RECLAMATION

Managing Water in the West

Draft Environmental Assessment

Sleeping Giant Hydropower Project

Montana Area Office

Great Plains Region

October 2015

Draft Environmental Assessment Sleeping Giant Hydropower Project

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CHAPTER 1 – INTRODUCTION

PROPOSED ACTION

The Helena Valley Irrigation District (HVID) has requested approval to develop hydropower from the Bureau of Reclamation (Reclamation) with respect to a hydroelectric project (Project) at the existing Helena Valley Pumping Plant site (Pumping Plant) at Canyon Ferry Dam. Under the Proposed Action, Reclamation would execute a Lease of Power Privilege (LOPP) with HVID. In order to acquire the necessary experience in developing, financing, designing, and constructing hydroelectric facilities similar to the proposed Project, HVID has entered into a binding Memorandum of Understanding, and subsequently a project development agreement (altogether, the MOU) with Sleeping Giant Power, LLC (SGP), a Montana limited liability corporation.

The LOPP would authorize the use of federal lands, facilities, and water to construct, operate, and maintain a 9.4 megawatt (MW) Hydropower Plant facility. Reclamation and Western Area Power Administration (Western) would also issue appropriate agreements to allow the construction, operation, and maintenance of between 0.27 to 0.34 miles of overhead 12.5 kV three-phase distribution lines to connect the new facility to the existing electrical grid. The Project would be located in Lewis and Clark County, Montana, approximately 10.0 miles southeast of the town of Helena, Montana as shown in Figure 1.

The Project is proposed to be located at the site of the Pumping Plant adjacent to the Canyon Ferry Dam/Reservoir and related infrastructure on the Missouri River near Helena, Montana. The Project would develop a total of approximately 9.4 MW of hydroelectric power generating capacity. The Project would be developed to include the following: (1) a retrofit of the Pumping Plant's existing mechanical water pumping equipment and the addition of new electrical generators and other related equipment; (2) enclosure of the existing structure above the Pumping Plant; (3) electric generation using the existing water required to operate the Pumping Plant for irrigation purposes as well as a portion of the seasonal runoff water that would have flowed through the Canyon Ferry Dam river outlet gates and over the spillway, when available; and (4) overhead distribution line alternatives and right-of-way (ROW) options from the Hydropower Plant to interconnect with existing Western Area Power Administration transmission lines via a new 12.5 kilovolt to 100 kilovolt ("kV") substation to be constructed on Federal Property. The Proposed Action is on Federal property adjacent to the Missouri River downstream of Canyon Ferry Dam (Figure 2) and the Alternative is located on Federal property northwest of the Canyon Ferry Dam (Figure 3). A purchase power agreement has been executed to sell the power to NorthWestern Energy (NorthWestern) located nearby.

This Environmental Assessment (EA) is prepared in accordance with the National Environmental Policy Act, the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500-1508), and the U.S. Department of the Interior's regulations (43 CFR Part 46). The EA evaluates the environmental effects of issuing the LOPP for construction and operation of the Project.

NEED FOR AND PURPOSE OF ACTION

Reclamation

A Lease of Power Privilege, or LOPP, is needed to permit a non-federal entity to use a Reclamation facility for electric power generation. The LOPP would ensure that the development of hydropower would be implemented consistent with established authorities, purposes, and water operations for the Canyon Ferry Dam and Helena Valley Unit.

The purpose of the Project is to develop a 9.4 MW Hydropower Plant at the Pumping Plant to provide a clean, renewable energy source that is locally controlled. Current Federal policy encourages non-Federal development of environmentally sustainable hydropower potential of Federal water resource-related projects. Royalties paid to HVID from electricity sales generated by the Project would provide it with

an additional source of revenue that can be used to defray annual operating expenses and assist in the maintenance and improvement of HVID's facilities.

Figure 1. Project Area.

Western Area Power Administration

The Project proponent, as an Interconnection Customer, requests to interconnect its proposed Project via a tap of Western's existing Canyon Ferry to Spokane Bench 100 kV transmission line near Reclamation's paint shop by the Canyon Ferry Dam. Western's purpose and need is to consider and respond to the interconnection request in accordance with the Southwest Power Pool (SPP) Open Access Transmission Service Tariff (Tariff) and the Federal Power Act. Western's Upper Great Plains Region is a member of SPP and subject to the SPP Tariff, which is filed with the Federal Energy Regulatory Commission (FERC).

In accordance with the Tariff, capacity on Western's transmission system is offered to deliver electricity when capacity is available. The Tariff also contains terms and procedures for processing requests for the interconnection of generation facilities to Western's transmission system. In reviewing interconnection requests, Western must ensure that existing reliability and service is not degraded. The Tariff provides for transmission and interconnection studies to ensure that system reliability and service to existing customers are not adversely affected by new interconnections. These studies also identify system upgrades or additions necessary to accommodate the proposed Project and address whether the upgrades/additions are within the Project scope.

BACKGROUND INFORMATION

Helena Valley Irrigation District

HVID was built from 1956 through 1958 and was designed to reclaim land inundated by the backing up of water from Canyon Ferry Dam. Other irrigation districts that formed at the same time and for the same purpose were the East Bench Irrigation District (in Dillon) and the Crow Creek Unit (in Toston). Between the three irrigation districts, enough land was brought into irrigation to offset productive farm lands in the Canton Valley destroyed by filling the Canyon Ferry Reservoir (HVID, 2015).

HVID was built as a “multi-purpose” project. Its mission is not only to provide water to irrigate crop lands, but to also provide municipal water for the City of Helena. HVID currently irrigates approximately 18,000 acres. The mission of providing municipal water to the City of Helena continues to increase in importance with the updates and capacity expansion of the Missouri River Water Treatment Plant.

The HVID Pumping Plant consists of a three-story enclosed pumping plant located approximately 500 feet downstream of Canyon Ferry Dam. The Pumping Plant receives its water through a penstock pipe out of Canyon Ferry Dam and goes directly into the turbine and pump intakes. The penstock begins as a 13-foot diameter pipe and reduces to a 10-foot diameter penstock after approximately 20 feet from the face of the dam. With an average head of 121 feet (52 psi) generated from the static head of Canyon Ferry Reservoir, two Francis-style hydraulic turbines power the centrifugal pump shafts to deliver water to the HVID canal system. The maximum turbine horsepower occurs at 200 cubic feet per second (“cfs”) and 119 feet of head and is 3,330 HP for each pump for a total of 6,660 maximum horsepower for the two hydraulic pumps. HVID’s operating expenses would be much higher if it had to pay electrical power bills for 6,660 hp for pumping; however, the cost to pump water which is powered by water is very low. Each pump is designed to pump an average of 180 cfs at 150 feet of head. Total combined pump output to the HVID canal system is 360 cfs at 150 feet of head.

Each pump discharges into a 4-foot diameter discharge pipe which transitions into a 6-foot 3-inch (75-inch) diameter discharge steel pipe after the pipes manifold together which slopes vertically up a mountain approximately 215 feet in elevation. The steel pipe transitions into a 7-foot diameter horseshoe-shaped concrete tunnel which transports water 2.6 miles through the mountains. The water then outlets into the HVID main canal which transports the water approximately eight miles to HVID’s regulating reservoir (the “Regulating Reservoir”), which has a capacity of approximately 10,000 acre feet, where it stores water and re-regulates water flow. Two gates are operated and adjusted on a daily basis to add or reduce water flows into the canal, leaving the Regulating Reservoir to irrigate the remainder of the Helena Valley. A City outlet is also located in the Regulating Reservoir’s dam which diverts water into a 36-inch diameter buried pipe and travels five miles to the City of Helena’s Missouri River Water Treatment Plant.

