.

Based on a geographic information system analysis of the planned locations for electrical lines and substations and intersections with waterbodies identified in the 2012 National Hydrography Dataset (U.S. Geological Survey 2012), there would be a total of 217 waterbodies crossed in Montana. Of these, Duck Creek is the only waterbody classified as perennial. Using the same geographic information system comparison, there would be a total of 250 waterbodies crossed in South Dakota, of which 16 are perennial.

Proposed construction and operation impacts on waterbodies potentially containing fisheries would be similar to those described for the transmission line discussed above; however, it is likely that the poles would be smaller and that the stringing and staging areas disturbed around the pole installation sites would likely be smaller.

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