

Kootenai Lower Meander Project

Draft Environmental Assessment

March 2017



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Acronyms and Abbreviations

BiOp	Biological Opinion
BPA	Bonneville Power Administration
cfs	cubic feet per second
dB	decibel
dBA	A-weighted decibel
EA	Environmental Assessment
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species List
FCRPS	Federal Columbia River Power System
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
GHG	greenhouse gas
IDFG	Idaho Department of Fish and Game
KRHRP	Kootenai River Habitat Restoration Program
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
OHW	ordinary high water
SHPO	State Historic Preservation Office
Tribe	Kootenai Tribe of Idaho
U.S.C.	United States Code
USACE	US Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

1 Purpose and Need for Action

1.1 Introduction

The Bonneville Power Administration (BPA) proposes to provide funding for the Kootenai Tribe of Idaho's (Tribe) Lower Meander Project. The Lower Meander Project is one of several projects being implemented under the Tribe's Kootenai River Habitat Restoration Program. This project would be located on the Kootenai River 0.5 to 1.0 miles above the town of Bonners Ferry, Idaho and is designed to improve habitat conditions for Kootenai River white sturgeon, which are listed as endangered under the Endangered Species Act (ESA; 16 U.S. Code [USC] § 1531 *et seq.*), and other native fish by enhancing islands, side channels, restoring stream banks and creating deep pools.

BPA prepared this draft Environmental Assessment (EA) under the National Environmental Policy Act (NEPA; 42 USC § 4321 *et seq.*) and the Council on Environmental Quality implementing regulations, which require federal agencies to assess the effects that their actions may have on the environment. This draft EA was prepared to determine if the project is likely to significantly affect the environment and warrant preparing an environmental impact statement or whether it is appropriate to prepare a Finding of No Significant Impact.

1.2 Need for Action

The need for the Proposed Action is to restore fish habitat features lost or degraded by past and current land use practices in the Kootenai River. The Lower Meander Project is designed to meet this need by restoring and improving Kootenai River white sturgeon habitat in the river near Bonners Ferry, Idaho by excavating new pools, enhancing existing islands and side channels, installing large wood structures, and planting riparian vegetation. The Kootenai River near Bonners Ferry, Idaho is a migratory corridor for native fish but currently provides poor fish habitat due to a number of limiting factors, including: lack of nutrients, cover, pools, and instream habitat complexity.

1.3 Purposes

In meeting the need for action, BPA seeks to achieve the following purposes:

- Help mitigate for effects of the construction and operation of Libby Dam and the Federal Columbia River Power System (FCRPS) on fish and wildlife in the Kootenai River, pursuant to the Pacific Northwest Electric Power Planning and Conservation Act of 1980 (Northwest Power Act) (16 U.S.C. § 839 *et seq.*).
- Assist in carrying out commitments related to the 2006 Libby Dam Biological Opinion as clarified in 2008 that directs the BPA and US Army Corps of Engineers to "support the Kootenai Tribe of Idaho's good-faith efforts to implement the Kootenai River Restoration Project Master Plan." (USFWS 2006, 2008)
- Implement BPA's Fish and Wildlife Implementation Plan Environmental Impact Statement and Record of Decision policy direction, which call for protecting weak stocks, like the Kootenai River white sturgeon, while sustaining overall populations of fish for their economic and cultural value (BPA 2003).
- Minimize harm to natural or human resources, including species listed under the ESA.

In addition to BPA's purposes, the Tribe seeks to achieve the following biological objectives:

- Increase distribution and abundance of large deep pools to provide holding and staging habitat for Kootenai River white sturgeon and to encourage sturgeon to migrate upstream to higher quality spawning habitat based on a "pool ladder" concept, and to support burbot spawning, staging, foraging, and migration.

- Increase the amount of riparian vegetation in the floodplain to improve primary production and increase food sources of all life stages of white sturgeon, burbot, bull trout, kokanee, westslope cutthroat trout, and redband trout.

1.4 Background

BPA is a federal power marketing agency within the United States Department of Energy. BPA's operations are governed by several statutes, including the Northwest Power Act. Under the Act, BPA must protect, mitigate, and enhance fish and wildlife and their habitats affected by the development and operation of the FCRPS. BPA must fulfill this duty in a manner consistent with the Fish and Wildlife Program developed by the Northwest Power and Conservation Council (Council). Under this program, the Council reviews habitat improvement (or restoration) plans submitted by various entities, and makes recommendations to BPA about which fish and wildlife projects to fund.

The Tribe began data collection and analysis of Kootenai River habitat conditions under the Council's Program in 2006 and completed the Kootenai River Habitat Restoration Program Master Plan (Master Plan) in 2009 (Kootenai Tribe of Idaho, 2009)(described in Section 1.3.3). In 2011, the Tribe submitted a proposal to the Council to implement specific habitat restoration projects consistent with the framework presented in the Master Plan. In 2012, the Council's Independent Scientific Review Panel reviewed the Kootenai River Habitat Restoration Program and the list of proposed projects, and recommended that BPA fund the proposal.

1.4.1 Libby Dam Biological Opinion

Libby Dam is on the Kootenai River in Montana approximately 220 miles from its confluence with the Columbia River. The US Army Corps of Engineers (USACE) operates Libby Dam for flood control, hydropower generation, navigation, recreation, fish, and wildlife. It is a major upriver storage dam for the region.

The USACE, the Bureau of Reclamation, and BPA have consulted with the US Fish and Wildlife Service (USFWS) and National Marine Fisheries Service to address the effects of the operation of FCRPS projects, including Libby Dam, on fish listed under the Endangered Species Act (ESA) and their designated critical habitat. Dam operations have affected annual peak flows, temperature, and sediment transport in the Kootenai River. In 2003, the USACE began altering discharges at Libby Dam, on an interim basis, to more closely mimic the Kootenai River's historical flow patterns, while still providing flood control.

In February 2006, the USFWS issued a Biological Opinion on the Effects of Libby Dam Operation on the Kootenai River White Sturgeon, Bull Trout and Kootenai Sturgeon Critical Habitat (Libby Dam BiOp) (USFWS 2006). The Kootenai River white sturgeon is one of 18 land-locked populations of white sturgeon in western North America. The population of Kootenai River white sturgeon, a freshwater fish, has declined primarily due to the changes in river flows caused by the existence of Libby Dam and its operations, other factors also include historical over-harvest, and floodplain development for agricultural activities. Dam operations have reduced annual peak flows by 50 percent and disrupted the historical rise and fall of water levels. This has created unnatural flow fluctuations and largely eliminated the river's connection with its floodplain.

The Libby Dam BiOp identifies general categories of actions and habitat improvements that would enhance conditions where sturgeon currently spawn, coax sturgeon to spawn in upstream areas where there is more suitable habitat, and improve habitat conditions associated with the Kootenai River. The restoration actions proposed for the Lower Meander Project are consistent with those identified in the BiOp.

1.4.2 Kootenai River Restoration Program Master Plan

In 2006, BPA provided funding to the Tribe to begin development of a Master Plan, and to continue with critical data collection and planning activities. In 2009, the Tribe completed a master plan for a large-scale, ecosystem-based river habitat restoration program. This master plan called for restoration of a 55-mile segment of the Kootenai River, extending from the confluence of the Moyie and Kootenai rivers, downstream to the Canadian border. It provides a summary of historical and existing conditions in the 55-mile project area, and identifies specific physical and biological characteristics in each of the river segments of the project area. It also identified factors that limit habitat for aquatic species including sturgeon, burbot, trout, and other native fish species within the project area. Based on this information, the plan identified restoration strategies and habitat enhancements to address the limiting factors in each river segment.

BPA's funding allowed the Tribe to use the completed Master Plan to identify specific habitat projects in the Kootenai River that would enhance habitat for Kootenai River white sturgeon as required by the Libby Dam BiOp. These projects also address habitat and nutrient limiting factors for burbot, trout and other native fish.

With funding primarily from BPA, the Tribe has implemented six habitat restoration projects under this plan from 2011 to 2016 upstream of the Lower Meander project site and one project immediately downstream of this project. The Lower Meander Project would be the eighth project to be implemented under the Kootenai River Habitat Restoration Program and is designed to achieve the following objectives that address site-specific limiting factors for fish habitat:

- Establishing a sequence of high-quality, deeper pools upstream of Bonners Ferry to support migration of adult Kootenai River white sturgeon to higher quality spawning habitat;
- Adding fill and plantings to existing islands to promote riparian vegetation development and food web support;
- Grading and planting eroding river banks to establish sustainable riparian buffers;
- Installing bank structures to increase complexity, promote bank stability and to maintain pools; and
- Installing woody debris structures in side channels and along bank margins to improve habitat complexity.

1.5 Public Involvement

BPA mailed scoping letters on October 12, 2016 to landowners, Tribes, government agencies, and other potentially affected or concerned citizens and interest groups that provided information about the proposal and EA scoping period, requested comments on issues to be addressed in the EA, and described how to comment. The public letter was posted on a project website established by BPA to provide information about the proposal and the EA process (www.bpa.gov/goto/KootenaiMeander). The public comment period began on October 12, 2016, and BPA accepted comments on the proposal from the public until November 14, 2016.

BPA identified five tribes that could have an interest in the proposed project, based on their historical or current use of the land in the project area: the Kalispel Tribe of Indians, the Coeur d'Alene Tribe, the Confederated Salish and Kootenai Tribes, the Spokane Tribe of Indians, and the Kootenai Tribe of Idaho. BPA provided information to, and requested information from, these tribes.

BPA considered comments it received during the scoping period in the development of this draft EA. Four comment letters were received: three expressed support of the proposed project and the fourth was an inquiry regarding an unrelated issue. The full text of the comments, including copies of any letters received, is available on BPA's website at: www.bpa.gov/goto/KootenaiMeander. None of the comments received in scoping resulted in the development of additional alternatives.

2 Proposed Action and Alternatives

This chapter describes the Proposed Action and the No Action Alternative, and compares the alternatives by project purposes and their potential environmental consequences.

2.1 Proposed Action

The Lower Meander Project is located between 0.5 and 1.0 miles upstream from Bonners Ferry, Idaho (Figures 1 and 2) and is one of several river habitat improvement projects that the Tribe has implemented since beginning restoration efforts in 2011. As with the previous projects, the Proposed Action is intended to improve habitat for juvenile and adult Kootenai River white sturgeon, burbot, bull trout, and other native fishes.

Figure 1. Lower Meander Project Location

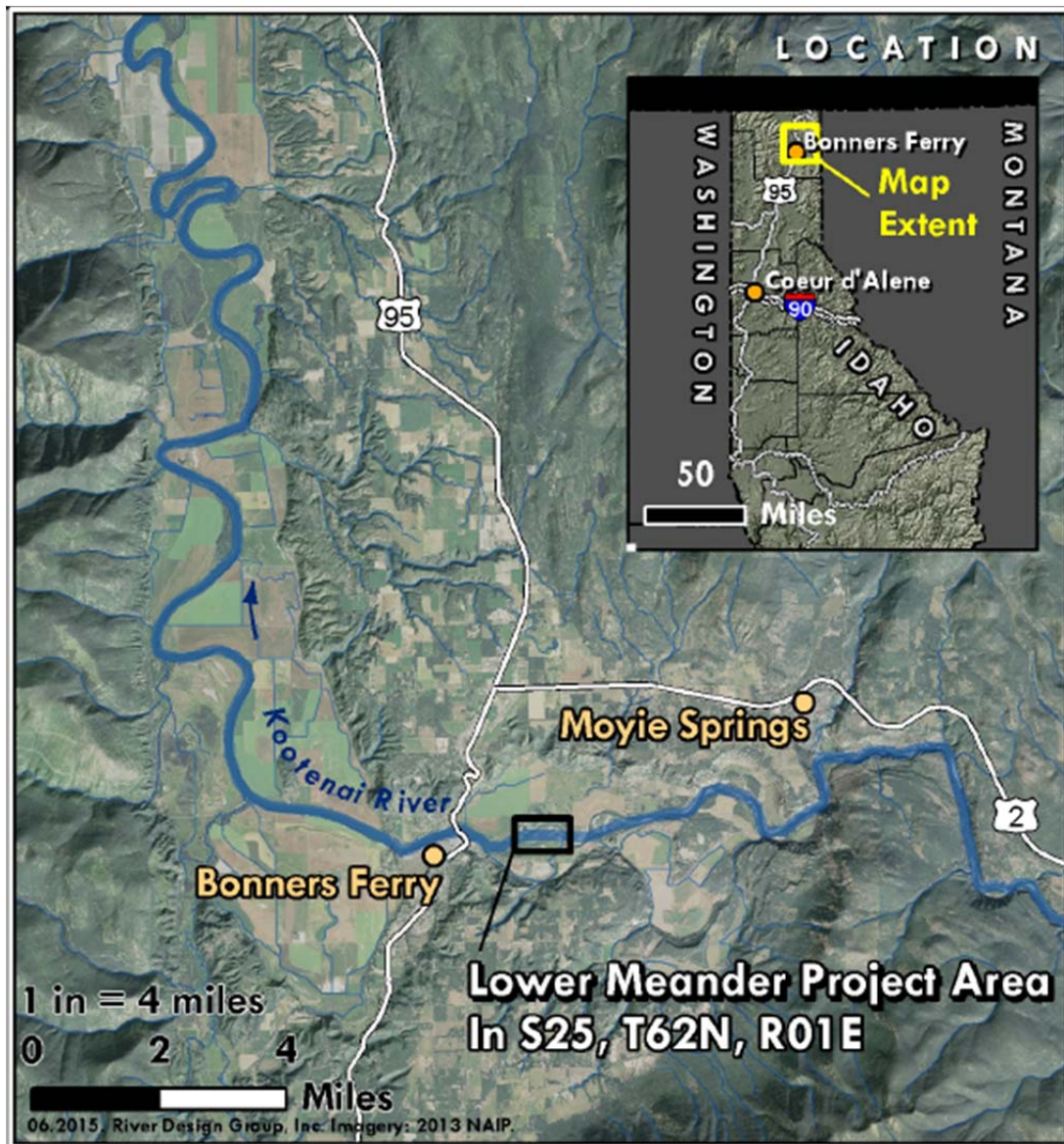
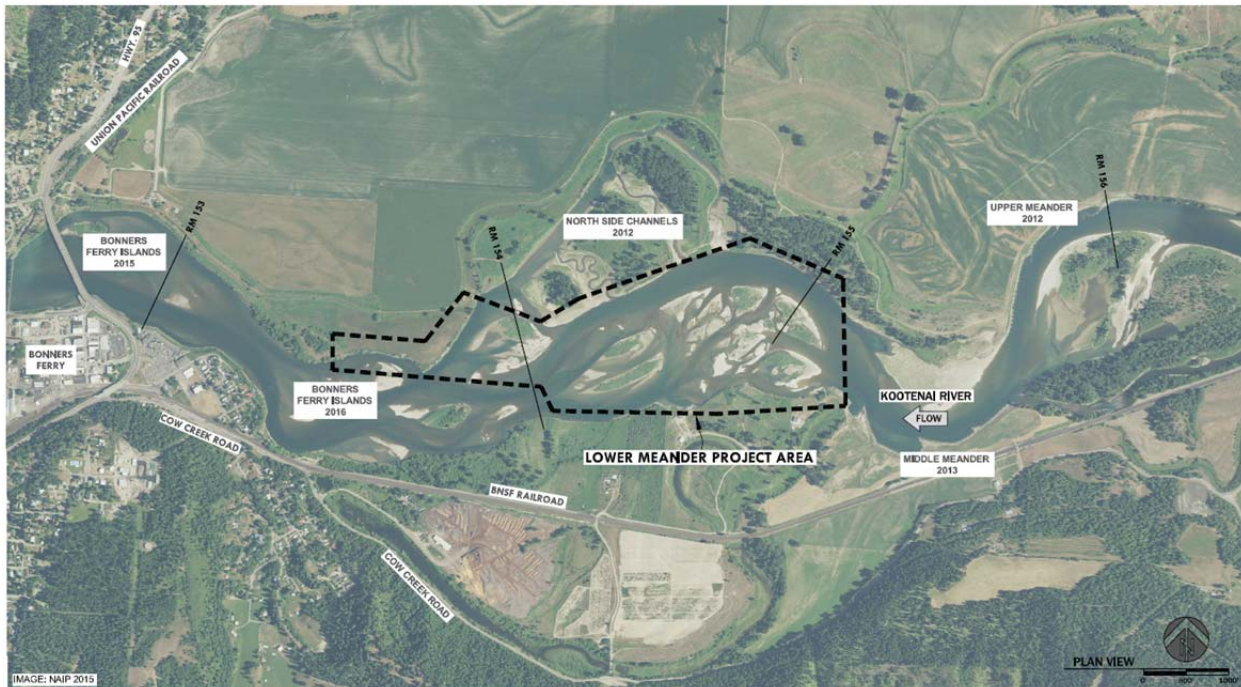


Figure 2. Lower Meander Project Area



The Proposed Action calls for creating large excavated pools within the main channel of the Kootenai River. Several mid-channel islands would be enhanced using material excavated from the river bottom to create the pools. Material removed from the north bank of the river would also be used to enhance the islands. Three stream bank structures would be constructed and bank stabilization methods would be used to reduce erosion and establish riparian vegetation. Each of these project elements is described in the sections that follow.