HVID’s main canal exiting the Regulating Reservoir is approximately 25 miles long and loops around the valley in a clockwise fashion, ending at the northeast corner of Lake Helena. Coming off of the HVID main canal are twenty different canal laterals that deliver water throughout the entire valley for an additional 40 miles of irrigation system delivery facilities.

A series of underground (piped) and above ground (open ditch) drains also thread throughout the valley. These drains work to provide proper soil drainage and lower the water table so crop yields are optimized.

Lease of Power Privilege

A Lease of Power Privilege, or LOPP, is a contract between a non-Federal entity and the United States to use federal project facilities for electric power generation consistent with Reclamation project purposes. The LOPP must not impair the efficiency of Reclamation generated power or water deliveries, jeopardize public safety, or negatively affect any other Reclamation project purpose. The Sleeping Giant Project includes the development of hydropower as an authorized project purpose. A LOPP has terms of 40 years and the general authority includes, among others, the Town Sites and Power Development Act of 1906 (43 U.S.C. 522) and the Reclamation Project Act of 1939 (43 U.S.C. 485h(c)).

On August 3, 2013, Congress passed the Bureau of Reclamation Small Conduit Hydropower Development and Rural Jobs Act. This act requires that Reclamation first offer a LOPP to the irrigation district or water users association operating the federal project, or to the irrigation district or water users association receiving water from the federal project. HVID operates the HVID Project.

On August 20, 2015, a Preliminary LOPP ("Preliminary LOPP") was entered into by Reclamation and HVID. The Preliminary LOPP permits federal cost-recovery for the NEPA compliance, engineering review, and development of the LOPP. A copy of the Preliminary LOPP is included for reference as Attachment A.

SCOPING

Scoping is an early and open process to determine the issues and alternatives to be addressed in the EA. Reclamation, Western, and the Sleeping Giant Project teams conducted internal scoping and utilized issues and concerns previously identified during similar LOPP processes for hydropower development. Reclamation also coordinated analysis with other Federal, State, and local agencies. Issues identified during the scoping process included:

- Helena Valley Irrigation District (HVID) Project Operations and Water Resources.
- Energy and Socioeconomic Conditions.
- Water Quality.
- Fisheries.
- Wildlife and Vegetation.
- Threatened and Endangered Species.
- Wetlands and Riparian Habitat.
- Recreational Use – Specifically Fishing
- Indian Trusts Assets.
- Environmental Justice.
- Cultural and Paleontological Resources.
- Air Quality and Green House Gases.
- Noise.
- Public Safety (EMF, etc.).
- Geology and Soils.
- Visual Resources.

In addition, a letter was sent to various interested parties consisting of Federal, State, and local agencies as well as public office holders and environmental groups. A copy of the letter and list of recipients of the letter is included as Attachment B.

CHAPTER 2 – PREFERRED ALTERNATIVE AND ALTERNATIVES

Alternatives evaluated in this EA include the No Action Alternative, the Preferred Alternative, and the Alternative. In addition, there were additional alternatives that were evaluated early in the project planning process and those alternatives were dismissed for various reasons.

NO ACTION ALTERNATIVE

Under this Alternative, Reclamation would not issue a LOPP and the proposed hydropower development at HVID's Pumping Plant would not be constructed at this time.

PREFERRED ALTERNATIVE

Under the Preferred Alternative, Reclamation would execute a LOPP to permit HVID to construct, operate, and maintain a 9.4 MW Hydropower Plant and associated facilities at the Pumping Plant adjacent to the Canyon Ferry Dam/Reservoir. The Preferred Alternative would modify the existing infrastructure to provide green energy to the grid.

Hydropower Project Component

Project designs would be reviewed and approved by Reclamation prior to authorizing construction. It is currently assumed that the Project would be developed to include the following:

- Retrofit of the Pumping Plant's existing mechanical water pumping equipment and the addition of new electrical generators and other related equipment.
- Enclosure of the existing steel frame structure above the Pumping Plant foundation.

From a Project design and mechanical/electrical point of view, the Project consists of altering, but not replacing, the Pumping Plant's existing mechanical turbines so that in addition to continuing to pump HVID's water they would also generate electricity.

In order to make the alterations, the existing mechanical water turbines must be removed from the Pumping Plant, modified by lengthening shafts and adding electric generators and related equipment, and then re-installed. Additionally, equipment must be added to manage the water flows within the penstock and water pumps. Figure 2 is a modified elevation of the original from 1958 depicting the water pumps – there are two water pumps in the Pumping Plant – modified by the addition of electric generators seen at the top of the drawing and butterfly valves to control water flows displayed in a cross-section of the water valve.

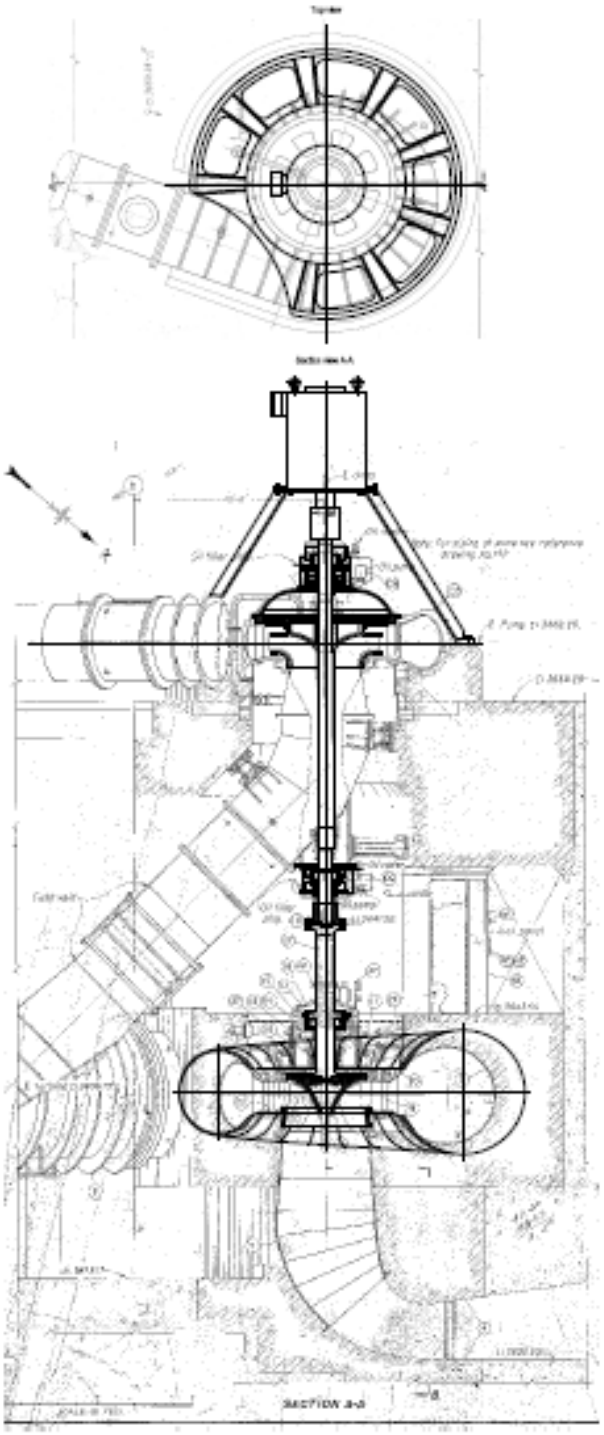

Figure 2. Water Pumps Modified with Generators.

Pumping Plant Building

The existing Pumping Plant is not enclosed (Figure 3). The existing steel frame would be enclosed to protect the electrical equipment installed above the pumps (Figure 4).

Figure 3. Existing Pumping Plant.

Figure 4. Future Pumping Plant Building Enclosure.

Generators

The Project would utilize the power generated from the existing turbine runner in the Pumping Plant. A generator would be directly coupled to the existing turbine shaft. The turbine is currently directly coupled to the pump impellor. This shaft would be extended above the pump impellor allowing the connection to the new electrical generator.