Construction of the Lower Meander Project would occur in two phases, during late summer/early fall of 2017 and 2018. The phasing is designed to work from upstream to downstream as displayed in Table 1 and Figures 3 and 4.

Table 1. Lower Meander project features by construction phase

Project Feature	Phase 1 2017	Phase 2 2018
Bank Stabilization (grading and brush-bank structures)	2600 ft.	2100 Ft.
Large Bank Structures	two structures (structures #1 and #2)	one structure (structure #3)
Side-Channel Large Wood Structures	15 structures	none
Excavated Pools	One pool (pool #1)	One pool (pool #2)
Island Enhancement	Three islands (total 20 acres)	Three islands (total 6.5 acres)

Figure 3. Kootenai Lower Meander construction actions, Phase 1 (upstream)

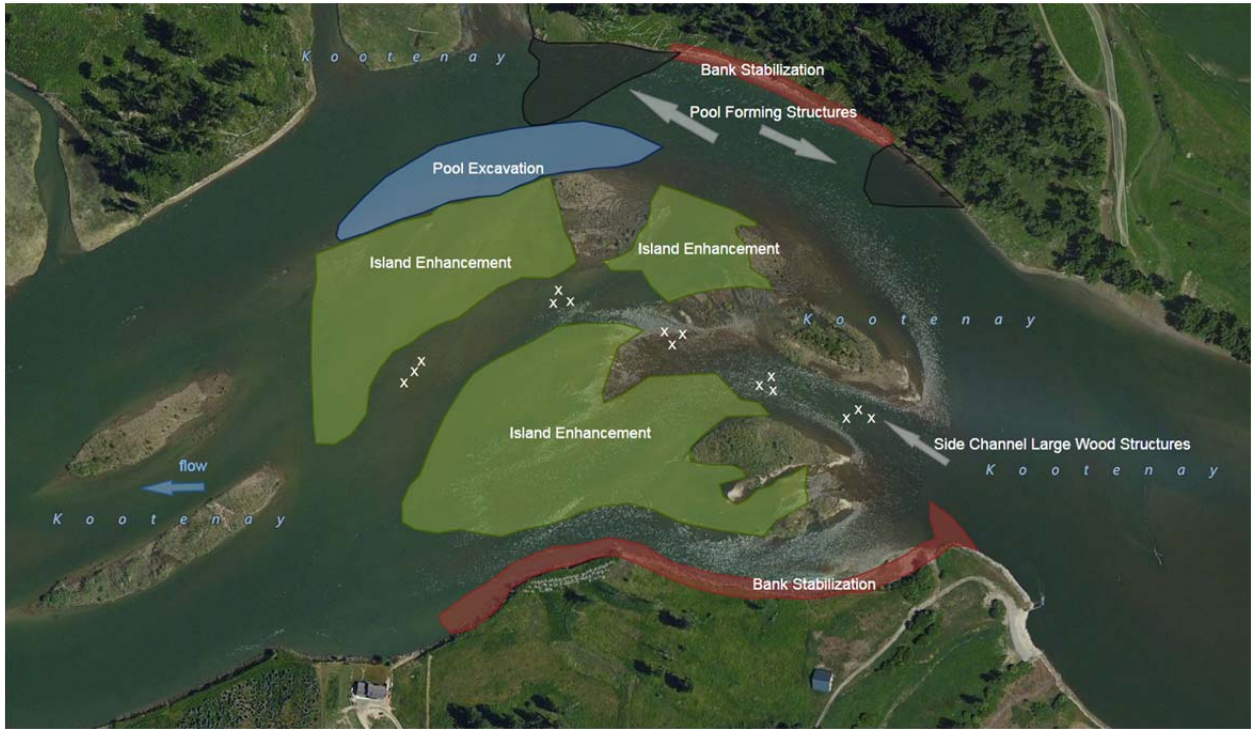
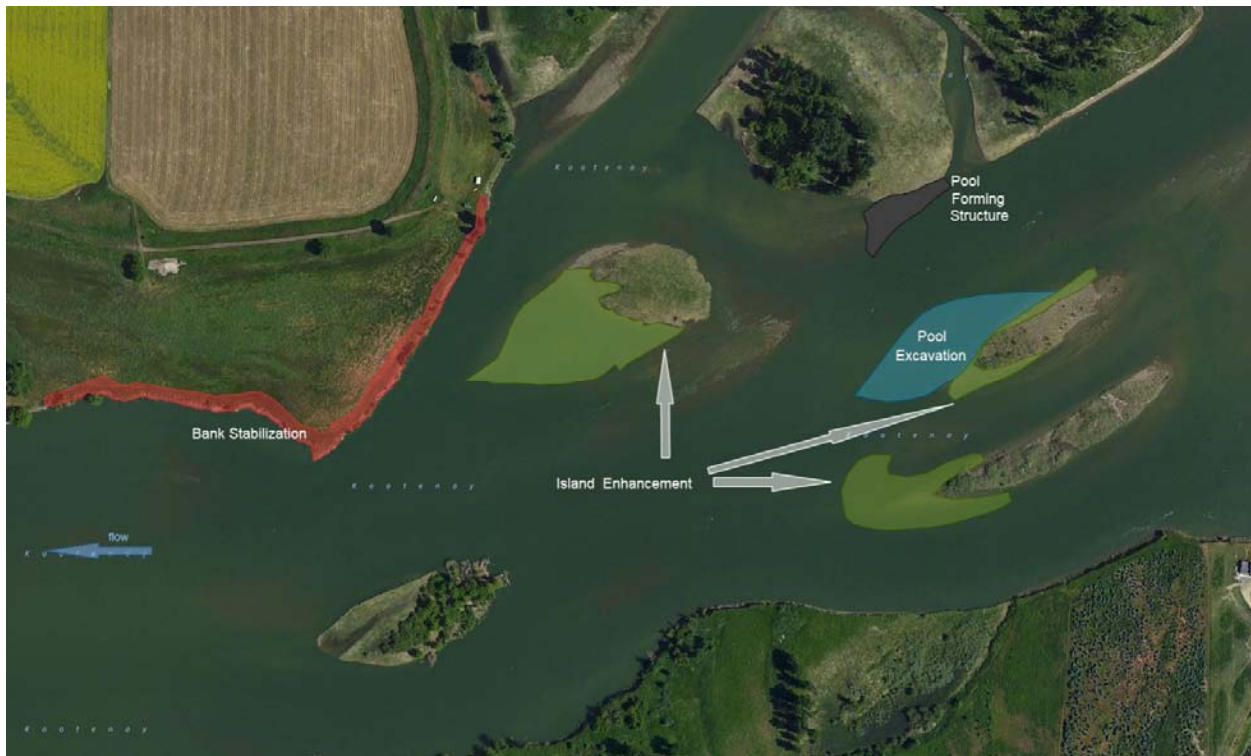


Figure 4. Kootenai Lower Meander construction actions, Phase 2 (downstream)



2.1.1 Large Bank Structures

Three large bank structures would be installed to provide large recirculation zones (eddies) and protect adjacent bank areas from erosion. The two upstream structures would be constructed from timber piles, imported gravel/riprap, and woody debris. The third downstream structure would be constructed from imported cobble only.

For the two upstream large bank structures (Structure 1, Structure 2), timber piles would be driven into the river bed with approximately four to six feet of each pile remaining exposed. Large logs would be placed in between the vertical piles and then bolted to secure them in place. A barrier composed of wood and rock would be installed at the upstream end of each structure that would direct the river to flow around the structure to reduce the risk of erosion. The downstream structure (Structure 3) created using imported rock would have moderately sloping sides and function similarly to other existing gravel bar features in the river.

Vegetated brush bank structures (as described in Section 2.1.3.3) would be installed between Structures 1 and 2 and at the bank tie-in points to create stable transitions to the existing bank at the upstream and downstream edges of the large bank structures.

Design information for large bank structures is provided in Table 2. Figure 5 displays photographs of similar large bank structures at previous restoration sites along the Kootenai River.

Table 2. Design details for large bank structures

	Structure 1 (upstream)	Structure 2 (middle)	Structure 3 (down stream)
Bank Length (feet)	180	390	350
Projection into River (feet)	100	180	200
Projection angle (degrees)	25	25	17
Elevation (NAVD88 feet)	1756 to 1765	1756 to 1764	1757 to 1758
Distance from next structure downstream (feet)	900	1,800	N/A
Number of timber piles	52	134	0
Riprap (cubic yards)	1,900	4,800	0
Gravel (cubic yards)	1,400	8,900	0
Cobble (cubic yards)	0	0	6,400
Area (square feet)	4,100	20,300	28,200
Volume (cubic yards)	3,300	13,700	6,400

Figure 5. Examples of large bank structures in the Kootenai River



2.1.2 Pool Excavation

Pools would be excavated at two locations in hopes of providing staging and holding habitat for Kootenai River white sturgeon and to encourage sturgeon to migrate further upstream to suitable spawning habitat. Locations for pool excavation were identified primarily based on their expected morphologic sustainability and their accessibility by land-based excavation equipment. Gravel and sand excavated from the pools would be used to construct islands as described below.

Each pool would be approximately four to five acres and, once completed, would be 10 to 15 feet deeper than the existing riverbed (Table 3). To create both pools, approximately 120,000 cubic yards of material would be removed. Figure 6 displays photographs of pool excavation activities conducted in 2015 during construction of the Bonners Ferry Islands Project.

Table 3 Design details for excavated pools

	Pool 1 (Upstream)	Pool 2 (Downstream)
Maximum width (feet)	180	300
Length (feet)	1,200	1,000
Side Slopes	5:1	5:1
Area (acres)	4	5
Volume (cubic yards)	51,000	69,000

2.1.3 Island Construction and Enhancement

Six existing islands would be enhanced using gravel and sand from excavated pools and bank grading. The new island areas would then be planted with native riparian vegetation and also receive floodplain roughness treatments.

Figure 6. Pool excavation actions in the Kootenai River



Island elevations would be similar to existing islands within the Kootenay Lake backwater influence, upstream from the project area, that display desired vegetation communities. The floodplain roughness treatments would create protected microsites both for planted species as well as native seedlings that are expected to colonize the newly constructed floodplain surfaces. Floodplain roughness would be created using furrows and ridges up to one foot high and partially buried pieces of wood and brush. The buried pieces of wood would be six to twelve inches in diameter and eight to twelve feet long and smaller brush up to six inches in diameter and eight to twelve feet in length.

2.1.4 Bank Stabilization

High banks and banks with steep angles would be graded and lowered to improve bank stability, increase the width of riparian buffers, establish floodplain connection, and to set elevations and slopes suitable for establishing trees and shrubs. Existing car bodies and other non-natural debris used historically for erosion control would be removed. Finished grades would include floodplain roughness treatments as described above. Approximately 18,400 cubic yards of material would be excavated in this process in Phase 1, and 39,800 cubic yards in Phase 2.

Vegetated brush bank structures would be installed in the re-graded banks to establish vegetation and provide stability. These structures consist of layered brush and small logs built on a small riprap foundation with live vegetative cuttings within the brush layers at elevations that are in contact with the water table during the growing season (Figure 7). Approximately 2,400 lineal feet of these structures would be installed in Phase 1 and 2,100 lineal feet in Phase 2.

Figure 7 Vegetated brush bank structures under construction at the 2015 Bonners Ferry Islands project



Side Channel Large-Wood Structures

Approximately 15 large-wood structures would be installed in the side channels to provide hydraulic complexity between the islands and to create a series of small scour pools in the side channels. The structures would be installed in groups of three structures as shown by the small 'X's' in Figure 3. Each structure would occupy approximately 400 square feet (20 ft. by 20 ft.) and would be constructed from timber piles and large woody debris. The timber piles would be driven into the bed below scour depth to provide stability. Large woody debris would be bolted to the timber piles in a variety of configurations to resemble a natural aggregate of racked logs. Gravel would be excavated from the location of the expected scour pool and used to backfill the interior of the structure. Over time these structures may collect additional debris and promote deposition in the side channels, thus contributing to floodplain development.

2.1.5 Access and Staging

Access on the north side of the Kootenai River areas would be from the District 2 Road via Ball Park Road and a private unimproved road across private land that is used as a pasture. A temporary staging area would be established in the pasture. Temporary haul roads would be constructed to access the river bank and structure locations (Figures 8 and 9).

Figure 8. Staging areas and temporary haul roads



Access to the south bank would be from Cow Creek Road via Waterhouse Lane. From Waterhouse Lane, access would be via a private unimproved road. A temporary staging area would be established and temporary haul roads would be constructed to access the river bank, islands and pool excavation areas (Figures 8 and 9).

Figure 9 Examples of temporary river access road construction



2.2 No Action Alternative

Under the No Action Alternative, BPA would not fund the Kootenai River Lower Meander Project and the Tribe would not make the fish habitat improvements to the Kootenai River as proposed. In addition, BPA would not use the project to help meet its fish and wildlife mitigation obligations under the Northwest Power Act, or further support habitat improvement efforts identified in the Libby Dam Biological Opinion.

2.3 Comparison of Alternatives

The following two tables compare the Proposed Action and the No Action alternative. Table 4 compares the alternatives by the purposes of this project. Table 5 displays a summary of the effects of implementing each alternative, with detailed information available in Chapter 3.

Table 4 Comparison of Alternatives by BPA purposes

Purposes	Proposed Action	No Action Alternative
Support efforts to mitigate for effects of the development and operation of the FCRPS on fish and wildlife in the mainstem Columbia River and its tributaries under the Northwest Power Act.	Would help support mitigation efforts called for in the Northwest Power Act by enhancing fish and wildlife habitat in the Kootenai River above Bonners Ferry.	Would not support BPA's efforts to enhance fish and wildlife habitat in the Kootenai River above Bonners Ferry.
Seek to further address obligations under the 2006 Libby Dam BiOp as clarified in 2008, which directs the BPA and USACE to "support the Kootenai Tribe of Idaho's good-faith efforts to implement the Kootenai River Restoration Project Master Plan."	Would further address BPA's obligations under the 2006 Libby Dam BiOp.	Would not contribute to BPA's efforts to meet obligations specified under the 2006 Libby Dam BiOp.
Implement BPA's Fish and Wildlife Implementation Plan EIS and ROD policy direction, which call for protecting weak stocks, like the Kootenai white sturgeon, while sustaining overall populations of fish for their economic and cultural value.	Would contribute to establishing self-sustaining populations of Kootenai River white sturgeon and other native species in the Kootenai River which are of cultural value and may provide	Would not further actions to help protect Kootenai River white sturgeon or other native fish for economic and cultural values.

Purposes	Proposed Action	No Action Alternative
	economic benefits, while at the same time protecting ESA-listed fish.	
Minimize harm to natural or human resources, including species listed under the ESA.	Proposed mitigation measures would minimize harm to natural and human resources. Approvals by, and reporting, to regulatory agencies would minimize the risk of adverse effects to ESA-listed species. (See Table 5 for a summary of effects.)	With no construction of new facilities, there would no potential to effect natural and human resources or short-term effects to native ESA-listed species; there would also be no additional potential for long-term Kootenai River white sturgeon recovery benefits. (See Table 5 for a summary of effects.)

Table 5 Comparison of Alternatives by Resource Impact¹

Resource Affected	Effects of Proposed Action ¹	Effects of No Action
Geology and Soils	Changed topography of riverbanks and nearly triple the size of islands in river. Short-term erosion/soil loss and sedimentation from excavation and temporary road building. Long-term erosion protection from stabilized banks and islands and improved riparian vegetation conditions. The overall effect to geology and soils would be low.	No new effects to geology and soils. Riverbank and island topography would remain unchanged. Rates and patterns of erosion would likely continue similar to present conditions.
Wetlands	Less than one acre of wetlands would be permanently impacted. The restoration activities would establish 24 acres of new wetlands on the newly created islands and along the riparian area where the river would be hydraulically connected to the areas of new plantings. The effects would be beneficial and moderate.	No new effects to wetlands or floodplains.
Water Resources	No long- or short-term changes to water quantity. Short-term effects to water quality are expected from turbidity during construction but stabilization of banks and improved riparian vegetation conditions are expected to reduce erosion/turbidity and improved water quality in the long term. River would be changed hydrologically by island, channel and pool construction, though these features are expected to change somewhat with river conditions over time. The effects to water resources would be low. The project would cause a 0.15 foot increase in base flood elevations within the project area and no increase at Bonners Ferry, but would not require a change in operations at Libby Dam to prevent flooding.	No new effects to water resources in the project area. Water quality and hydrologic conditions would remain unchanged.

Resource Affected	Effects of Proposed Action¹	Effects of No Action
Fish	Long-term improvement in fish habitat. Short term adverse effects from pile-driving noise, turbidity, excavation, rock placement, and accidental hazardous material spills during construction activities. In the short-term fish are expected to move out of the construction area when wooden piles are driven. Long-term increases in fish populations from improved habitats are expected. There would thus be a low to moderate short-term and temporary effect to fish populations in the project area.	No new effects to fish in the project area. No short-term displacement effects. No benefit to fish or increased population potential from not improving river banks, pools, channels, islands, and riparian habitats.
Recreation	Short-term adverse effect on fishing opportunities during construction activities. Long-term beneficial effect on fishing opportunities from increased fish populations in areas where habitat has been improved for fish. Some effects on boaters using side channels with large wood structures as these may create an obstacle needing avoidance, but would also create fish habitat with increased fishing opportunities. Effects would be low.	No effects to boating recreation since construction activities would not occur. No addition of boating obstacles (large wood structures), but no improvement in fishing opportunities from increased fish populations.
Cultural Resources	No known cultural resources were identified in the areas impacted. If unanticipated sites are discovered during construction, sites could be affected; however, stop work, notification, and mitigation requirements would lessen potential effects.	No effects to cultural resources.
Visual Resources	Visual changes would include an approximate three-fold increase in island sizes with more vegetative cover than are visible at present on both islands and river banks. Large wood structures not likely discernable from public roadways, but clearly evident to boaters. Effects would be low.	No changes to land use or visual character of the river or its islands and banks.
Noise	Pile driving would be the primary effect, though distance to Bonners Ferry is nearly one mile away, largely attenuating the impact. Approximately 30-day noise level change would be noticeable, but likely not much greater than routine background noise in town. Effects would be low.	No changes to ambient noise levels in project area or in Bonners Ferry.
Air Quality, and Greenhouse Gasses	Air pollutants and greenhouse gases from vehicle emissions and dust from construction activities would be generated during the construction period. Effects would be short-term, temporary, and low because of application of mitigation measures.	No new effects to air quality or the existing conditions relative to greenhouse gas (GHG) emissions.

Resource Affected	Effects of Proposed Action¹	Effects of No Action
Public Health and Safety	Minor increase in traffic, potential for accidents, and demands on local emergency services during construction activities. Introduction of long-term boating hazards into the Kootenai River though these types of river hazards are routine for boaters and mitigation would be implemented to minimize the effects to boaters. Effects would be low.	No effect on public health and safety.
Transportation and Utilities	Temporary increase in traffic, including large construction vehicles, on local roads during construction; though no routing through residential areas. No anticipated alteration of traffic patterns. Effects would be low to moderate.	No new effects to transportation or utilities near the project site.
Socioeconomics	Only a few temporary jobs provided by construction activity, with no long-term employment opportunities provided. No impact on housing. Moderate short to mid-term beneficial economic impact from construction spending and need for supply and haul of local gravel, logs, etc. and the multiplier effects through the local economy. No effect to environmental justice populations.	No socioeconomic effects.

¹ The effects displayed in this table presume the application of the Mitigation Measures listed in Table 6.

2.4 Mitigation Measures

Table 6 lists the mitigation measures that would lessen or avoid potential impact of implementing the Kootenai Lower Meander Project.

Table 6 Mitigation Measures

Environmental Resource	Mitigation Measure
<p style="text-align: center;">Geology and Soils</p>	<p>Prepare and implement a plan for erosion and sedimentation control and a stormwater pollution prevention plan for construction activities to minimize erosion and soil loss (e.g., use silt fences, straw bales, interceptor trenches or other perimeter sediment management devices; maintain as necessary throughout construction).</p>
	<p>Locate staging areas in previously disturbed or graveled areas to minimize soil and vegetation disturbance, where practicable.</p>
	<p>Design and build access roads that minimize drainage from the road surface directly into surface waters, and direct sediment-laden waters into vegetated areas where possible.</p>
	<p>Inspect and maintain access roads and other facilities during construction to ensure proper function and nominal erosion levels.</p>
	<p>Reseed disturbed areas, monitor seed germination, and implement contingency measures as necessary until areas disturbed from construction activity are stabilized.</p>
	<p>Existing unimproved roads, temporary haul roads and the staging area would be graded, surfaced with gravel and treated for dust control (water application) as needed to support haul traffic during construction.</p>
<p style="text-align: center;">Wetlands</p>	<p>Identify clearing limits on all construction drawings and flag as “no-work” areas before construction.</p>
	<p>Revegetate disturbed areas (including wetlands) with appropriate native species using seed mixes that meet the requirements of federal, state, and county noxious weed control regulations and guidelines.</p>
	<p>Implement mitigation measures to control potential noxious weed infestations before, during, and after construction.</p>

Environmental Resource	Mitigation Measure
	Implement best management practices during construction to minimize adverse effects on wetlands (e.g., limit wetland disturbance areas; flag or stake wetland boundaries; refuel machinery and store fuels away from wetlands; develop and implement erosion and sedimentation control plan).
	Install silt fences and straw wattles at culvert locations and wetland areas to prevent effects from stormwater runoff and construction-related disturbance.
Water Resources	Deposit and stabilize all excavated material not re-used in an upland area outside of floodplains.
	Follow the Idaho Department of Environmental Quality's Catalog of Stormwater Best Management Practices for Idaho Cities and Counties (IDEQ, 2005) to create a stormwater pollution prevention plan for construction activities. Use and maintain this plan throughout construction to minimize erosion and soil loss (e.g., use silt fences, straw bales, interceptor trenches or other perimeter sediment management devices).
	Implement measures to prevent stockpile erosion during rain events (e.g., surround piles with compost berms, cover piles with impervious materials, or use other equally effective methods).
	Minimize staging areas to the size necessary to conduct the work, and locate the staging areas in previously disturbed areas at least 150 feet from the river or wetlands.
	Create and use a spill prevention, control and countermeasures plan to minimize the potential for spills of hazardous material, which includes provisions for storage of hazardous materials, and refueling of construction equipment outside of riparian zones, a spill containment and recovery plan, and notification and activation protocols.
	Store spill containment kits at each work site and train the construction crews in proper use.

Environmental Resource	Mitigation Measure
	Wash all equipment before moving it to the project site, to minimize the introduction of foreign materials and fluids to the project site.
	Use only hydraulic fluids certified as non-toxic to aquatic organisms in equipment used to work in the water.
	Inspect all equipment to ensure it is free of oil, hydraulic fluid, and diesel fuel leaks. Repair detected leaks in the vehicle staging area before the vehicle resumes operation. Document inspections in a record that is available for review on request.
	Locate vehicle staging, cleaning, maintenance, refueling, fuel storage areas, and sanitary facilities, such as chemical toilets, at least 150 feet from the Kootenai River or wetlands.
	Clean all equipment operated in stream before beginning operations below the bankfull elevation to remove all external oil, grease and dirt. Every day, inspect all power equipment operating within 150 feet of the water for fluid leaks.
	Apply truck diapers to any stationary power equipment (e.g., generators) operated within 150 feet of any stream, water body or wetland to prevent leaks.
	Floating silt curtains and temporary berms would be used where water depth allows for turbidity management. Practical efforts would be made to install floating silt curtains in lower velocity areas at the downstream end of the work areas such that construction related turbidity can settle out in lower velocity backwater areas. Floating silt curtains would be anchored with 12-inch diameter temporary steel piles.
Fish	Conduct work below the Ordinary High Water Mark (OHWM) from August through November
	Operate machinery for below OHWM construction from the top of the stream bank along adjacent upland areas, to the extent possible.
	Protect existing riparian and wetland vegetation

Environmental Resource	Mitigation Measure
	to the extent possible.
Recreation	Install signage at the Twin Rivers Canyon Resort boat launch to inform boaters of restoration activities and indicate their location.
Cultural Resources	Install permanent signs at the Twin Rivers boat ramp requesting that boaters and tubers stay clear of the restoration area in order to protect the restoration work. Signs would also contain an educational element to describe the different project locations, the types of structures, and the benefits they provide for fish.
	Mark known cultural resource sites as avoidance areas on construction drawings and flag as no-work areas in the field prior to construction.
	Protect any unanticipated cultural resources discovered during construction as follows:
	Stop all work; cover and protect the 'find' in place.
	Notify Project Manager and BPA cultural resources specialist immediately.
	Implement mitigation or other measures as instructed by BPA cultural resource specialist.
Visual Resources	Retain existing vegetation, when possible, to visually screen disturbance created by construction activities.
	Reseed and plant disturbed areas with appropriate native species. Control weeds following construction.
Noise	Limit construction noise to normal daytime working hours.
Public Health and Safety	No Mitigation not required
Air Quality and Greenhouse Gasses	Confine vehicle fueling and maintenance to approved locations.
	Use water trucks to control dust during construction, as needed.
	Ensure that all vehicle engines are maintained in good operating condition to minimize exhaust emissions.

Environmental Resource	Mitigation Measure
	Implement vehicle idling restrictions.
	Encourage the use of the proper size of equipment for each job.
	Use alternative fuels for stationary equipment at the construction sites, such as propane, or use electrical power, where practicable.
	Reduce electricity use in the construction office by using compact fluorescent bulbs and turning off computers and other electronic equipment every night.
	Recycle or salvage nonhazardous construction and demolition debris, where practicable.
	Keep construction activities and equipment clear of residential driveways, to the greatest extent possible.
Transportation and Utilities	Employ traffic control flaggers and post signs along roads warning of construction activity and merging traffic for temporary interruptions of traffic, where needed.
	Coordinate with Burlington Northern Santa Fe to determine whether they would require a flagger be present during construction times to avoid train conflicts or delays at the unmarked crossing of the Burlington Northern Santa Fe rail line.
	Limit construction noise to daytime working hours (see Noise, Section 3.8).
	Use water trucks to control dust during construction, as needed (see Air Quality, Section 3.9).
Socioeconomics	N/A

3 Affected Environment and Environmental Consequences

This chapter evaluates the potential effects of the Proposed Action, as well as the No Action alternative, on human and natural resources, to determine whether either have the potential to cause significant environmental effects. For each resource, the existing environment that could be affected by the alternatives and the potential environmental consequences of the alternatives are described. Many of the effects would be minimized by the application of the mitigation measures listed in Section 2.4 and the discussions here presume the application of those conditions. Discussion of the cumulative effects (incremental effects of the Proposed Action when added to other past, present, and reasonably foreseeable future actions) is at the end of this chapter.

3.1 Soils and Geology

3.1.1 Affected Environment

Regional Geology

The proposed project area is within the Boundary County soil survey area, which is within the Northern Rocky Mountains geographic province. Between 100,000 and 11,000 years ago, the Cordilleran ice sheet (a large mass of ice, also known as a continental glacier) covered most of the valley areas in the region, leaving only the higher mountain peaks exposed. These glacial episodes created much of the surface materials and topography that exists today. Alpine glaciers eroded the craggy, jagged peaks and filled in mountain valleys with moraine (soil and rock deposited by glaciers) and outwash (sand and gravel left by melting water) deposits. The ice sheet extended as far south as Coeur d'Alene Lake, 75 miles to the south. The glaciers left thick deposits of glacial till (unsorted glacial sediment) and silt, transported large boulders to the area, and scoured some areas, leaving bedrock exposed at the surface (USDA NRCS, 2013).

Seismic Faults

There are no known seismic faults in Boundary County. The Boundary County Comprehensive Plan states that the county is in Seismic Zone 2, as delineated in the Uniform Building Code. Seismic Zone 2 indicates that a moderate damage risk could be experienced in this area should an earthquake occur (Boundary County, 2008).

Local Surface Soils

Soils in the Kootenai River floodplain are comprised of silty, alluvial (material deposited by flowing water) deposits left behind from floodwaters that spread over the floodplain and deposited silt, clay, and very fine sands (USDA NRCS, 2013). More ashy, silty loam soils occur on the gently sloping areas bordering the shoreline, floodplain, and the steep escarpments. (Toxicity sampling of river sediments is discussed in Section 3.3, Water Quality.)

3.1.2 Environmental Consequences – Proposed Action

Within the area of the Proposed Action, large amounts of soil would be moved and topography would be changed (lowering pool elevations in the riverbed, raising island elevations, and grading of currently eroding river banks). The work would cause sedimentation and erosion in the short term during construction, but the bank grading and bank stabilization structures and planting of native vegetation would help stabilize soil movement in the long term.

The two pools to be excavated would require relocation of 51,000 and 69,000 cubic yards of gravel and sand from the main channel of the river. This excavated material would be deposited on existing adjacent gravel bars and islands to enhance six islands and raise their elevations so they are able to

support riparian vegetation. The newly created island surfaces would be stabilized through grading and creation of floodplain roughness to minimize erosion and through extensive planting of native riparian vegetation.

Grading to stabilize eroding banks would result in some temporary soil loss during construction but erosion and sediment control measures would be used to control and manage those effects. Over the long term, the Proposed Action would have beneficial effects on soils, as bank stabilization, large bank structures, and more vegetatively robust riparian areas would reduce the amount of soils exposed to river currents.

About 1.25 miles of temporary access roads, would be built to allow heavy machinery to access project locations along the river for excavation, gravel and sand relocation, rock and log placement, etc. These temporary roads would compact and displace soils while in use but would be removed and the land restored following construction.

Construction could result in erosion caused by stormwater runoff or windblown dust during dry conditions. These effects would be minimized by implementing best management practices (see Section 2.4).

Although implementation of construction best management practices and mitigation measures would reduce the potential for short-term increased erosion, some increased levels of temporary erosion and soil loss would be expected during and immediately after construction. For the long term, however, stabilized and revegetated banks and islands would reduce the potential for erosive loss of soil resources. The overall impact of the Proposed Action on soils and geology would be low.

3.1.3 Environmental Consequences – No Action

Under the No Action alternative, there would be no short-term soil losses or topography changes because construction activities would not occur. The ongoing erosional processes occurring in the river and on its banks and islands would continue.

3.2 Wetlands

3.2.1 Affected Environment

In general, wetland functions are separated into three primary categories: water quality, hydrology, and habitat (Novitzki, 1996). Palustrine wetlands next to river systems have the potential to improve water quality by filtering and storing sediments, processing pollutants, and storing and cycling nutrients. Hydrologic functions often include groundwater recharge, flood moderation and floodwater storage. Wetlands can support high levels of primary productivity and provide unique habitat for fish and wildlife (Hruby, 2004). Their ability and opportunity to perform any of these functions depends largely on their position in the landscape, size and complexity, adjacent land use, and level of disturbance.

Palustrine emergent wetlands are characterized by erect, rooted, and non-woody vegetation. A scrub-shrub wetland is dominated by woody vegetation less than 20 feet tall (Hruby, 2004).