The generator would be able to operate over a range of speeds and match the desired speed of the pumps.

Two 4.7 MW, variable speed, generators would be installed, one on each existing mechanical pump. The generators would produce electricity at 690 Volts and use inverters and a step up transformer at the powerhouse. Electricity would be transmitted at 12.47 kV to the proposed substation where a transformer would step up the voltage to 100 kV, allowing interconnection with Western's transmission line. A controls system would be installed for operation of the turbine and pumps. The required pumping flowrate would be dictated by HVID. This pumping flowrate command would control the speed of the generator by adjusting the wicket gates and thus, the generator output. Output data from the controls would include total flowrates, shaft speed, and power output.

In the event of a power failure, the generator would automatically go offline and the wicket gates would automatically adjust to maintain pump speed without electricity generation. This would allow pumping to take place independent of generation. The existing gate controls would be automated to perform these functions.

Butterfly valve controls would be added to allow for generation when pumping is not required. This would be a new mode of operation for the system. A shaft seal cooling water system would be added to allow for running the pump dry.

Operation

Current operations restrict flows through the turbine to match only the power needed for pumping. The Project proposes to increase flows through the turbine, which would increase power available from the shaft and can be utilized by the new generator. The proposed “Base Case” of operation would use flows that otherwise would have been released through the river outlet or spillway gates. Operation of the Project does not propose any alteration to the releases in timing or quantity from the Canyon Ferry Dam. The releases would be redirected through the turbines, when available.

Using historic release data from 1994 through 2014, on average 102,600 acre-feet flowed through the HVID turbines to provide energy for pumping. The proposed operation would increase this flow by 117,450 acre-feet annually. This increased flow would reduce river outlet and spillway flows. On average 142,500 acre-feet were released through the river outlet and 337,600 acre-feet were spilled.

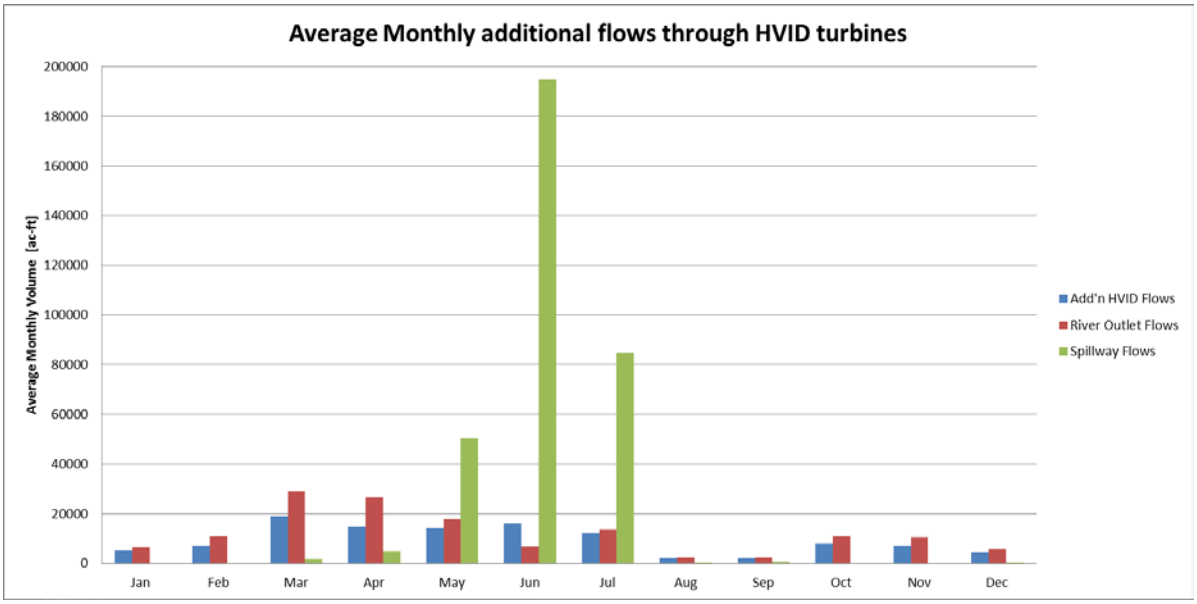

Figure 5. Canyon Ferry Dam - Historic River Outlet and Spillway Flows and Additional Flows for HVID.

Figure 5 shows the average monthly flows for the proposed additional flows through the HVID turbine (in blue), historic River outlet flows (in red), and historic spillway flows (in green). Generally, increased flows to the turbine would reduce flow through the river outlet gates at Canyon Ferry. The exception is in June when river outlet flows are not sufficient; the turbines would use a small percentage of the spillway flow.

Electric Distribution System – Preferred Alternative

The Project would require connecting the Hydropower Plant to the power grid with a new 12.5 kV distribution line via a new 12.5 kV to 100 kV substation (Figure 6). Several components of the electrical distribution system would be required to accomplish connecting the Hydropower Plant to the grid (see Figure 2 for the Electrical One-line Diagram). These components are discussed in the following sections and include the following:

- Pad-mounted transformers at the Hydropower Plant.
- Underground power line from the Hydropower Plant to steel poles near the river.
- Steel weathering poles.
- Over the river power lines.
- Skid mounted substation and tap into the Western 100 kV transmission line.

Figure 6.Preferred Alternative– Hydropower Plant, Distribution Line, and Substation.

Pad-Mounted Transformers

Two 5MVA pad–mounted transformers would be installed outside of the Pumping Plant/Project between the Pumping Plant and the hill. A FR3 fluid would be used in the transformer in lieu of mineral oil. FR3 is a bio- degradable vegetable oil and is an ideal option to use in an area close to water because of its inherent environmental benefits.