A wetland delineation for the project area was conducted on July 19, 20, and 21, 2016 and followed the methods for routine delineations in areas greater than five acres in size from the Corps of Engineers Wetland Delineation Manual (Environmental Laboratory 1987). Data collection and wetland boundary delineations followed methods described in Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (U.S. Army Corps of Engineers 2010). Wetland delineation data collection occurred on all locations within the Lower Meander Project area (including the potential access routes) and all locations were visited to identify areas with wetland characteristics.

Wetland delineation sampling data were collected to capture variations in vegetation communities, landscape position and topography. Data collection points were located to be paired upland and wetland plots, except where sample points only documented upland conditions.

The OHWM was identified for waters of the U.S. using guidance from Title 33 of the Code of Federal Regulations, Part 328 “Definition of Waters of the United States” and the Regulatory Guidance Letter number 05-05 from the Army Corps of Engineers (2005).

On the north side of the Kootenai River there is a relic side channel. This area was delineated as palustrine unconsolidated bottom wetlands. While not part of the area to be disturbed by the Proposed Action, the area was delineated because of its proximity to the project area. The side channel is not connected to the Kootenai River but does receive overbank flows during high water events. Palustrine unconsolidated bottom wetlands normally have shallow water throughout the most of the year and are surrounded by palustrine emergent wetlands. The boundary between the two wetland classes is marked by a transition from areas where surface water exists year round and is deep enough to suppress vegetation growth to areas with established emergent vegetation communities.

Within the Lower Meander Project, there are approximately 11 acres of palustrine scrub shrub wetlands and about 9.5 acres of palustrine emergent wetlands (Table 7). There is also approximately 7 acres of wetlands classified as a mix of scrub/shrub and emergent wetlands. The vegetation found in the emergent wetland in the project area is dominated by either water knotweed or sedges. The vegetation found within the palustrine scrub shrub wetlands includes sandbar willow, yellow willow, and red-osier dogwood.

Table 7 Summary of wetlands mapped in the Lower Meander Project area

Wetland Class	Existing Area (acres)
Palustrine emergent	9.53
Palustrine emergent/scrub shrub	7.29
Palustrine scrub shrub	10.85
Palustrine unconsolidated bottom	3.13
Total wetland area	30.80

3.2.2 Environmental Consequences – Proposed Action

The placement of excavated material around existing vegetation on the mid-channel islands would overlap with the edges of some of the delineated palustrine scrub wetlands resulting in a permanent loss of 0.4 acres of wetland. Stream bank regrading is expected to also result in a permanent loss of approximately 0.2 acres palustrine emergent wetlands. Temporary effects associated with constructed access routes would result in a loss of 0.25 acres of wetlands, which would be restored once construction is completed.

In addition, as a result of the Proposed Action there would be a net gain of approximately 24 acres overall of wetland area resulting from the creation of new floodplain and island surfaces that are hydrologically connected to the Kootenai River. The area of palustrine scrub shrub wetland would be increased on the constructed islands as a result of natural recruitment and planting. The regraded stream banks would also be planted and result in new palustrine scrub shrub wetlands. Because of the net increase in overall wetland area, the effects on wetlands would be beneficial. The effects would be moderate overall.

3.2.3 Environmental Consequences – No Action

Under the No Action alternative, the existing wetlands would remain unaffected and there would be no wetland creation.

3.3 Water Resources

3.3.1 Affected Environment

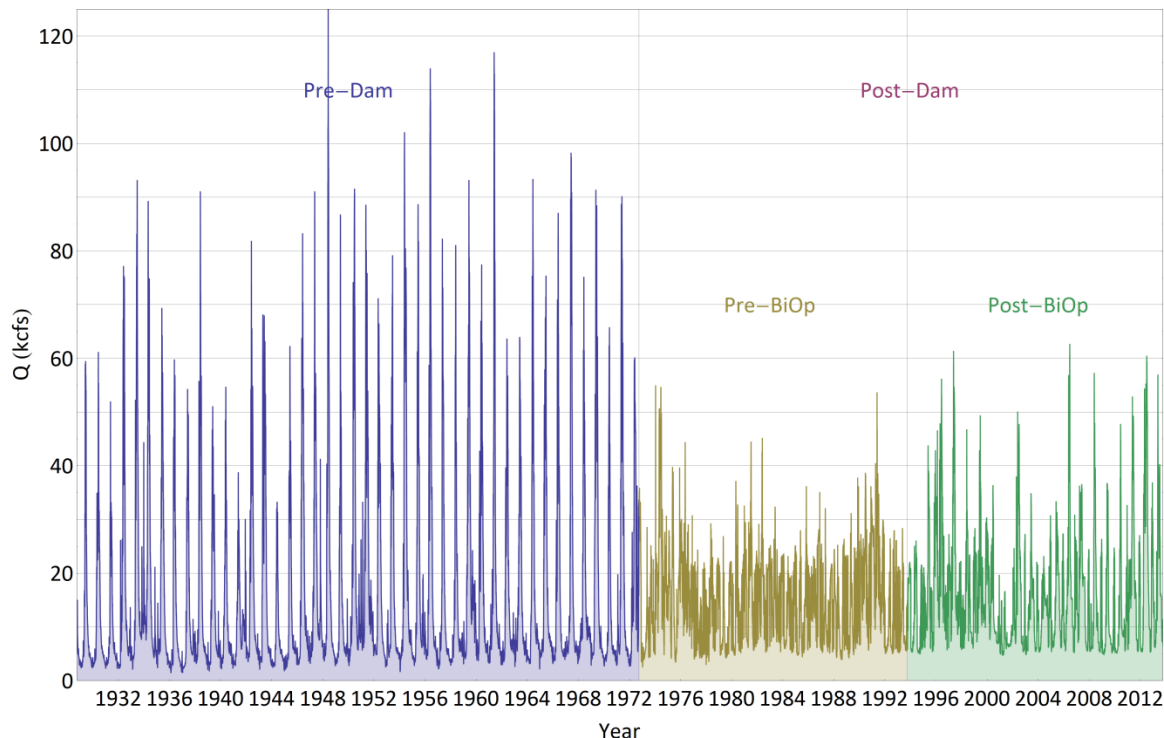
Hydrologic Characteristics

The Kootenai River (spelled “Kootenay” in Canada) originates in southeastern British Columbia (BC). From the headwaters, it flows south into Lake Koocanusa, which straddles the border between British Columbia and Montana. Lake Koocanusa is a melding of the words Kootenai, Canada, and the USA. Libby Dam, operated by the USACE, holds the river back to form the Lake Koocanusa Reservoir. Downstream of the dam, near Libby, Montana, the river turns and flows westward toward Idaho. Near Bonners Ferry, Idaho, the river turns north, and flows again into BC where it enters Kootenay Lake. From the outlet on the west arm of the lake near Nelson, BC, the river flows westward, through several hydropower facilities, to its confluence with the upper Columbia River near Castlegar, BC.

The Kootenai River subbasin encompasses approximately 18,000 square miles (seven percent) of the Columbia River basin. It is the third largest sub-basin by area, and the second largest by volume of water (KTOI 2009).

Historically, the amount of water in the Kootenai River has varied greatly through the year. As with many rivers in the Columbia River basin, the Kootenai is fed by melting snow, and the annual peak flows occurred in the spring. Once the snow had melted at higher elevations, hot dry summers would result in dramatic decreases in flows through late summer into the fall, when winter rains would resume. Following the construction of Libby Dam in 1972, peak springtime flows have been reduced by 50 percent, and winter flows have increased by 300 percent (USFWS 2006, 2008) (Figure 10).

Figure 10. Peak Flows in the Kootenai River, 1932-2012



Flows in the Kootenai River through Bonners Ferry are also affected by a backwater effect (reduced water surface slope which causes little or no current in the river) caused by Kootenay Lake. Kootenay Lake is 70 miles downstream of Bonners Ferry and is regulated by Corra Linn Dam. When high flows raise the level of Kootenay Lake during the spring runoff, a backwater effect occurs in the portion of the Kootenai River between Kootenay Lake and Bonners Ferry. In most years, the upstream extent of the backwater reaches river mile 153 near Bonners Ferry. This backwater effect changes the slope of the water surface, and consequently, the velocity of the water passing through the proposed project area. When the amount of water in the river is greatest, the velocity of the water slows through the proposed project area and the water surface elevation increases. When the flows are lower, and the lake level drops, the velocity of the water through the proposed project area increases, and water surface elevation decreases.

Floodplains

A floodplain is an area near a river or a stream that floods when the water level reaches flood stage. The 100-year floodplain is used and is defined as any area determined by the Federal Emergency Management Agency (FEMA) to have a one percent chance of flooded during a given year.

FEMA uses flood insurance rate maps (FIRM) to identify the areas with the potential to flood. For the proposed project the most recent FIRM map showing floodplains in this area was issued August 2, 1982 and shows the project area is within the 100-year floodplain (FEMA, 1982b).

The area just downstream of the project area, where the Kootenai River passes through Bonners Ferry, is protected from flooding by levees. In the areas protected by levees, a base flood elevation, rather than a floodplain area, is used to determine flood risk. Like the 100-year floodplain, the base flood elevation is the height that has a one percent chance or greater of flooding in a given year. The base flood elevation within the City of Bonners Ferry is 1,768 feet at the downstream end, and 1,769 feet at the upstream end. The USACE operates Libby Dam and manages flows in the Kootenai River, to minimize the potential for flooding.

3.3.2 Environmental Consequences – Proposed Action

The installation of the three large bank structures along the north bank would provide erosion protection by deflecting river flow. These large wood and riprap structures would also provide areas with slower flows and recirculation eddies. The use of river bottom material from pool excavation to create new islands would create new areas of shallow water along the shores of these islands that would slow water velocities in areas where a deeper channel and faster water exist currently.

Pool sustainability at the project site would be influenced by river geometry (meander radius and width-depth ratio), transitory backwater conditions, and the flow partitioning between the mainstem and side channels. The potential for pool filling was minimized to the degree possible in project design, but the excavated pools would likely fill over the next few years. Pools created by the three large bank structures could form in the same area but the size and location of those new pools are uncertain.

The side-channel large wood structures would create hydraulic complexity in the side channels between the islands. The structures would promote development of bedform diversity by establishing a series of small scour pools. Over time, these structures may collect additional debris and promote deposition in the side channels, thus contributing to floodplain development.

Construction activities in and adjacent to the Kootenai River would generate temporary and localized increased turbidity. However, previous samples taken in the Kootenai River area show that the river bottom material is comprised predominantly of gravel and sand (95-97 percent) with very little silt or fine material (3-5 percent) (River Design Group, 2012). Because of the small amount of fine material in the sediment, turbidity in the river during construction would dissipate quickly. Figure 11 shows the

added sediment to the Kootenai River during island construction at the Bonners Ferry Island location. The sediment plume stayed in a narrow band along one side of the river and dissipated within 0.6 miles downstream of the source of the sediment.

Stormwater runoff from temporarily-disturbed construction and staging areas could also contribute sediment laden water to the river and increase turbidity. Erosion and sediment control measures would be used during all construction activities to prevent discharges from construction sites to the river to the maximum extent practicable.

Figure 11. Sediment plume during 2015 Island Construction



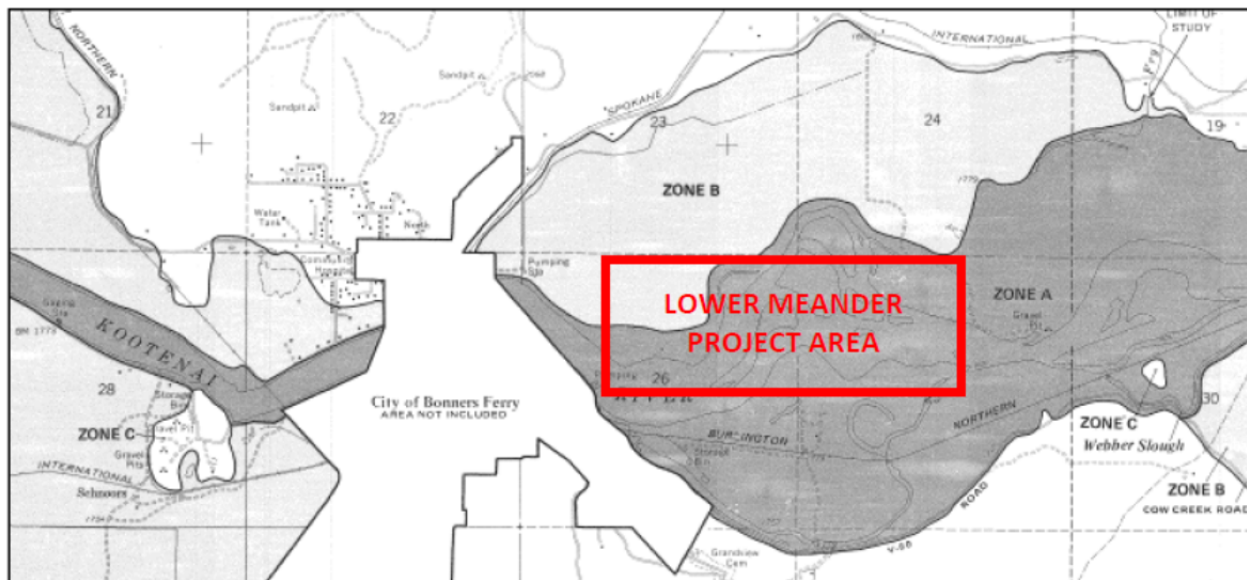
The use of hazardous materials or substances during construction of the Proposed Action has the potential to result in the contamination of surface water or groundwater. Construction equipment contains petroleum products, such as gasoline, diesel fuel, motor oil, and hydraulic fluid, and other hazardous fluids, such as anti-freeze. Equipment leakage may lead to the release of small quantities of these substances into the environment. The implementation of a spill prevention, control and countermeasure plan and BMPs would reduce the potential for leaks or spills of hazardous materials from equipment during construction. Releases of hazardous substances to the environment may also occur if existing sites of contamination are encountered during construction. As described above, the sediment analysis conducted in the project area showed low levels of contaminants but they were within allowable levels (Barton et al. 2012).

Plantings associated with the Proposed Action would, when mature, provide a beneficial effect on water temperature by creating additional shade along the river.

In summary, river hydraulics would be changed in localized areas in the project area. Construction activities would result in temporary and localized sediment effects on surface water quality, though these effects would be mitigated by the application of best management practices and mitigation measures (see Section 2.4). Over the long-term, reduced stream bank erosion and turbidity would result from the creation of new riparian habitat areas along the regraded riverbanks and new enhanced islands. Thus, the effects of the Proposed Action on water resources would be low.

In accordance with a request from the USACE, an analysis was conducted of the project's potential to increase flooding in the project area as well as areas downstream within Bonners Ferry that is regulated by USACE. The analysis included the cumulative effects of all the completed and proposed KRHRP projects in the Braided Reach. Modeling results of the effects of a; the KRHRP projects show less than 0.15 feet of increase to water surface elevations at Bonners Ferry (Zone AE) for the 100-year flood event and 0.2 feet for the 10-year flood event. These increases were determined to be the result of the Bonners Ferry Islands Project that was completed in 2016. When the Bonners Ferry areas was analyzed to determine the effects of the Lower Meander Project, no additional increase in water seen in the water surface elevation for either the 100-year or 10-year flood events. Modeling of potential changes of water surface elevation changes within the Lower Meander project area showed an increase of less than 0.1 feet for both the 10-year and 100-year flood events. Based on these results, the Proposed Action would not notably increase the Bonners Ferry flood elevations to a degree that would require changes in the USACE's water management activities at Libby Dam for flood regulation operations (River Design Group, Inc., 2017).

Figure 12. Excerpt from FEMA FIRM Panel 16027 0575 B showing the regulatory floodplain in the Lower Meander Project area within Boundary County.



3.3.3 Environmental Consequences – No Action

Under the No Action alternative, there would be no changes in river hydrology, no construction-related turbidity, and no change in base flood elevations in Bonners Ferry. Ongoing shoreline erosion would continue to contribute to some sedimentation in the river.

3.4 Fish and Fish Habitat

3.4.1 Affected Environment

Fish

Numerous native fish species including, bull trout, westslope cutthroat trout, Columbia River redband trout, kokanee, burbot, and Kootenai River white sturgeon exist in the Kootenai River, in or near the proposed project area. No anadromous fish (fish that live part of their life in the ocean, then return to the river to spawn, e.g. salmon and steelhead) populations occupy the Kootenai River. Table 8 shows a list of fish species in the Kootenai River.