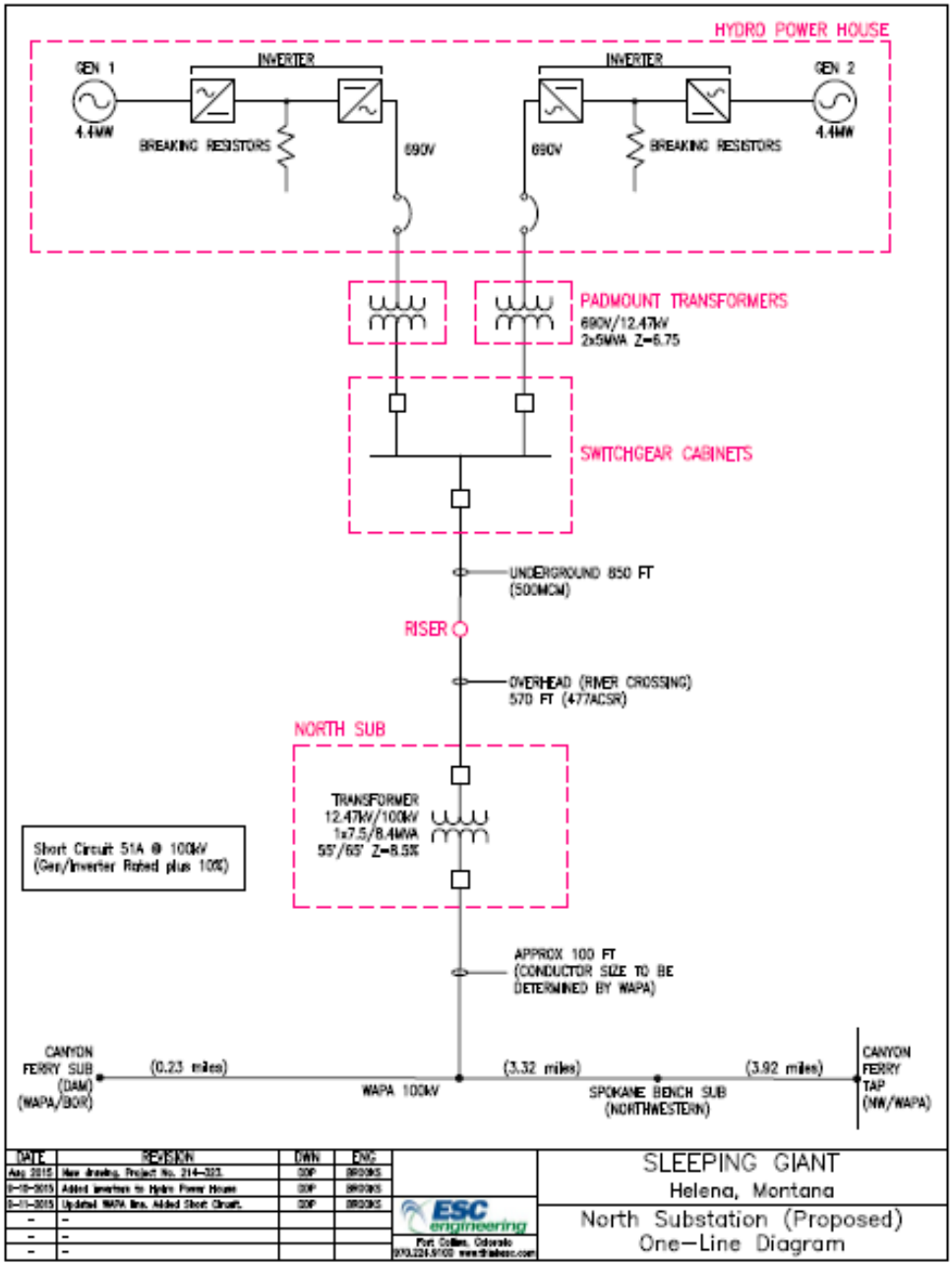

Figure 7. Electrical One-line Diagram for Preferred Alternative.

Underground Power Line

An underground power line would be installed from the Pumping Plant/Project to the steel weathering poles that would be used for the river crossing. The underground line would be three-phase in a conduit and would be approximately 850 feet long and located on Reclamation land. The underground line route would be located adjacent to the service road. It is assumed that trenching for the line placement would be approximately 18 inches wide and 3 feet deep. Approximately 0.031 acre would be temporarily disturbed by the construction activities for the trench. Trenched and excavated material would be placed adjacent to the trench and used subsequently for backfill of the trench. All attempts would be made to minimize any disturbance to existing shrubs, grasses, and trees adjacent to the road bed. Erosion control measures and other Best Management Practices would be implemented

during construction to prevent erosion and potential water quality impacts. Following installation of the cable, the area disturbed by the trenching would be reseeded and reclaimed. An overhead power line may be an option if soil and geological conditions prevent trenching for the underground power line.

Steel Poles

Two 70 or 75-foot steel weathering poles would be used for the power line crossing the river (Figure 8*).* Made of a specially-formulated steel material that forms a patina to seal out the atmosphere and reduce further corrosion, weathering steel poles naturally weather to a deep dark brown color over time. This darker color would mitigate the potential visual impact of the steel pole and would blend into the visual landscape.

The pole structures would meet or exceed current guidelines and recommendations outlined by the Avian Power Line Interaction Committee (APLIC 2012) raptor protection. These standards are considered by the United States Fish and Wildlife Service ("USFWS") as preferred to minimize the potential for raptor electrocutions. In addition, appropriate line marking devices would be used to minimize bird collisions with the power line.

Figure 8. Typical weathered pole.

Overhead Power Line across the River

An overhead power line would be installed from the steel poles across the river for a distance of approximately 570 feet to connect to the substation. The overhead line would be a 477 ACSR with grade B suitable for crossing the river. In addition, appropriate line marking devices would be used to minimize bird collisions with the power lines in order to meet the APLIC guidelines for raptor protection.

Substation

A substation would be built on a site located on Reclamation land near the existing Western 100 kV transmission line (Figure 6). In order to minimize the amount of land required, a skid mounted substation would be used (Figure 9). The approximate size of the skid mounted substation would be 100 feet by 150 feet. The substation would be located close enough to tap directly into the 100 kV transmission line. Western's tap facility needed to accommodate the interconnection to Western's 100 kV transmission line is currently under configuration. The facility might be an adjacent switchyard or a three-ring breaker and

would result in minor disturbance. The substation would have built-in secondary containment to prevent any potential oil release from the transformer reaching the river. In addition, the transformers would use the FR3 biodegradable vegetable oil instead of mineral oil. The substation would be painted a brown or neutral color to blend into the existing visual landscape which would reduce potential visual impact associated with the substation.

Access to the distribution line ROW and substation for construction and maintenance would be via the existing HVID and Reclamation service roads on both sides of the river. The amount of short-term and long-term disturbance would be minimal for the project (see Table 8).

Figure 9. Example of Skid Mounted Substation

ALTERNATIVE

Under the Alternative, Reclamation would execute a LOPP to permit HVID to construct, operate, and maintain an 9.4 MW Hydropower Plant and associated facilities at the Pumping Plant adjacent to the Canyon Ferry Dam/Reservoir. The description for the Hydropower Project Design, Generator, and Pump Building would be the same as the Preferred Alternative. The electrical distribution system and the location of the distribution line and substation location for this Alternative, however, would be different, as described in the subsequent section.

Electrical Distribution System - Alternative

The Project would require connecting the Hydropower Plant to the power grid with a new 12.5 kV distribution line via a new 12.5 to 100 kV substation (Figure 10). Several components of the electrical distribution system would be required to accomplish connecting the Hydropower Plant to the grid (see Figure 11 for the Electrical One-line Diagram). These components are discussed in the following sections and include the following:

- Pad-mounted transformers at the Hydropower Plant (Description would be the same as under the Preferred Alternative).
- Overhead power line from the Hydropower Plant to the Substation.
- Substation and tap into the Western 100 kV transmission line.