Table 8. Native and non-native fish species in the Kootenai River likely to inhabit the project area

Common name	ESA status	Idaho State status
White sturgeon	Endangered	Endangered
Burbot	None	Endangered
Bull trout	Threatened	Threatened
Westslope cutthroat trout	None	Game fish
Redband Rainbow trout	None	Game fish
Kokanee salmon	None	Game fish
Mountain whitefish	None	Game fish
Redside shiner	None	Unprotected wildlife
Peamouth chub	None	Unprotected wildlife
Northern pikeminnow	None	Unprotected wildlife
Largescale sucker	None	Unprotected wildlife
Slimy sculpin	None	Unprotected wildlife
Longnose sucker	None	Unprotected wildlife
Torrent sculpin	None	Unprotected wildlife
Rainbow trout	None	Game fish
Brown Trout	None	Game fish
Brook trout	None	Game fish
Bluegill	None	Game fish
Pumpkinseed	None	Game fish
Smallmouth Bass	None	Game fish
Largemouth Bass	None	Game fish
Northern Pike	None	Game fish
Yellow perch	None	Game fish
Black bullhead	None	Game fish

Two fish species listed under the ESA may exist in the project area: the Kootenai River white sturgeon (endangered), and the Columbia River bull trout (threatened) (USFWS 2013).

Juvenile and adult Kootenai River white sturgeon live year-round in the Kootenai River downstream of Bonners Ferry (USFWS, 2006, 2008). Juvenile sturgeon can be found all year long upstream of Bonners Ferry, but adult sturgeon are found infrequently past Bonners Ferry. About one-third of Kootenai River white sturgeon in spawning condition are believed to migrate upstream to the Bonners Ferry area annually (May through July), but few remain there to spawn (USFWS 2013).

The Kootenai River is one of 22 designated bull trout recovery units in the Columbia River Basin, and has been designated as critical habitat. Field studies show that adult bull trout exist in the Idaho portion of the mainstem Kootenai River in very low densities. Bull trout have two life history strategies: migratory or resident. Migratory forms move between lakes or mainstem rivers to small tributaries to spawn. Resident forms remain in the small tributaries all year long. Migratory forms of bull trout in the Kootenai River use the mainstem Kootenai River as a migratory corridor to access the small tributaries, located upstream in Montana, in June and July. After spawning in small tributaries in September and October, they move downstream into deep pools in the mainstem Kootenai River or Kootenay Lake in late October and November.

Fish Habitat

Human activity since the early 1900s has caused significant losses in riparian and wetland areas along the lower Kootenai River, negatively affecting fish habitat in the Kootenai River (US EPA, 2004). Some of the most serious effects to fish habitat have come from the following activities:

- Water impoundment and diversion
- River diking
- Flood control and channelization
- Dam construction and operation
- Wetland draining and associated reduction of native species dependent on wetlands (including beavers)
- Livestock grazing
- Urban and suburban development
- Land clearing for agriculture
- Road building
- Recreation

These activities caused riparian and riverine habitat loss and degradation that impaired key ecological functions, including sediment filtering, stream bank building, water storage and aquifer recharge, dissipation of stream energy, primary productivity, and nutrient retention. The degradation of these key ecological functions has caused the loss of aquatic habitats that are important for the survival of the native fish found in the Kootenai River (US EPA 2004).

In the project area, land use practices including grazing, bank armoring, gravel mining, dike construction and vegetation clearing have altered riverbank, floodplain and vegetation conditions. In addition, the project area is affected by the altered magnitude and timing of flows released from Libby Dam located upstream, and by a transient backwater condition created by Kootenay Lake located downstream in Canada. Multiple vegetated islands have developed in the project area, though vegetation development on them has been slow due to intense browse pressure from wildlife, the altered flow conditions, and low supply of sediment and woody debris.

Aquatic habitat limiting factors in this reach include a lack of cover, complexity, and pools. Based on monitoring data from the Idaho Department of Fish and Game and University of Idaho graduate studies,

this section of the Kootenai River is used primarily as a migratory corridor for native fish (Zelch 2003). Native fish have also been documented in the nearby enhanced off-channel and side-channel habitat created by the Kootenai Tribe's North Side Channels project. Infrequent Kootenai River white sturgeon use has been documented in this reach but no spawning locations have been identified (USFWS 2013). Juvenile Kootenai River white sturgeon appear to be moving through this reach.

3.4.2 Environmental Consequences – Proposed Action

Although the Proposed Action's activities are intended to improve fish habitat conditions over the long term, short-term adverse effects to fish and fish habitat may occur because of construction activities. The Proposed Action could temporarily affect fish by increasing turbidity, generating noise from pile driving and general construction activities, and by disturbance and injury from rock placement.

In-water work would occur between late August and early November, per the work window identified by IDFG and USFWS, and the period of lowest seasonal flows in the Kootenai River. The work window for the project was established so that construction would occur well after the spawning period for Kootenai River white sturgeon, and to ensure that adult Kootenai River white sturgeon would not be in the area during project implementation. Even at such low flows, because of the size of the work area and the depth and velocity of the water, work site isolation and dewatering would not be practical. Consequently, dewatering is not proposed, and pool excavation, bank grading, and bank structure installation would occur in wet conditions. In addition, silt curtains are not feasible because of the water depth and velocity – any material used to capture or slow water sufficiently to allow turbidity to settle out would be quickly over-topped. However, because the river bottom material is predominantly gravel and sand with very little silt or fine material to remain suspended in the water column, turbidity in the river during construction would dissipate quickly.

Floating silt curtains and temporary berms would be used at the downstream bank stabilization area and island creation area because water velocity in these areas is expected to be low enough to allow construction-related turbidity to settle out. Floating silt curtains would be temporarily anchored with one-inch diameter steel piles. Temporary haul roads would be used as berms to direct flow around the work areas and reduce flow velocity in the work areas. Floating silt curtains would not be used in the upstream areas because water depth and velocity there is expected to be too great to allow construction-related turbidity to settle out.

Because of the amount of in-water work necessary to implement the Proposed Action, other effects to fish habitat could occur, such as accidental hazardous material spills or fluid leaks from construction equipment. The use of BMPs would reduce the likelihood of any exposure to aquatic organisms should a spill occur (see Section 2.4.).

Implementation of the Proposed Action would require driving timber piles into the riverbed to create two of the three proposed pool-forming structures along the north bank and fifteen side-channel large-wood structures in the side channels. The two upstream pool-forming structures would require approximately 52 piles (Structure 1) and 134 piles (Structure 2) for a total of 186 piles. Each pile would be 30 to 50 feet long, and 12 to 18 inches in diameter. The fifteen side-channel structures would require 150 piles (10 piles each). Driving each pile into the riverbed would require about 380 impact hammer strikes allowing for about eight to 10 piles to be installed per day. At this rate, installation of piles into the river bed would take about 30 to 40 work days.

The level of impact to fish from this pile-driving is based on the sound exposure level, which is determined by the loudness and duration of the noise, and the distance fish would be from the noise. Fish are also affected by the accumulated sound exposure level. The accumulated sound exposure level that a fish would experience is calculated by using the number of hammer strikes during a one-day work period (assuming there would be a break of at least 12 hours between work periods) minus the

amount of sound energy absorbed by the water. The accumulated sound exposure level, per work period/day, determines the level of effect to fish from the exposure to prolonged noise (USFWS 2013).

During installation of the large bank structures, the sound pressure levels would likely exceed the physical injury threshold for bull trout and Kootenai River white sturgeon. Accumulated sound exposure levels would also reach the threshold for adverse physical effects to both bull trout and Kootenai River white sturgeon, extending 420 feet from the pile being driven. Bull trout and Kootenai River white sturgeon up to 705 feet away from pile driving activities would likely be behaviorally affected (move away from the noise) by noise generated by driving piles (USFWS 2013).

Although it is possible that bull trout would be in the project area during construction, they are in low abundance, and the habitat area available in the lower Kootenai is quite large compared to the area that would be temporarily affected by elevated noise levels during construction. Additionally, the project area is currently characterized as degraded habitat, which makes it unlikely that bull trout would be present at all. In addition, because bull trout typically migrate at night (Howell and Buchannan, 1992), it is unlikely that they would be passing through the project areas when pile driving is occurring. Therefore, the effects on bull trout from noise generated by pile driving would be low.

Sturgeon are not expected to remain in the vicinity of pile driving for any time long enough to be more than temporarily affected by pile driving noise. The habitat is poor to begin with, so few are expected to be present, and those moving through would be expected to remain for only brief periods of time - not long enough for the accumulated sound exposure levels to cause harm. Therefore, the effects on Kootenai River white sturgeon from noise generated by pile driving would be low.

Other fish species would likely be present in the project area during construction (Table 9) and would also be affected by the short-term and temporary construction activities. The largest effect to fish would be their short term displacement from occupied habitats from the noise generated by pile driving. Though adjacent habitats are available for them to displace into, those habitats are likely already occupied by other fish. This sets up a competitive scenario that puts individual, likely smaller or weaker, fish at higher risk from increased exposure to predation or some adverse environmental factor such as temperature, flow, prey scarcity, etc. for the period of time they are displaced and exposed. However, the numbers of fish impacted would likely be low, as fish habitat in this area is limited and of poor quality and fish populations here are thus anticipated to be low. There would thus be a low to moderate short-term and temporary effect to fish in the project area.

As a result of the project, however, fish habitat would be improved and expanded. The Proposed Action would create habitat conditions consistent with what once existed naturally in the Kootenai River system but has since been lost due to human-caused changes to the basin. These improvements would provide higher carrying capacity than before for multiple species and all life stages, and the long-term outcomes would be beneficial.

3.4.3 Environmental Consequences – No Action

Under the No Action alternative, there would be no disturbance to fish due to construction activities and poor habitat conditions for Kootenai River white sturgeon, burbot, bull trout, and other native fish species would remain and possibly worsen.

3.5 Recreation

3.5.1 Affected Environment

The Kootenai River is a wide, slow-moving river in the reaches above and below the project area and thus holds little attraction for kayakers and rafters who prefer the faster water found upstream of the project area. Its use is primarily by recreational boaters and anglers as the river supports cutthroat

and rainbow trout as well as mountain whitefish and other species. Fish habitat quality has been improving due to the Tribe's habitat restoration efforts and so its attraction for fish and anglers is increasing. In 2009, the estimate of trout per mile had increased from 50 fish per mile to almost 300 fish per mile (Ryan Hardy, pers com, 2016).

The river is relatively inaccessible from shore since most shoreline is in private ownership. There is some evidence of limited private shoreline use but there are no public access sites to the river within the project area. The nearest boat ramps are located four miles upstream at the Twin Rivers Resort and two miles downstream at the Search and Rescue Boat Ramp. Boats launched at this location would travel through the project area and take out at the Boundary Search and Dive Rescue boat ramp located on the south bank of the Kootenai River, off Riverside Drive downstream of Bonners Ferry. Approximately 200 boats launch from Twin Rivers each year (Rex Hoisington, personal communication, Dec 2016). Some of these boats motor upstream into the Kootenai River Canyon; the remainder float downstream to Bonners Ferry.

3.5.2 Environmental Consequences – Proposed Action

Because the Kootenai River is regularly used for recreational boating, the implementation of the proposed project has the potential to affect recreation, both during construction and from the long-term presence of large wood structures on the bank or in the side channels.

The installation of large bank and instream wood structures along the banks and within the channels could pose a danger to boaters, kayakers, and tubers. These log structures would extend into the current of the river and could create the potential for snagging or damaging passing boats or that people floating on inner tubes could be being injured or entrained by the swirling currents created by the structures.

Construction of large bank and large wood structures in the project area would occur between late August and early November in 2017 and 2018. During construction, some equipment would be in or near the river thus creating the potential for a boating hazard. This potential is likely to be low because of the long sight lines that would allow boaters to see the construction activities before reaching the area. Also the Tribe would post signs at the Twin Rivers Resort boat launch notifying boaters of the construction activity and to remain aware.

Because of high flows and cold water, the majority of the boating through the project area occurs between July and September when flows range from 20,000 cfs in July to less than 10,000 cfs in September. At the lowest flows, the large bank structures would extend approximately 200 feet out into the main channel of the river, leaving 200-300 feet of channel width for boaters to navigate. In the side-channels established between the newly constructed islands, fifteen large wood structures would become stationary objects that recreational boaters would need to avoid. At low flows, there would be approximately 100 feet of channel to navigate around the structures, though the majority of boaters are expected to remain in the main channel and not enter the side channels at all. In addition, the structures would mimic the appearance, function, and effects on flow of similar natural features occurring along major waterways like the Kootenai River. Flows are expected to be deflected away from the structures and toward the unobstructed areas of the river, and experienced river floaters routinely use such flows to avoid river obstacles. Once completed, the recreation effects would be low because the structures would be visible to boaters approaching from upstream and there would be ample time and space with which to navigate through the area.

Temporary construction, transportation, and staging activities along the banks and islands are expected to have no effect on recreation as these areas are not accessible to the public and are not used recreationally.

Long-term improvement in fishing opportunities are anticipated as fish populations respond to improved habitat conditions. As recently as September 2016, a Spokane, Washington newspaper (Landers 2016) cited these ongoing habitat improvements in the Kootenai River as boosting fish populations and increasing fishing opportunities.

3.5.3 Environmental Consequences – No Action

Under the No Action alternative, no restoration actions would be implemented and there would be no effect (positive or negative) on recreation activities on the Kootenai River.

3.6 Cultural Resources

Cultural resources are things and places that show evidence of human occupation or activity related to history, architecture, archaeology, engineering, and culture. Historic properties, as defined by 36 CFR 800 (the implementing regulations of the National Historic Preservation Act [NHPA], 54 USC 306108) are a subset of cultural resources. This subset consists of any district, site, building, structure, artifact, ruin, object, work of art, or natural feature important in human history that meets defined eligibility criteria for the National Register of Historic Places (NRHP).

The NHPA requires that federal agencies inventory and evaluate cultural resources for eligibility for listing in the NRHP, and evaluate and consider effects of their actions on these resources. Federal agencies evaluate cultural resources for eligibility in the NRHP using specific criteria, including an examination of the cultural resource's age, integrity (of location, design, setting, materials, workmanship, feeling and association), and significance in American culture, among other things. A cultural resource must meet at least one criterion to be eligible for listing in the NRHP. Historic properties include prehistoric resources that predate European contact and settlement.

3.6.1 Affected Environment

Ethnographic Overview

The project area is within the traditional territory of the Ktunaxa (Kootenai) Nation, and specifically, the Lower Kootenai people. The Kootenai Tribe of Idaho is part of the Ktunaxa Nation. The Lower Kootenai people traditionally occupied the Kootenai River valleys, and the surrounding areas, from what are now Libby and Jennings, Montana, to Kootenay Lake in British Columbia.

A few Lower Kootenai would accompany the Upper Kootenai on snowshoes (before they had horses), to areas east of the Rocky Mountains on their yearly bison-hunting expeditions (Brunton, 1998). One of the stops along the Kootenai River where groups would find resources was at the mouth of the Moyie River, now the site of the Kootenai Tribe's Twin Rivers Canyon Resort and Twin Rivers Sturgeon and Burbot Hatchery (on a portion of the Kootenai Tribe's reservation).

Some of the Kootenai, especially the Lower Kootenai, would join large tribal gatherings at Kettle Falls, for the July and August runs of Chinook, coho, and sockeye salmon (Kennedy and Bouchard, 1998). Bird hunting was essential to the Lower Kootenai and sought-after species included cranes, ducks, gulls, spruce grouse (known as fool hens), and geese.

The Kootenai Tribe of Idaho relied heavily on the local fishery including sturgeon (which their canoes were modeled after) and burbot as well as other native fish. In the summer and fall, they collected berries, fall roots, seeds, and various plants, and hunted for deer, elk, caribou, and moose. They also hunted or trapped beaver, muskrat, mountain goats, bear, lynx, wolf, and other animals for their hides and, occasionally, for food.

Historical Overview

David Thompson, a British-Canadian surveyor and fur trader, was the first non-Indian to explore the area. In 1807, Thompson travelled up the Kootenai River from Kootenay Lake in southeastern British Columbia. He stored canoes near Bonners Ferry and traveled on horseback up the Moyie River valley, to the area that is now Cranbrook and Ft. Steele, B.C. (Tyrell J. B., 1916).

Following the early exploration of the region by fur traders, the discovery of gold caused the first sustained rush of Euro-American settlers to northern Idaho. This inspired the construction of a transportation system sufficient to carry people and goods. After the initial rush of prospectors brought development of more stable communities, interest turned to rock mines. This, in turn, required a regional transportation system to bring the massive equipment that the mills and smelters required (Ostrogorsky et al, 1991).

In 1882, workers completed the transcontinental Northern Pacific Railroad. It spanned northern Idaho, north of the Clark Fork River, around the north side of Lake Pend Oreille, along the north side of the Pend Oreille River. There, it crossed just above Albeni Falls, and then went southwest from Newport to Spokane, Washington.

In 1893, James J. Hill completed his Great Northern Railroad, which ran from Duluth, Minnesota, to Seattle, Washington, by way of the Kootenai River and Bonners Ferry. The railway route in north Idaho crossed the Kootenai River at Bonners Ferry, ran south to cross Lake Pend Oreille at Sandpoint, and continued across the Rathdrum Prairie to Spokane. The Spokane International line followed in 1905, crossing the Kootenai River at Bonners Ferry, and connecting Spokane with the Canadian Pacific Railway (Bonner County History Book Committee, 1991).

Railroads opened the area to large-scale logging, mining, and agricultural development. This gave rise to small communities and lumber mills along their routes. Small towns including Addie, Meadow Creek, Snyder, and Moyie Springs in Idaho, depended on the railroad for supplies and communication.

3.6.2 Environmental Consequences – Proposed Action

Based on the review of archaeological site records and cultural resource survey reports on file at the Idaho State Historic Preservation Office and nineteenth-century maps created by the General Land Office, two previously recorded archaeological sites within the project area were identified.

A pedestrian and subsurface survey was conducted on November 16, 2016 and finished November 19, 2016. Ron Abraham, Kootenai Tribe of Idaho Tribal Councilman, observed the fieldwork. During the pedestrian survey, two new archaeological sites were identified. One of the sites was previously determined eligible for listing in the NRHP; however, the site remains are located outside of the construction footprint thus direct impacts to it would not occur. The second site was previously identified and determined not eligible for listing in the NRHP (Dampf, Perrin, & Tarman, 2014). Thus, the potential for the proposed action to effect cultural resources is low.

Though the potential for additional undiscovered sites to be found during construction is low, a protocol for managing an inadvertent discovery would be developed and followed that would prevent or lessen potential effects to sites if discovered during construction activities.

3.6.3 Environmental Consequences – No Action

Under the No Action alternative, because no restoration actions would be implemented, there would be no potential for effects on cultural resources.

3.7 Visual Resources

3.7.1 Affected Environment

The visual character of the project area is dominated by the natural features of the river and the human-altered features of agricultural areas and private home sites.

The river's features include the broad, nearly quarter mile-wide Kootenai river surface, willow-shrub or wooded riparian islands and river banks, and exposed gravel and sand bars. The agricultural and home site features along the river include plowed or cultivated hay fields, farmhouses, outbuildings, barns, and farm roads and equipment.

The project area is visible to only a small section of the elevated residential northeastern section of Bonners Ferry east of US Highway 95/2 and south of Cow Creek Road; and to the river-level residences immediately east of the Kootenai River Inn. The project area is not visible from the Kootenai River Inn.

The project area would be clearly visible from the Cow Creek Road in places as it is elevated 30 to 50 feet above the river. This road follows the river upstream and is between 0.35 and 0.65 miles from the project area at various spots, thus the project area would be middle ground to background viewing. None of the project area is in foreground or near middle-ground viewing distance.

3.7.2 Environmental Consequences – Proposed Action

Building the Proposed Action would cause several changes to the visual landscape. The new and enhanced islands (a nearly three-fold increase in size), bank grading and stabilization, and large wood structures would be visible from Cow Creek Road and the bluff south of the main downtown area, and by recreational boaters. While visible, they would likely not be that noticeable to most viewers due to their distance away (generally over one-half mile). None of the large bank structures would be clearly discernable to anyone other than boaters on the river or the two private residences near the south bank of the river.

Construction activities from August to November in 2017 and 2018 might be visible, but not clearly discernable because of distance. Construction effects on visual resources from locations the public might be present would be temporary and low.

During and after construction is completed, the habitat structures and enhanced/new islands would be visible to boaters and the few residents adjacent to the project site. Over time, as new vegetation establishes and matures, the site would resemble natural features that occur along large rivers, and would be consistent with the existing landscape. Consequently, the long-term effects on the visual resources would be low.

3.7.3 Environmental Consequences – No Action

Under the No Action alternative, no restoration actions would occur in the Kootenai Lower Meander project area. The views of the Kootenai River both from land and water would still change over time as the shoreline and existing islands erode, cut banks shift, and as the river redeposits materials.

3.8 Noise

3.8.1 Affected Environment

For the purposes of this analysis, noise is any sound that is loud, disruptive, unexpected, or otherwise undesirable. Environmental noise is commonly quantified in terms of A-weighted decibels (dBA); an overall frequency-weighted sound level that approximates the frequency response of the human ear. Table 9 contains examples of common activities and their associated noise levels in dBA.

Table 9. Common activities and associated noise levels

Source/Location	Sound Level
Threshold of Hearing	0 dBA
Library	35 dBA
Chicago Suburbs – nighttime	minimum 40 dBA
Small Town/Quiet Suburb	47-53 dBA
Private Business Office	50 dBA
Light Traffic at 100 ft Away	50 dBA
Average Residence	50 dBA
Large Retail Store	60 dBA
Accounting Office	60 dBA
Boston - Inside House on Major Avenue	68 dBA
Average Traffic on Street Corner	75 dBA
Inside Sports Car (50 mph)	80 dBA
Los Angeles - ¾ mile from Jet Landing	86 dBA
Inside New York Subway Train	95 dBA
Loud Automobile Horn (at 1 m)	115 dBA

Source: EPA 1974

The ability to perceive a new noise source intruding into background conditions depends on the nature of the intruding sound, and the background sound. For situations where the nature of the new sound is similar to the background sound (e.g., new traffic noise added to background traffic noise), a noise of 3 dBA is just noticeable, a change of 5 dBA is clearly noticeable, and a change of 10 dBA is perceived as doubling the sound level (or halving, if the sound is reduced). For situations where the nature of the new intruding sound is different from background sound (e.g., construction noise in an otherwise quiet setting), the new sound (including sporadic “clanks” from construction equipment) can be easily perceived, even if it only raises the overall noise level by less than 1 dBA.

There are nearby residents and those recreating in or near the project area that would be susceptible to noise effects. Existing noise sources include traffic along US Highway 95/2 and Cow Creek Road, train traffic on the Burlington Northern Santa Fe railway line immediately south of the project area, the Union Pacific railway west of the project area, and saw mill operations south of the project area.

Background noise levels in small towns such as Bonners Ferry are typically around 45 dBA during the day and 35 dBA at night (EPA, 1974). The train generates intermittent, loud sounds as it passes. Noise generated by an individual train depends on the train type, length, speed, and whether the train uses its warning whistle. Trains sound their warning whistle at the “at-grade” vehicle crossings, like the one on Oak Street in Bonners Ferry, to warn motorists of the on-coming train. At a distance of 100 feet, a train-warning whistle can generate maximum noise levels of about 100 to 105 dBA. Train engines typically generate maximum noise levels of approximately 80 to 85 dBA, while train cars generate noise levels of about 70 to 75 dBA.

3.8.2 Environmental Consequences – Proposed Action

The primary effect from construction activities for this project would come from the noise of pile driving. An impact pile-driving hammer is a large piston-like device that is usually attached to a crane. Most impact pile driver hammers have a vertical support that holds the pile in place, and a heavy weight, or ram, moves up and down, striking an anvil that transmits the blow of the ram to the pile. The noise from an impact pile-driving hammer comes from the impact of the tool against material. These levels can vary depending on the type and condition of the material. Noise levels at 50 feet from impact

pile-driving hammer can range from 80 to 110 dBA. The nearest residence to the project area is on the south bank of the Kootenai River and more than 1,000 feet away from where pile driving would occur.

The two upstream large bank structures would require approximately 186 piles, 30 to 50 feet long, and 12 to 18 inches in diameter. The fifteen side-channel structures would require 150 piles (10 piles each). Driving each pile into the riverbed would require about 380 impact hammer strikes. Workers would likely install eight to 10 piles per day, and would thus be driving piles into the river bed for approximately 34 to 42 days Monday through Saturday, 7:30 AM to 6 PM.

Assuming maximum construction-generated noise level of 110 dBA at 50 feet and an average exterior or interior structural attenuation of 15 dBA, inhabitants of residences within approximately 2,000 feet of the construction areas and material yards could experience increases in ambient noise levels of greater than 10 dBA. If construction activities were to occur during the more noise-sensitive periods of the day (i.e., evening and nighttime hours), resultant increases in ambient noise levels could result in sleep disruption to occupants of these residential dwellings. Because the project would restrict construction to daytime hours, effects from construction-generated noise would be moderate but short term for nearby residences.

For all other general construction activities in the Lower Meander Project areas, noise generated during construction would likely be only slightly higher than existing background levels. Because of the low noise levels and the short duration of the construction period, noise effects during construction would be low.

3.8.3 Environmental Consequences – No Action

Under the No Action alternative, no restoration actions would be implemented in the Kootenai River Lower Meander Project area and there would be no effects from construction-related noise.

3.9 Air Quality and Greenhouse Gasses

3.9.1 Affected Environment

Existing, localized sources of air pollutants in the study area include vehicles on state and local highways, diesel train locomotives, agricultural activities, and industrial land uses, such as timber mills. Boundary County is “in attainment” with the National Ambient Air Quality Standards under the Clean Air Act. Being “in attainment” means that the concentrations of air pollutants in the area are historically below the limits described in the National Ambient Air Quality Standards which contain criteria that the Environmental Protection Agency (EPA) uses to determine air quality based on what kind of contaminants, and how much of them, are in an air sample for a given time period (IDEQ, 2016).

3.9.2 Environmental Consequences – Proposed Action

Air pollutant emissions would be generated during the construction of the Proposed Action. If the pollutants occur in significant amounts, they could pose a public health hazard, especially for people with respiratory ailments. The emissions could reduce visibility on roads, highways, and in scenic areas to the detriment of public safety or enjoyment. In addition, vehicle emissions and combustion of fossil fuels during project operations, as well as during construction, could emit greenhouse gases.

The pollutants that could increase because of project construction are carbon monoxide, ozone, and particulate matter (dust). Dust could be created during construction by vehicles travelling on unpaved surfaces and from ground-disturbing activities. There is no residential area close enough to the construction sites to be affected by construction activity dust – the nearest is over a mile away. However, dust effects would be low because they would only occur during construction (August through November of 2017 and/or 2018), would be temporary, and would occur in localized areas. Consequently, air quality effects during construction would be low.

Emissions from construction vehicles would contribute greenhouse gases to the atmosphere through gasoline and diesel combustion motors.

Greenhouse gas (GHG) emissions were estimated based on the approximate number of vehicles to be used during project construction, and the approximate distance those vehicles would travel during the construction period. For the Proposed Action, workers would have an estimated 30 vehicle round trips per day at the site during two, three month construction periods (2017 and 2018). The estimated greenhouse gas emissions for these two construction periods would be 383 metric tons of carbon dioxide (CO₂). While all emissions of greenhouse gases contribute to global greenhouse gas concentrations and climate change, the total CO₂ emissions from the proposed project would be low compared to emissions from other contributors.

3.9.3 Environmental Consequences – No Action

Under the No Action alternative, no restoration actions would be implemented in the Kootenai Lower Meander project area and there would be no effect on air quality and no emissions of GHGs.

3.10 Public Health and Safety

3.10.1 Affected Environment

The Proposed Action is located in a rural setting on private properties on which the owners conduct residential, ranching and other activities that are not typically regarded as likely sources of toxic or hazardous substances. Public health and safety risks present at and near the sites are typical of those for rural areas with limited development, including events such as traffic accidents, weather-related travel hazards, wildfires, floods and medical emergencies. Numerous federal, state and local government jurisdictions provide law enforcement, fire protection, emergency medical and related public health and safety services in the Bonners Ferry area.

3.10.2 Environmental Consequences – Proposed Action

Work around water is inherently dangerous, and risk of drowning would increase because worker mobility would be restricted while equipment is operating. Risk of injury to workers comes from the use of heavy equipment, working near high-voltage lines, working in water, and being exposed to hazardous materials such as fuels during temporary road construction and earthwork, and placement of structures. Construction activity, however, would be conducted subject to standard BPA contract requirements for worker safety; access to the construction sites and travel on local roads would be managed to minimize safety risks for non-project human activity in the project area, and construction activities would meet the guidelines for use, handling, storage, and disposal of hazardous substances.

Future needs for law enforcement, fire protection, emergency medical, and related public health and safety services would remain within the capacity of the existing service providers. There would be no impact from these activities on the continued delivery of those services.

Large wood structures introduce a long-term potential boating hazard at multiple locations within the river in the project area. Project designs for these features would provide adequate time and space for boaters to avoid the structures. Also, the Tribe has installed signage at the Tribally-owned Twin Rivers Canyon Resort boat launch to inform boaters of the restoration activities along the river and indicating their location.

Because project activities would be conducted in compliance with applicable laws, regulations, and guidelines; and there would be no effects on public health and safety services, the effect of the Proposed Action on public health and safety would be low.

3.10.3 Environmental Consequences – No Action

Under the No Action alternative, no restoration actions would be implemented in the Kootenai Lower Meander project area, and there would be no effect on public health and safety.

3.11 Transportation and Utilities

3.11.1 Affected Environment

Public and Private Roads affected

The project area is accessible only by private farm roads. The nearest public roads are the Cow Creek Road and Waterfront Lane to the south and the District 2 Road (County Road 60) and Ball Park Road to the north and west. Private farm roads that connect to these public roads would be improved and used for construction access as discussed in Sections 2.1.5 and 2.1.6. Figure 8 displays the existing and proposed temporary access roads. Figure 13 displays the transportation infrastructure in and near the project area.

Figure 13 Main public access roads into the project area



Railroads and Public Utilities

The Burlington Northern Santa Fe rail line parallels the Kootenai River along its southern bank, and approximately 42 trains use this rail line per day. The Union Pacific rail line crosses District 2 Road on the north side of the river and is used by approximately eight trains per day.

There are no major utility corridors within or adjacent to the project area, though there is a local distribution powerline that crosses the river immediately downstream of the project area, and buried local powerlines upslope of, but not within, the bank stabilizations work areas in phase 2 (see Figure 4).

3.11.2 Environmental Consequences – Proposed Action

The Proposed Action would temporarily increase traffic from vehicles carrying construction materials to and from the project area sites. Large construction equipment traveling to the project areas may also periodically block traffic, causing short-term delays for other vehicles.

Construction vehicles would be required to cross the unmarked level crossing of the Burlington Northern Santa Fe rail line on Waterfront Lane. Because this crossing is unmarked, a Burlington Northern Santa Fe flagger may need to be present during all construction times to avoid train conflicts or delays. Traffic will also cross the Union Pacific railway on the north side of the river at District 2 Road. This is a public marked crossing so would not require a flagger.

Both the District 2 Road and the Cow Creek Road are readily accessible from Hwy 2. Construction traffic traveling along the south bank of the Kootenai River on Cow Creek Road would pass through several small residential areas. While construction would temporarily increase traffic, the effect would be minor compared with existing roadway use, and is not expected to substantially alter traffic operations on the local roads. Although large construction vehicles and trucks containing materials could cause traffic delays, those delays would be brief and infrequent. Therefore, transportation effects during construction at both locations would be low to moderate.

3.11.3 Environmental Consequences – No Action

Under the No Action alternative, restoration activities in the Kootenai Lower Meander Project area would not occur; therefore, there would be no effect on transportation.

3.12 Socioeconomics

3.12.1 Affected Environment

Boundary County, Idaho, is the study area for socioeconomics.