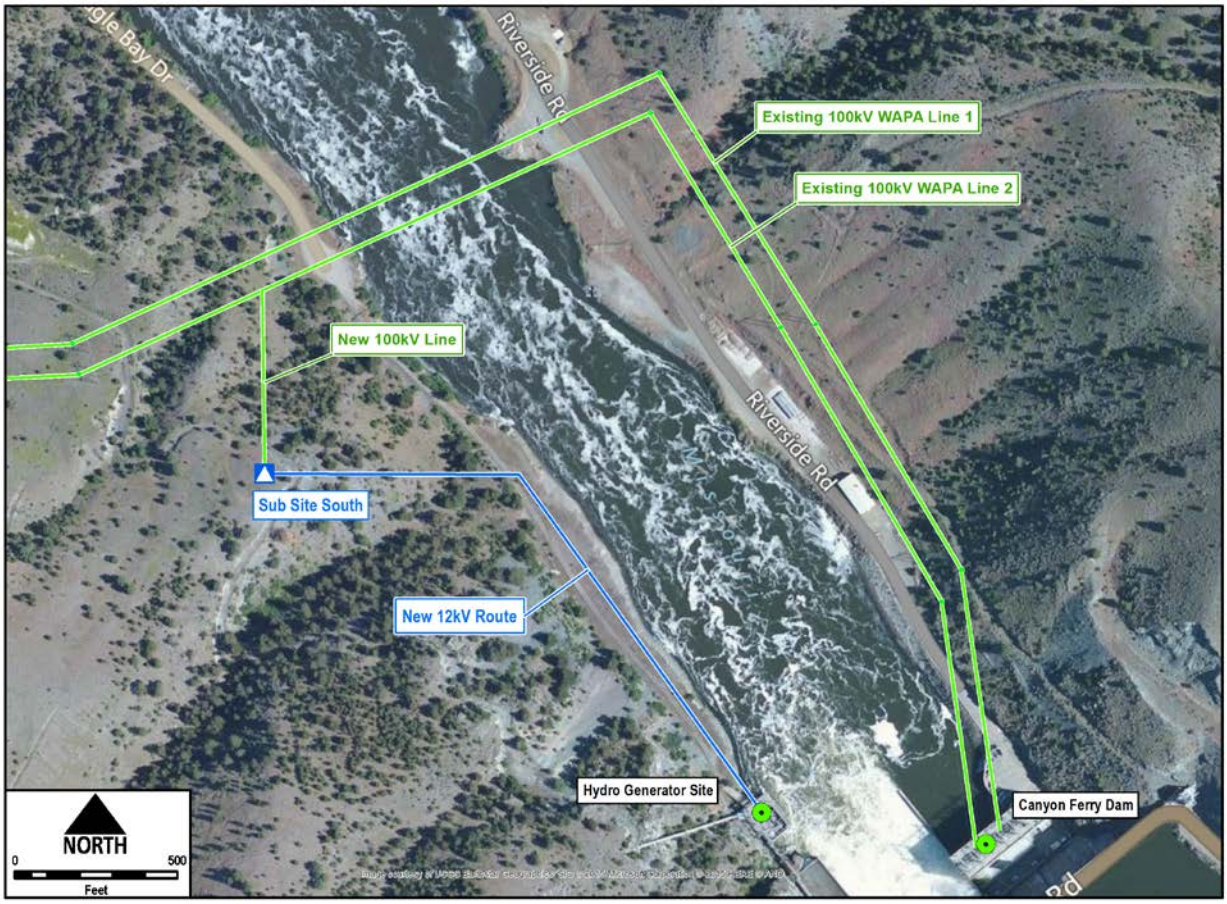

Figure 10. Alternative - Distribution Line and Substation.

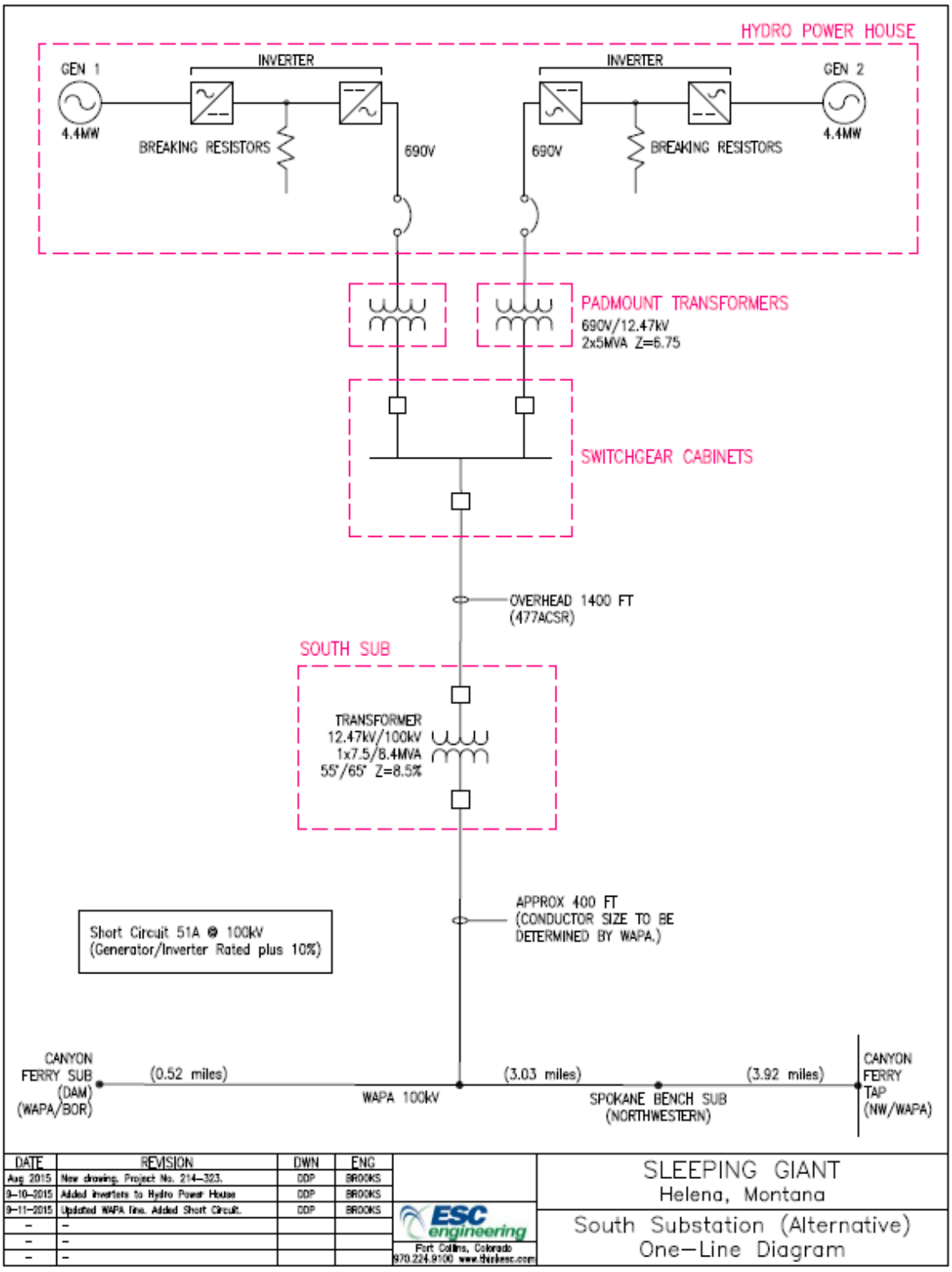

Figure 11. Electrical One-line Diagram for the Alternative.

Overhead Power Line

The Project would require a new 12.5 kV distribution line to connect the new Hydropower Plant to the power grid via a new 12.5 kV to 100 substation. The route of the distribution line would be from the Pumping Plant/Project north along the road that is adjacent to the river, then west across Reclamation land to a new substation (occupying approximately 0.34 acres) and built on Reclamation property near the 100 kV Western transmission line. Total distance of the distribution line is approximately 0.35 miles (see Figure 10 for the location of the distribution line).

Other than a span from the line into the substation, there should not be any 100 kV construction needed. The preliminary design indicates there would be large conductor (probably 477 MCM ACSR) which would be on wood poles. These would probably be either 35 or 40 feet tall with a single cross arm for a typical pole (see Figure 12 for an example). Typically, pole spacing on a line like this is 200 to 250 feet, but may be different in this instance given the need to get up the hill and then cross some rough terrain. It is anticipated that there would be approximately 10 to 11 poles used for this distribution line. The line would be stepped up to 100 kV at the new substation and then transmitted over Western's transmission line.

Figure 12. Typical Distribution Line Pole.

Substation and Tap

A substation would be built on a site located on Reclamation land near the existing Western 100 kV transmission line (Figure 10). The approximate size of the substation would be 100 feet by 150 feet occupying approximately 0.34 acres (see Figure 13 for an example of a substation). The substation would be approximately 400 feet from the 100 kV transmission line and would be directly tapped into the line near the 6/8 structure for the 100 kV transmission line. One or two additional poles would be needed to complete the tap. The substation would have secondary containment designed for 110%

containment to prevent any potential oil release from the transformer reaching a water body. In addition, the transformers would use the FR3 biodegradable vegetable oil instead of mineral oil. In addition, the substation would be painted a brown or neutral color to blend into the existing visual landscape which would reduce potential visual impacts associated with the substation.

Access to the distribution line ROW and substation for construction and maintenance would be via the existing HVID service road which goes to the substation site. The amount of short-term and long-term disturbance would be minimal for the Alternative (see Table 9).

Figure 13. Typical Substation.