Population and Housing

Boundary County's scenery, recreational opportunities, quality of life and expanding job market drew many new residents in the 1980s and 1990s. The economic downturn in 2001 slowed economic and population growth of the county with growth resuming in 2005 as population and employment expanded across the state. The county's lower housing costs and rural lifestyle drew some people from neighboring Bonner County. From 2005 to 2015, the county's population grew 10 percent from 10,303 to 11,318 while Idaho's population grew 16 percent and the U.S. population grew 9 percent. (Idaho Dept. of Labor 2016)

About 90 percent of the county is forested so most of the people live in the Kootenai River Valley. Bonners Ferry had a population of 2,549 and Moyie Springs had a population of 717 in 2015. (Idaho Dept. of Labor 2016)

Table 10 Demographic Characteristics, 2012

	Bonnors Ferry	Boundary County	State of Idaho
Total Population	2,543	10,972	1,567,582
Minority Population	146 (5.7%)	574 (5.2%)	171,095 (10.9%)
Low-Income Population	23.9 (+/- 7.9)	16.1 (+/- 3.8)	15.0% (+/- 0.3)

Employment and Income

Agriculture, forestry and related enterprises have historically been the economic mainstays in Boundary County but other industries such as transportation, wholesaling, retailing, service businesses, and governmental service are increasing in their contribution to the county's economy. Health care, manufacturing and retail play an increasingly important role (Idaho Dept. of Labor 2016).

Agriculture's importance increased in the 1980s when Anheuser-Busch began growing hops at Elk Mountain Farms, and several ornamental tree nurseries and Christmas tree farms opened. With the change in ownership from Anheuser-Busch to the Belgium-based In-Bev company—forming Anheuser-Busch InBev, Elk Mountain Farms cut back production and remains in flux. (Idaho Dept. of Labor 2016)

In 1986, the Kootenai Tribe opened the Kootenai River Inn, contributing to the county's tourism sector potential. In the 1990s, the Tribe added a casino and most recently expanded the hotel. The county also benefits from economic activity at its two ports of entry on the Canadian border— Porthill and Eastport. Imports increased 24 percent at the two ports through the depths of the recession and exports increased 37 percent from 2009 to 2011. Bonnors Ferry, named by tourists as Idaho's "friendliest city," has made major improvements to its downtown to attract more visitors (Idaho Dept. of Labor 2016).

Boundary County has been successful in diversifying and expanding its economy with the number of private-sector employers in Boundary County increasing by 13.4 percent (374 to 424) since the year 2000. The industries creating the most new businesses were health care, professional, and business services (Idaho Dept. of Labor 2016).

About 4,288 people age 16 and over had jobs in some capacity in Boundary County in 2012 (US Census, 2012). The unemployment rate in the study area in 2012 was 5.6 percent. In 2012, per-capita personal income in the study area was \$18,298 (US Census, 2012). Boundary County government and Boundary Community Hospital are the largest employers; and Idaho Forest Group and Welco are the largest private employers (Idaho Department of Labor, 2017).

Environmental Justice

Executive Order 12898 directs federal agencies to identify and address "disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations" (collectively, environmental justice populations) (59 Federal Register 7629 [February 11, 1994]). This executive order directs agencies to analyze the effects of potential actions on minority and low income communities through the National Environmental Policy Act review process (Council on Environmental Quality, 1997).

To determine potential effects, federal agencies identify geographic areas where ethnic and racial minorities exceed 50 percent of the population, in addition to geographic areas where the percentage of the ethnic and racial minority population is "meaningfully greater" than the percentage in the surrounding area. Low-income populations are populations that are at or below the poverty line, as established by the U.S. Department of Health and Human Services.

In Bonners Ferry, 4.7 percent of the population is considered a minority. In Boundary County, 3.6 percent of the population is considered a minority population. In the state of Idaho, 5.4 percent of the population is considered a minority population (US Census, 2012).

The U.S. Census Bureau uses a set of dollar value thresholds that vary by family size and composition to determine the poverty level. Between 2008 and 2012 in Bonners Ferry, 23.9 percent of people had incomes below the poverty level Boundary County as compared to 16.1 percent of the population of Boundary County and 13.6 percent of the statewide population (US Census, 2014).

3.12.2 Environmental Consequences – Proposed Action

Population and Housing

Because staging and construction for the proposed action would occur between July and November in 2017 and 2018, the duration of work would likely not be long enough to induce any permanent changes to population in the study area. Construction would require approximately 20 workers, with the workforce coming from both inside and outside Boundary County. Workers from outside Boundary County would likely reside temporarily within the project vicinity and have an indiscernible effect on the overall population of the study area. The workers from out of the area would require temporary lodging in the local area. Construction workers would likely occupy recreational vehicle parks and hotels or motels. There is expected to be sufficient temporary lodging to accommodate this small increase in demand over the construction period. Therefore, the potential for effects on population and housing from construction would be low.

Employment and Income

As discussed above, the temporary increase in jobs during construction would represent a very small proportion of the current workforce in the study area. Therefore, the temporary effect on the labor market in the study area would be low. For those people who get construction jobs, especially if they are currently unemployed, the individual effect would be positive. Construction of the Proposed Action is expected to cost approximately \$7 million. This cost would include expenditures on materials and equipment, and labor – some of which would be spent locally in the study area. These local expenditures would have multiplier effects within the economy, as workers and businesses receiving income would re-spend some of the money locally, the workers and businesses that receive that money would re-spend some locally, and so on. These direct and indirect expenditures would represent a small proportion of the total annual income in the study area, so the effect would be temporary and low.

Environmental Justice

No residential or concentrated human use areas near the project site would be affected by construction noise, dust, or air quality reductions. Human health and the living conditions of any community would be unaffected, including those where environmental justice might be of concern.

As described above, construction of the Proposed Action would have a low but positive temporary impact on the economy in the affected area, with multiplier effects likely benefitting many to a small degree and adversely affecting none. Thus, construction of the Proposed Action would likely have no adverse or disproportionate effects on minority or low income populations.

3.12.3 Environmental Consequences – No Action

Under the No Action alternative, restoration actions in the Kootenai Lower Meander Project area would not occur; therefore, the effects related to construction would not happen. Short-term contributions to the local economy would not occur. No other effects on socioeconomics or environmental justice have been identified.

3.13 Other Environmental Resources

3.13.1 Wildlife

Effects on wildlife would be low. Vegetation removal along the north banks of the Kootenai River at Sites 1 and 2 would modify some habitat, but all of this would be replaced with native-species plantings. This is expected to increase the value of the habitat for the species currently using these areas. The individuals, however, would likely be temporarily displaced during construction activities, in that process, but may return or be replaced by other individuals of the same types of species as the plantings mature over time, and are able to support greater numbers of animals.

The proposed restoration of in-river and riparian habitats along the Kootenai River would likely benefit native wildlife species such as beaver, muskrat, otter, mink, and various species of birds. The project would have no effect on ESA-listed wildlife species because the project area is outside management areas or designated critical habitat for three ESA-listed wildlife species known to occur in Boundary County: grizzly bear, woodland caribou, and Canada lynx. Staging and construction would occur between July and November, which is outside of the nesting period for migratory birds.

3.13.2 Vegetation

Effects on upland vegetation would be low. Scattered limited numbers of trees and shrubs within streambank grading areas would be removed during construction; however, existing native vegetation will be preserved to the greatest extent possible. Where construction requires removal of native vegetation, efforts will be made salvage and transplant appropriate species where feasible. Planting native vegetation on over 21 acres of improved islands and approximately 8 acres of stream banks would fully mitigate the removal of this minor amount of existing vegetation.

3.13.3 Land Use

Effects on land use would be low. The construction would occur in the main channel of the Kootenai River and cause no changes to land use. Some land currently used for agriculture and pasture would be used for temporary access and staging areas but those land uses would continue during construction, and no permanent change in their use is proposed.

3.14 Cumulative Effects Analysis

Cumulative effects are those that could occur when considered in addition to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Current actions are those projects, developments, and other actions that are underway because they are either under construction or occurring on an ongoing basis. Reasonably foreseeable future actions generally include those actions formally proposed or in the planning stages. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

Past actions that have affected natural and human resources along the Kootenai River in Idaho include the construction of Libby Dam, timber harvest, diking, agriculture, road development, commercial and residential development, and mining. Since 2011, the Tribe has implemented aquatic and riparian habitat restoration projects along the Kootenai River intended to benefit native fish and wildlife species, focusing in particular on the recovery of Kootenai River white sturgeon and burbot. The Tribe has also implemented upland restoration actions along the Kootenai River's historical floodplain and tributaries.

In determining the present and reasonably foreseeable actions with the potential to contribute to cumulative effects, when combined with the effects of the alternatives, BPA considered other planning efforts, large-scale projects, or restoration actions along the Kootenai River below Libby Dam that would be likely to result in effects that could interact cumulatively with those from the proposed project.

Timber harvesting activities contribute sediment to the rivers and streams that flow into the Kootenai River. The Kootenai River below Libby Dam flows through the Three Rivers Ranger District of the Kootenai National Forest in Montana and the Bonners Ferry Ranger District of the Idaho Panhandle National Forest in Idaho. There are no timber sales being considered in either of these ranger districts that would result in effects to the Kootenai River (USFS, 2014a, 2014b). Private timber sales could occur that could result in effects to wetlands, vegetation, and water quality.

The U.S. Forest Service's Collaborative Forest Landscape Restoration Program (CFLRP) provides funding for collaborative, science-based ecosystem restoration of priority forest landscapes. Past practices have degraded forest health and increased fire risk. The Kootenai Valley Restoration Initiative has received CFLRP funding to implement restoration actions on U.S. Forest Service lands that focus on:

- Reforestation
- Pre-commercial Thinning
- Prescribed Burning
- Invasive Plant Management
- Culvert Upgrades
- Fish Passage Culvert Replacements
- Road Decommissioning
- Road Maintenance

3.14.1 Soils and Geology

The past, present, and reasonably foreseeable future actions that could cumulatively affect soils and geology are habitat restoration actions and continued hydroelectric dam operations as well as land-disturbing operations such as road construction, agriculture, commercial and residential development, and mining.

The Proposed Action may cumulatively affect erosion-preventing vegetation and wetlands during construction because there would be other actions impacting vegetation and wetlands during the same general timeframe as this project. The Proposed Action, when considered with past, present, and future habitat restoration projects in the Kootenai Basin below Libby Dam would contribute to preventing soil loss over time by reestablishing healthy native vegetation along the river and in the adjacent uplands. Environmental design features/mitigation measures described in Section 2.4 would ensure that negative cumulative effects from the project on soils and geology would be low.

3.14.2 Wetlands

Because the Proposed Action would result in an overall increase in wetland area and improved wetland functions for the long term, the Proposed Action would not contribute to the cumulative effects of the loss of wetlands along the Kootenai River that have occurred over time. Implementation of the mitigation measures described in Section 2.4 would ensure the negative short-term cumulative effects on wetlands would be low.

3.14.3 Water Resources

The past, present, and reasonably foreseeable future actions that could cumulatively affect water resources are habitat restoration actions and continued hydroelectric dam operations as well as land-disturbing operations such as road construction, agriculture, commercial and residential development, and mining.

As discussed in Section 3.3.2, water quality effects from the Proposed Action would be low and of short duration during construction, and would likely improve water quality from the bank stabilization, riparian plantings, and erosion control elements of the project. Thus, when added to past, present, and reasonably foreseeable future actions, the cumulative effects of the Proposed Action on water resources would be low.

3.14.4 Fish and Fish Habitat

The past, present, and reasonably foreseeable future actions that have affected, and are continuing to cumulatively adversely affect fish and fish habitat include continued hydroelectric dam operations as well as land-disturbing operations such as road construction, agriculture, commercial and residential development, and mining. These cumulative actions have degraded habitat for sturgeon, burbot, bull trout, and other species and are the primary drivers for this current action. The cumulative effect of Kootenai River fish habitat restoration actions in the recent past have benefitted fish to some degree, but the cumulative effects of the adverse actions listed above continue to depress fish populations.

The Proposed Action would have short-term adverse effects on fish and fish habitat (as discussed in Section 3.4) yet provide long-term benefits from the increased habitat quantity, diversity, and complexity. This action would continue the trend of the recent past toward improved fish habitat and increased fish populations, and though not expected to reverse the cumulative impact of the historical adverse actions discussed above, the cumulative effect on fish and fish habitat would be low.

3.14.5 Recreation

Past and present actions such as, hydroelectric dam operations, road construction, agriculture, mining, and commercial and residential development, have not had a significant cumulative impact on recreational use of this river beyond the loss of fishing opportunities resulting from reduced fish habitat and fish populations.

The Proposed Action contributes to the reversal of lost fishing opportunities by improving fish habitat and in the long term, increasing fish populations. Though the project would create long-term obstacles (large wood structures) that recreational river users must navigate, project designs for these features would provide adequate avoidance time and space for boaters. This project would contribute positively to this river's recreation attraction through the potential future improvement in fishing opportunities. Therefore, the Proposed Action's overall cumulative effect to recreation would be low.

3.14.6 Cultural Resources

Cultural resources in the project area have likely been cumulatively affected by past, present, and current development activities. Most effects have likely occurred as a result of inadvertent disturbance or destruction from land-disturbing operations such as road construction, agriculture, mining, and commercial and residential development.

Implementation of the mitigation measures described in Section 2.4 would reduce the potential for construction activities to contribute incrementally to the cumulative effects on unknown cultural resources. In the event that previously undiscovered cultural resources are encountered, potential effects would depend on the level and amount of disturbance, and the eligibility of the resource for listing in the NRHP.

3.14.7 Visual Resources

The current visual character of the project area is the cumulative result of past and present land uses and human-caused changes in the Kootenai River. While this project is intended to change the Kootenai River to improve fish habitat, the elements and scale of that change are still consistent with the existing character of this large meandering river. Therefore, the cumulative effect on the visual character of this area would be low.

3.14.8 Noise

While the Proposed Action would cause a temporary increase in noise levels, there would be no long term or permanent source of new sound introduced into this area by this project. The soundscape that exists now would not be changed in the long term. This project would make no cumulative permanent contribution to noise levels in or near the project area.

3.14.9 Air Quality

Ongoing vehicular use, agricultural activities, and commercial and residential facilities in the analysis area all contribute to ambient air pollutant emissions. These existing sources of pollutants would continue to occur. While the Proposed Action would contribute a small amount to pollutant levels during construction, when combined with past, present and reasonably foreseeable future actions in the affected area, these actions are not expected to violate National Ambient Air Quality Standards and, therefore, cumulative effects on air quality would be low. There would be no long term, or permanent sources of pollutant emissions from this project.

All levels of greenhouse gas emissions play a role in contributing cumulatively to global GHG concentrations and climate change. However, given the low emissions caused by the temporary construction of the Proposed Action, its cumulative contribution to global greenhouse gas concentrations is considered low.

3.14.10 Public Health and Safety

The Proposed Action may introduce a minor amount of roadway travel risk on public roads and highways as heavy equipment is moved in and out, but it makes no permanent or long term change in any roadway travel, utility, or communication feature that would affect public safety or the delivery of law enforcement, fire protection, or emergency response capabilities currently available.

The installation of side-channel large wood structures, however, may constitute a slight increase in risk to boater safety since they are permanent and mid-stream in these channels. This would contribute cumulatively to whatever existing boater safety hazards are present on the river. This additional risk, however, is considered to be low and thus the cumulative effect of this project on public health and safety is low.

3.14.11 Transportation and Utilities

The Proposed Action would cause minimal temporary increases in traffic during construction, but it makes no changes to the existing transportation or utility infrastructure, nor modifies any environmental feature that would put these existing infrastructures at risk. This project does not require a power source, and does not effect existing transportation and utility infrastructure. This project would have no cumulative effect on transportation or utility infrastructure or demands.

3.14.12 Socioeconomics

The Proposed Action would provide a very small and short term contribution to the local economy, with very little temporary and no long-term effect on population, housing, employment, and income. Increased recreational angling over the longer-term could provide some economic benefits. Because

the positive effects of the Proposed Action would be temporary and low, it would have a low, effect on population and housing, employment and income, and no effect on environmental justice populations.