ALTERNATIVE DISTRIBUTION LINE (D/L) ROUTES CONSIDERED, BUT ELIMINATED

Early in the planning process, three additional distribution line routes were considered, but were dismissed from consideration because of technical feasibility and private owner access concerns. A summary of the three alternatives and why they were dismissed is included in the subsequent sections.

D/L Alternative A

With this Alternative, a 12.47/7.2 kV distribution line would be built from the Pumping Plant/Project north along the road that is adjacent to the river, then west across Reclamation land to a new substation (occupying approximately 0.5 to 1.0 acres) and built on private property next to the Western 100 kV transmission line. Total distance of the distribution line is approximately 0.35 miles, of which 0.25 miles is on Reclamation land and the remainder is on private land (see Figure 14 for the location of the distribution line). The line would be stepped up to 100 kV at the new substation to be transmitted over Western's transmission line. This Alternative was dismissed, however, because of the inability to obtain the private land owner's permission for construction of the substation on private land.

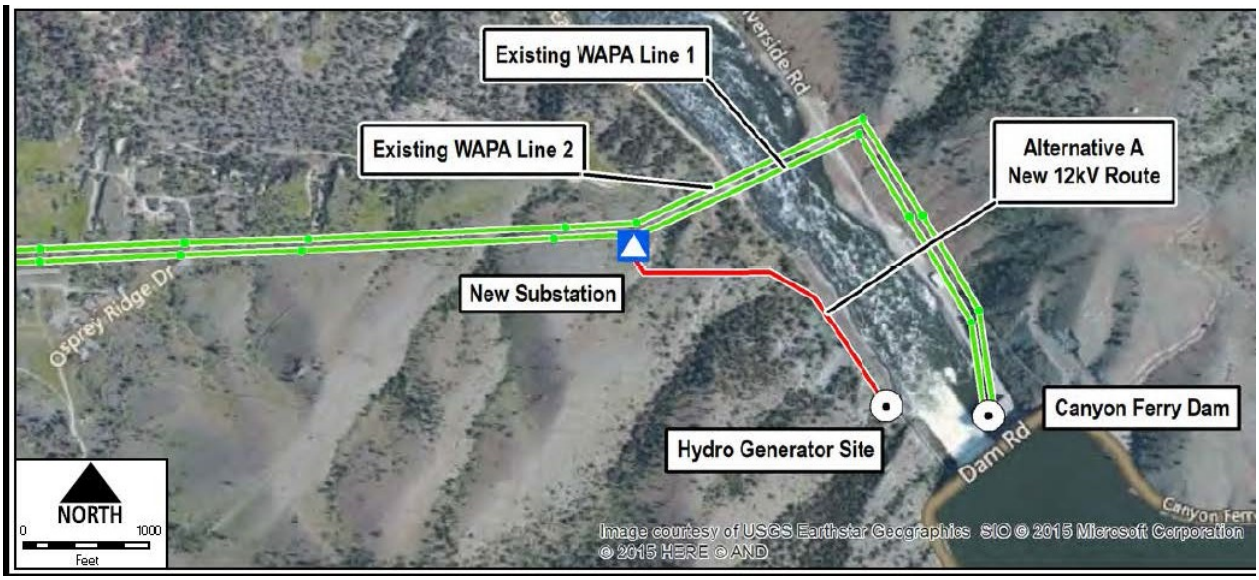

Figure 14. D/L Alterative A Distribution Line and Substation.

D/L Alternative B

A 12.47/7.2 kV distribution line would be built from the Pumping Plant/Project north across Reclamation land and would then parallel the Western transmission line for approximately 3.3 miles to tie into NorthWestern's Spokane Bench Substation (see Figure 15). If this Alternative line could not be built on Western's ROW, a new ROW would need to be identified and access agreements or permits would need to be obtained from the Bureau of Land Management and six private landowners. There would be substantially more poles and disturbance associated with this Alternative. After meeting with NorthWestern, this Alternative was dismissed because of its technical infeasibility.

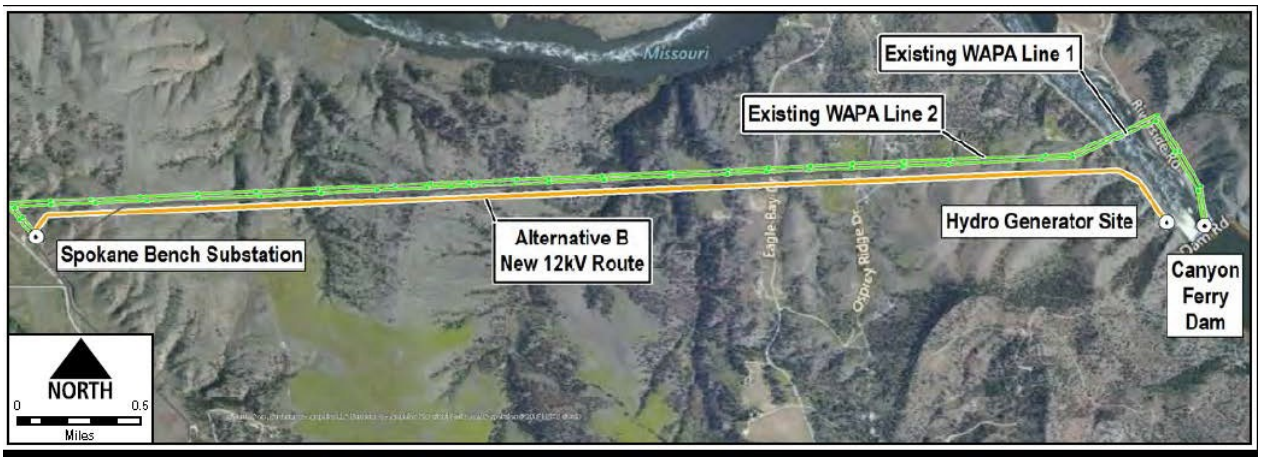

Figure 15. D/L Alternative B.

D/L Alternative C

A 12.47/7.2 kV distribution line would be installed inside HVID's existing irrigation tunnel from the Pumping Plant/Project and would tie into NorthWestern's distribution line at Kerr Road which proceeds north to NorthWestern's Spokane Bench Substation (see Figure 16). The tunnel exits on Reclamation land approximately 2.6 miles from the Pumping Plant/Project and a distribution line on that segment would need to be included in the LOPP. The existing NorthWestern distribution line that parallels Kerr Road to the Spokane Bench Substation would most likely need to be upgraded with new poles and conductors. After careful review, this Alternative was dismissed because of its technical feasibility and costs and does not appear to provide any additional benefit over the other alternatives.

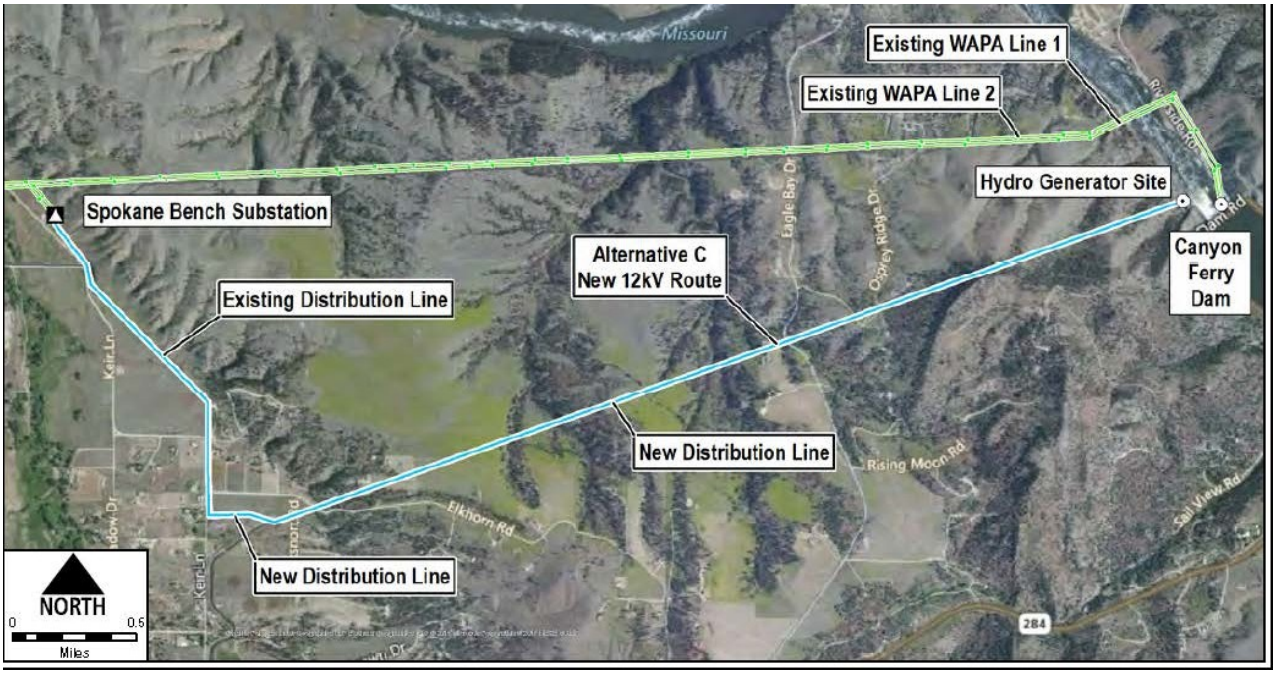

Figure 16. D/L Alternative C.

SUMMARY

Table 1. Summary of Potential Impacts for Alternatives

	ALTERNATIVES				
Resource	**No Action**	**Preferred Alternative**		**Alternative**	
		Hydropower Plant	**Electrical Distribution System** (D/L and North Substation on East Side of the River)	**Hydropower Plant**	**Electrical Distribution System** (D/L and South Substation on West Side of the River)
HVID Project Operations and Water Resources	No Effect	HVID Pumping Plant and Hydropower Plant would operate year around if water is available.	Not Applicable	HVID Pumping Plant and Hydropower Plant would operate year around if water is available.	Not Applicable
Energy and Socioeconomics	No Effect	Would produce 13,000,000 kWh yearly. Provide a source of renewable energy for HVID to market; and a temporary benefit of increased construction jobs, increased employment tax revenues. Long-term benefit to HVID members resulting from sale of power.	Would enable the electricity to be transmitted to the grid. Temporary benefit of increased construction jobs for substation and power line.	Would produce 13,000,000 kWh yearly. Provide a source of renewable energy for HVID to market; and a temporary benefit of increased construction jobs, increased employment tax revenues. Long-term benefit to HVID members resulting from sale of power.	Would enable the electricity to be transmitted to the grid. Temporary benefit of increased construction jobs for the substation and power line.
Water Quality	No Effect	Additional flows to Pumping Plant would not affect water quality or fish populations.	No Effect	Additional flows to Pumping Plant would not affect water quality or fish populations.	No Effect
Fisheries	No Effect	Additional flows to Pumping Plant would not affect water quality or fish populations.	No Effect	Additional flows to Pumping Plant would not affect water quality or fish populations.	No Effect

	ALTERNATIVES				
Resource	**No Action**	**Preferred Alternative**		**Alternative**	
Wildlife and Vegetation	No Effect	No Effect	Result in temporary impacts and long term impacts associated with the construction of the power line and substation (0.34 acres). No major impacts to migratory birds associated with the power lines. Power line marking would reduce the risk associated with bird and power line collisions.	No Effect	Result in temporary impacts and long term impacts associated with the construction of the power line and substation (0.34 acres).
Threatened and Endangered Species	No Effect	No Effect on Listed Endangered Species	No Effect on Listed Endangered Species	No Effect on Listed Endangered Species	No Effect on Listed Endangered Species
Wetlands and Riparian Resources	No Effect	No Effect	No Effect	No Effect	No Effect
Recreation Use	No Effect	No Effect	Minor Effects due to decreased quality of the fishing experience associated with visual impacts of power line crossing the river, power poles, and substation.	No Effect	Minor Effects due to decreased quality of the fishing experience associated with visual impacts of power line adjacent to river.
Indian Trusts Assets	No Effect	No Effect	No Effect	No Effect	No Effect
Environmental Justice	No Effect	No Effect	No Effect	No Effect	No Effect
Cultural Resources	No Effect	Installation and enclosure of the Pumping Plant would not change the historical character of the Pumping Plant.	Construction of power line and substation would not have any impacts on cultural resources.	Installation and enclosure of the Pumping Plant would not change the historical character of the Pumping Plant.	Construction of power line and substation would not have any impacts on cultural resources.

	ALTERNATIVES				
Resource	**No Action**	**Preferred Alternative**		**Alternative**	
Air Quality and Greenhouse Gases	No Effect	No adverse impact on air quality. Carbon dioxide emissions would be reduced by an estimated 26,910,000 to 28,210,000 pounds per year.	Would not impact air quality.	No adverse impact on air quality. Carbon dioxide emissions would be reduced by an estimated 26,910,000 to 28,210,000 pounds per year.	Would not impact air quality.
Noise	No Effect	No major increase in noise level during construction. Enclosure of Pumping Plant could decrease noise levels outside Pumping Plant.	No major increase in noise level during construction of substation and power line. Following construction, noise levels would return to ambient levels.	No major increase in noise level during construction. Enclosure of Pumping Plant could decrease noise levels outside Pumping Plant.	No major increase in noise level during construction of power line. Following construction, noise levels would return to ambient levels.
Public Safety	No Effect	No Effect	No public health risk associated with EMF.	No Effect	No public health risk associated with EMF.
Geology and Soils	No Effect	No Effect	Minor disturbance to soils associated with construction of power line and substation.	No Effect	Minor disturbance to soils associated with construction of power line and substation.
Visual Resources	No Effect	Positive Minor Effect because the Pumping Plant would be enclosed.	Negative Minor Effect due to power lines crossing the river. The substation would be built in a disturbed area north of the paint shop. The substation would not represent a negative visual effect.	Positive Minor Effect because the Pumping Plant would be enclosed.	Negative Minor Effect for the power line. However, minor visual impact, for the substation because of the substation's visible location on the bluff.

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter discusses resources that may be affected by actions taken to construct and operate a hydropower plant at the Helena Valley Irrigation District Pumping Plant. For each resource, existing conditions and impacts are described for the various alternatives. This chapter is concluded with a list of environmental commitments.

HELENA VALLEY IRRIGATION DISTRICT (HVID) PROJECT OPERATIONS AND WATER RESOURCES

Existing Conditions

Under the existing conditions, HVID gets its water delivered to their Pumping Plant from April 1st to October 1st. The water comes from Canyon Ferry Reservoir at an elevation of 3,690 feet (at a depth of 25 to 30 meters depending upon reservoir elevation) through the penstock to the turbines. The water that is delivered to the plant is either pumped up the tunnel to Lake Helena for irrigation and municipal water supply or is discharged back into the Missouri River/ Hauser Reservoir after going through the turbines. The top part of the pumping plant is not enclosed and the pumps and other equipment are exposed.

No Action Alternative

Under the No Action Alternative, there would be no changes to current irrigation deliveries or operations to the HVID.