4 Environmental Consultation, Review, and Permit requirements

4.1 National Environmental Policy Act

BPA prepared this EA pursuant to regulations implementing NEPA (42 U.S.C. 4321 et seq.), which require federal agencies to assess the effects their actions may have on the environment. NEPA requires preparation of an EIS for major federal actions significantly affecting the quality of the human environment. BPA prepared this draft EA to determine if the Proposed Action would create significant environmental effects that would warrant preparing an Environmental Impact Statement, or if a Finding of No Significant Impact is justified.

4.2 Wetlands, Floodplains, and Water Resources

As part of the NEPA review, U.S. Department of Energy NEPA regulations require the assessment of effects on floodplains and wetlands, and the evaluation of alternatives for protection of these resources in accordance with Compliance with Floodplain/Wetlands Environmental Review Requirements (10 CFR 1022.12) and Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands). An evaluation of effects of the project on floodplains and wetlands is discussed in Section 3.2, Wetlands, and Section 3.3, Water Resources, of this EA.

Several sections of the Clean Water Act (33 USC 1251 et seq.) and the Idaho Stream Channel Protection Act (Title 42, Chapter 38, Idaho Code) address wetland and waterway management, regulation, and protection. The Tribe would submit a Joint Permit Application to the USACE and Idaho Department of Water Resources before construction. The applicable regulations to the project are discussed below.

4.2.1 Clean Water Act Section 401

A federal permit to conduct an activity that causes discharges into navigable waters is issued only after the State of Idaho certifies that existing water quality standards would not be violated if the permit were issued. DEQ would review the project's Section 402 and Section 404 permit applications for compliance with Idaho water quality standards and grant certification if the permits comply with these standards.

4.2.2 Clean Water Act Section 402

This section authorizes National Pollutant Discharge Elimination System permits for the discharge of pollutants, such as stormwater. The EPA, Region 10, has a general permit for discharges from construction activities. The Tribe and its contractor would file Notices of Intent for coverage under this general permit, and would prepare a stormwater pollution prevention plan to address stabilization practices, structural practices, stormwater management, and other controls.

4.2.3 Clean Water Act Section 404

When dredged or fill material discharges into waters of the United States, including wetlands, it requires authorization from the USACE in accordance with the provisions of Section 404 of the Clean Water Act. The Tribe would work with the USACE to get a Section 404 permit for fill placed in wetlands and waters of the United States, and work with DEQ to get Section 401 water quality certification (see

Section 4.2.1). Sections 3.3, Wetlands, and 3.4, Water Resources, of this EA describe potential effects on wetlands and other waters.

4.2.4 Idaho Stream Channel Protection Act

The Idaho Stream Channel Protection Act requires protection of stream channels of the state and their environment against alteration to protect fish and wildlife habitat, aquatic life, recreation, aesthetic beauty and water quality. Idaho Department of Water Resources issues a Stream Channel Alteration permit before any work is done within the beds and banks of a continuously flowing stream. The Tribe will submit a Joint Permit application to the USACE and Idaho Department of Water Resources before construction.

4.3 Fish and Wildlife

4.3.1 Endangered Species Act

The ESA (16 USC 1531 et seq.) establishes a national program for the conservation of threatened and endangered species of fish, wildlife, and plants, and the preservation of the ecosystems on which they depend. The USFWS administers the ESA for terrestrial species and some freshwater fish species, while National Marine Fisheries Service has jurisdiction over anadromous fish and marine species. Section 7(a) of the ESA requires federal agencies to ensure that the actions they authorize, fund, and carry out do not jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat. Section 7(c) of the ESA and other federal regulations require that federal agencies prepare a biological assessment addressing the potential effects of their actions on listed or proposed endangered species and critical habitats.

In 2013, BPA prepared a programmatic biological assessment and submitted it to USFWS (Meridian Environmental, Inc., 2013). This programmatic biological assessment evaluated the effects to Kootenai River white sturgeon (endangered) and Columbia River bull trout (threatened), and their designated critical habitat associated with the Tribe's proposal to implement their 2013-2015 Restoration Program. The 2013-2015 Restoration Program includes projects identified in the Kootenai Tribe's Kootenai River Habitat Restoration Program, which identified specific habitat projects in the Kootenai River that would enhance habitat for Kootenai River white sturgeon as required by the Libby Dam BiOp. The restoration actions described in this EA are in the same action area and implement the same types of actions with the same objectives as those evaluated in the biological assessment and evaluated by the USFWS for the larger restoration program. Communications with USFWS led to an agreement that the Lower Meander Project evaluation under ESA section 7 is adequately covered in the 2013 consultation.

The USFWS issued a biological opinion on July 30, 2013 with the determination that implementing the Kootenai River Habitat Restoration Program is not likely to jeopardize the continued existence of the Kootenai River white sturgeon or its critical habitat. The biological opinion provided an incidental take statement to authorize the potential incidental take of Kootenai River white sturgeon that may occur during construction activities, and stated that no reasonable and prudent measures nor terms and conditions were necessary, in addition to those measures incorporated into the program's description, to further minimize such incidental take of Kootenai sturgeon. The biological opinion also concurred with BPA's determination of "may affect, not likely to adversely affect" bull trout and bull trout critical habitat.

In addition to Kootenai River white sturgeon and bull trout, BPA determined that four terrestrial species are listed as threatened or endangered under the federal ESA in Boundary County, Idaho.

Based on the scope, timing, and location of the proposed projects in the Kootenai River, BPA has determined that the Proposed Action would have no effect on woodland caribou (endangered), grizzly bear (threatened), Canada lynx (threatened), or North American wolverine (proposed threatened).

Because the Kootenai River Habitat Restoration Program was expected to be implemented over several years with a time line that was subject to change, the USFWS treated the ESA consultation in a semi-programmatic way. This means that the USFWS determination is based on an agreement that BPA will informally consult with the USFWS before the implementation of each phase of restoration. As a result, BPA has reviewed the proposal for the Kootenai River Lower Meander Project in relation to the information presented in the original biological assessment, considering any new information available, and made a determination that the effects upon ESA-listed species and critical habitat are within the type and scope of effects addressed within this opinion. On February 22, 2017 BPA requested confirmation from the USFWS that the project's effects on bull trout and its designated critical habitat, and Kootenai River white sturgeon and its designated critical habitat are identical to the type and scope of effects addressed in the original biological assessment and opinion. USFWS confirmed that the specific project's effects are consistent with the biological assessment and opinion.

4.3.2 Fish and Wildlife Conservation Act and Fish and Wildlife Coordination Act

The Fish and Wildlife Conservation Act of 1980 (16 USC 2901 et seq.) encourages federal agencies to conserve and promote conservation of non-game fish and wildlife and their habitats. The Fish and Wildlife Coordination Act (16 USC 661 et seq.) requires federal agencies with projects affecting water resources to consult with USFWS and the state agency responsible for fish and wildlife resources. The analysis in Section 3.5, Fish and Fish Habitat, of this EA indicates that the Proposed Action would have low to moderate short-term adverse effects on fish and fish habitat, with implementation of appropriate mitigation; with the goal of providing long-term habitat benefits. BPA and the Tribe have consulted with USFWS regarding potential effects of the project on ESA-listed fish and wildlife species and will implement the mitigation measures included in the biological assessment and any other measures that USFWS requires. The USFWS and IDFG have been notified of the project and will be sent copies of the Draft and Final EA.

4.3.3 Migratory Bird Treaty Act and Federal Memorandum of Understanding

The Migratory Bird Treaty Act of 1918, as amended, implements various treaties and conventions between the United States and other countries, including Canada, Japan, Mexico, and Russia, for the protection of migratory birds (16 USC 703–712). Under the act, taking, killing, or possessing migratory birds, or their eggs or nests, is unlawful. The act classifies most species of birds as migratory, except for upland and nonnative birds such as pheasant, chukar, gray partridge, house sparrow, European starling, and rock dove.

BPA (through the U.S. Department of Energy) and USFWS have a memorandum of understanding to address migratory bird conservation in accordance with Executive Order 13186 (Responsibilities to Federal Agencies to Protect Migratory Birds). This order directs each federal agency taking actions that could negatively affect migratory birds to work with the USFWS to develop an agreement to conserve those birds (DOE and USFWS, 2013). The memorandum of understanding addresses how both agencies

can work cooperatively to address migratory bird conservation, and includes specific measures to consider implementing during project planning and implementation.

The analysis in Section 3.14.1 Wildlife, of this environmental assessment indicates that the project would have low effects on birds, including migratory birds. The project may have short-term adverse effects on a few nesting birds because a few trees would be removed. But staging and construction activities would be conducted between July and November (outside the nesting period for migratory birds), and riparian habitats would be expanded and improved, providing more habitat in the future than is there at present.

4.3.4 Bald Eagle and Golden Eagle Protection Act

The Bald Eagle and Golden Eagle Protection Act (16 USC. 668–668d) addresses taking or possessing of and commerce in bald and golden eagles, with limited exceptions. The Act only covers intentional acts or acts in “wanton disregard” of the safety of bald or golden eagles.

Bald and golden eagles may temporarily use the proposed project area, but no nesting sites or long term occupancy has been observed. Because the project would not involve knowing take or other acts in wanton disregard of bald or golden eagles, its implementation would not violate the provisions of the Bald Eagle and Golden Eagle Protection Act.

4.4 Land Use Plan Consistency

As indicated in Section 3.14.3, construction activities would occur in the main channel of the Kootenai River and result in no changes to land use. Also, there would be no change in land use from temporary access road construction and staging of materials.

4.5 Farmland Protection Policy Act

The Farmland Protection Policy Act (7 USC 4201 et seq.) directs federal agencies to identify and quantify adverse effects of federal programs on farmlands. This act minimizes the number of Federal programs that contribute to the unnecessary and irreversible conversion of agricultural land to non-agricultural uses. There is no prime farmland in the sites affected by this project and the Proposed Action would not permanently convert any area of agricultural land to non-agricultural uses

4.6 Cultural and Historic Resources

Laws and regulations govern the management of cultural resources. A cultural resource is an object, structure, building, site, or district that provides irreplaceable evidence of natural or human history of national, state, or local significance, such as National Landmarks, archaeological sites, and properties listed (or eligible for listing) in the NRHP. Cultural resource related laws and regulations include:

- Antiquities Act of 1906 (16 U.S.C. 431–433),
- Historic Sites Act of 1935 (16 U.S.C. 461–467),
- Section 106 of the NHPA (16 U.S.C. 470 et seq.), as amended,
- Archaeological Data Preservation Act of 1974 (16 U.S.C. 469 a–c),
- Archaeological Resources Protection Act of 1979 (16 U.S.C. 470aa-mm), as amended,
- Native American Graves Protection and Repatriation Act (25 U.S.C. 3001 et seq.),
- Executive Order 13007 Indian Sacred Sites, and
- American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996, 1996a).

Section 106 of the NHPA requires federal agencies to consider the effects of their actions on historic properties. The NHPA provides the Section 106 process that enables agencies to assess effects on historic properties along with participation from interested and affected parties such as tribes, and then avoid, minimize, or mitigate these effects. Historic properties may be prehistoric or historic sites, including objects and structures that are included in or eligible for inclusion in the NRHP. Historic properties also include artifacts or remains within historic sites and properties of traditional and cultural importance to tribes.

To this end, BPA has provided information about the Proposed Action to, and requested information from numerous agencies, on the level and type of proposed identification and evaluation efforts of the prehistoric resources. Agencies consulted include the Idaho State Historic Preservation Office, the Confederated Salish and Kootenai Tribes, Coeur d'Alene Tribe of Idaho, Kalispel Tribe of Indians, the Spokane Tribe of Indians, and the Kootenai Tribe of Idaho.

4.7 Air Quality

The Clean Air Act, as amended (42 U.S.C. 7401 et seq.), requires states and the EPA to carry out a wide range of regulatory programs intended to comply with National Ambient Air Quality Standards. In Idaho, both the EPA and Idaho Department of Environmental Quality are responsible for air quality. Because the Proposed Action would occur in an area that is in attainment with the air quality standards, and because no stationary sources of air emissions would result, construction associated with the Proposed Action are exempted from state regulation. Air quality effects from construction would be low and mitigated as discussed in Section 2.4.

4.8 Climate Change

Gases that absorb infrared radiation and prevent heat loss to space are called greenhouse gases (GHGs). Models predict that atmospheric concentrations of all GHGs will increase over the next century, but the extent and rate of change is difficult to predict, especially on a global scale. As a response to concerns over the predicted increase of global GHG levels, various federal and state mandates address the need to reduce GHG emissions, including the following.

- The Clean Air Act is a federal law with regulations to control emissions from large generation sources such as power plants; limited regulation of GHG emissions occurs through the New Source Review permitting program.
- The EPA's Final Mandatory Reporting of Greenhouse Gases Rule (40 C.F.R. 98) requires reporting of GHG emissions from large sources. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHGs must submit annual reports to the EPA (CEQ, 2010).
- Executive Orders 13423 (Strengthening Federal Environmental, Energy, and Transportation Management) and 13514 (Federal Leadership in Environmental, Energy and Economic Performance) require federal agencies to measure, manage, and reduce GHG emissions by agency-defined target amounts and dates.

GHG emissions would be below EPA's mandatory reporting threshold of 25,000 metric tons or more per year for the proposed project (383 metric tons of CO₂ equivalents for the two-month construction periods). The effect of the Proposed Action on GHG concentrations would be low, as discussed in Section 3.9, Air Quality, of this EA.

4.9 Noise

The Noise Control Act of 1972 (42 USC 4901 et seq.) sets forth a broad goal of protecting all people from noise that jeopardizes their health or welfare. The Act further authorizes federal agencies to carry out the programs within their control to further this policy. Idaho does not have statewide regulations limiting noise emissions from commercial facilities. Similarly, neither Boundary County nor the City of Bonners Ferry has a noise control ordinance that limits noise emissions. The noise effects from the project would be temporary and moderate for people within 2,000 feet of construction, and low to none for those farther than 2,000 feet from project actions. As described in Section 3.8, the project would have temporary low to moderate noise effects, and mitigation would further reduce noise effects.

4.10 Hazardous Materials

Several federal laws related to hazardous materials and toxic substances potentially apply to the project, depending upon the quantities and types of hazardous materials being used.

4.10.1 The Spill Prevention, Control, and Countermeasures Rule

The Spill Prevention Control and Countermeasures Rule (40 CFR Part 112) includes requirements to prevent discharges of oil and oil-related materials from reaching navigable waters and adjoining shorelines. It applies to facilities with total aboveground oil storage capacity (not actual gallons onsite) of greater than 1,320 gallons, and facilities with below-ground storage capacity of 42,000 gallons. This project does not propose on-site storage of oil or oil-related materials.

4.10.2 Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (42 USC 9601 et seq.) provides funding for hazardous materials training, emergency planning, preparedness, mitigation implementation, response, and recovery. Eligible individuals include public officials, emergency service responders, medical personnel, and other tribal response and planning personnel. No hazardous materials sites are located within the project area.

4.11 Executive Order on Environmental Justice

In February 1994, the President released Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations. This order directs federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low income populations. The Proposed Action would not cause disproportionately high and adverse effects on minority and low-income populations. (see Section 3.12, Socioeconomics).

There are no residential or concentrated human use areas near the project site such that off-site construction effects such as noise, dust, or air quality reductions might impact human health or temporarily impact living conditions of any community, including those where environmental justice might be of concern. Also, construction activities would have a low but positive temporary impact on the economy in the affected area with monetary multiplier effects likely benefitting many and adversely affecting none. Thus, construction of the Proposed Action would likely have no adverse or disproportionate effects on minority or low income populations.

5 Tribes, Agencies, and Persons Consulted

Those consulted or receiving notice of document availability include local, state, and federal agencies, public officials, and tribes in the project vicinity. Specific individuals were contacted to gather information and data about the project area and applicable requirements, as part of consultation, or for permit applications.

5.1 Federal Agencies

- U.S. Environmental Protection Agency
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service, Spokane Office

5.2 State Agencies

- Idaho Department of Environmental Quality
- Idaho Department of Fish and Game
- State of Idaho House and Senate members for Districts encompassing the project area
- Idaho State Historic Preservation Office
- Montana Fish Wildlife and Parks

5.3 Tribes

- Kootenai Tribe of Idaho

5.4 Local Governments

- Boundary County
- Bonners Ferry, Idaho

5.5 Other

- Burlington Northern – Santa Fe Railroad

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