Preferred Alternative (Hydropower Plant and Electrical Distribution System)

Under the base case or Preferred Alternative, there would be an operational change implemented by Reclamation where some of the existing releases from the outlet or spillway, when available, would be redirected to the HVID Pumping/Hydro Plant to allow for generation of electricity year around. It is anticipated that this change in operation and redirection of the water through the HVID/Hydro Plant would not change the water levels in either Canyon Ferry Reservoir or Hauser Reservoir below Canyon Ferry Dam. In order to determine the potential impact of this change in operation on water levels, water quality and fisheries in Hauser Reservoir, it is important to review Reclamation's historic Canyon Ferry Reservoir release data from 1994 through 2014. On average, 102,600 acre-feet flowed through the HVID turbines to provide energy for pumping during that time frame. The proposed operational change would increase this flow amount by 112,600 acre-feet annually. For comparison, 142,500 acre-feet were released through the river outlet and 337,600 acre-feet were spilled for this time frame. The additional amount being proposed to be redirected to HVID would only represent approximately 23% of the water that Reclamation is currently discharging.

In order to assess the change in operation with the redirected flows, it is important to review the historical flows from the outlet and the spillway in relationship to the proposed additional flows through the HVID turbine. On a monthly average basis, Figure 17 below shows proposed additional flows through the HVID turbine (in blue), historical river outlet flows (in red), and historical spillway flows (in green). Generally, additional flows to the turbine would otherwise have been released through the river outlet, except in June when a small percentage of spilled water would be redirected through the turbine. It can therefore be concluded that the change in operation would not affect water levels in Hauser Reservoir.

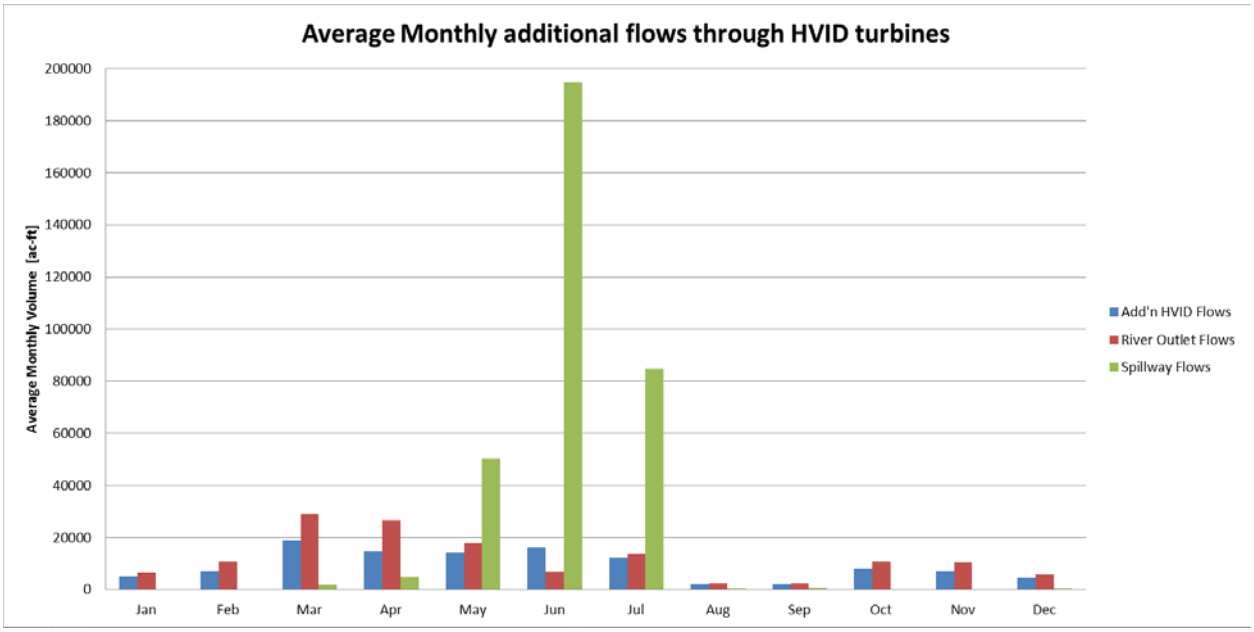

Figure 17. Reclamation Historical Releases from Canyon Ferry Dam and Potential Additional Flows for HVID Power Plant.

Alternative (Hydropower Plant and Substation)

The potential water resource impacts associated with this alternative would be the same as described for the Preferred Alternative.

ENERGY AND SOCIOECONOMC CONDITIONS

Existing Conditions

The proposed Project is located at Canyon Ferry Dam on the Missouri River in west-central Montana. The Project is located in Lewis and Clark County. Table 2 lists total income and earnings for Clark County by industrial sector from 1980 to 2013. Personal income has changed significantly from 1980 to 2013. In addition, earnings by industrial sector have also changed substantially in all categories and the services sectors have increased significantly.

According to the Montana Department of Labor & Industry, Lewis and Clark unemployment rate in August 2015 is 3% and with a total labor work force of 36,391 the total unemployment is currently 1,085 (MDLI, 2015). The current trend in employment during the last several years for Lewis and Clark has been a decline in agriculture and a rise in services, including health care services, which follows the national and regional changes.

Table 2. Personal Income by Industrial Sector for Lewis and Clark County (1980-2013).

	1980	1990	1996	2013
Total personal income	$431.5	$773.4	$1,123.3	$2,739.4
Earnings by industrial sector				
Farm	2.3	1.9	0.1	6.9
Agricultural services, forestry, fishing, and other	0.6	1.3	2.3	3.8
Mining	3.2	3.5	4.8	24.9
Construction	17.3	21.3	54.7	103.7
Manufacturing	26.9	25.1	35.7	45.9
Transportation, utilities, and communications	46.1	38.3	43.2	95.6
Wholesale trade	14.3	17.4	26.8	45.5
Retail trade	33.9	64.2	84.9	139.3
Financial, insurance, and real estate	21.0	35.4	63.9	178.0
Services	64.4	148.9	254.0	458.9
Health Care	-	-	-	248.2
Government				
Federal	25.2	49.1	63.9	192.9
State and local	84.7	149.1	211.5	584.9
Total earnings by place of work (Labor Income)	341.8	557.9	848.4	2,127.5

(From Reclamation, 2003 and U.S. Department of Commerce, 2015)

Under the existing conditions, there is no energy production at the HVID Plant.

No Action Alternative

Under the No Action Alternative, no hydropower facilities would be constructed at the HVID Pumping Plant and economic opportunities associated with the Hydropower Project would be forgone.

Preferred Alternative (Hydro Plant and Electrical Distribution System)

Under the Preferred Alternative, a hydropower facility would be installed at the HVID Pumping Plant and the new Project would produce an estimated average of 13,000,000 kWh of energy per year.

The life of the Project is expected to extend well beyond 50 years, and could thus provide a long-term, reliable revenue stream. According to initial estimates, revenues could be negative for the first couple of years but the Project would produce positive cash flow shortly thereafter. Revenues would be relatively small at first but then increase over time. The projections are highly dependent on interest rates and actual operation and maintenance costs. However, after the Project debt is paid, the long-term life for which the Project would be designed results in revenues to HVID and Sleeping Giant, LLC. The proposed Project would provide an additional source of renewable energy for Northwestern Energy to market and would then help those agencies reach the Renewable Energy Standards.

It is anticipated that there would be six to ten jobs required for the construction phase which would result in short-term spending and employment and spending on goods, services, and materials. There would also be one full time job created for operating the Project. This would benefit local communities and businesses, as well as increase tax revenues from taxes collected on these purchases.

The transport and delivery of irrigation or municipal and industrial water in the HVID system would not be affected by hydropower development during construction, operation, or any future maintenance projects.

Alternative (Hydro Plant and Electrical Distribution System)

The potential energy production and socioeconomic impacts associated with this alternative would be the same as described for the Preferred Alternative.

WATER QUALITY

Existing Conditions

Historical water quality monitoring dating back to 1996 indicated that dissolved oxygen (DO) levels in the Missouri River below Canyon Ferry Dam were significantly below the Montana State water quality standard of 6.5 mg/L for flowing waters. It was estimated that the lowest DO levels occurred in mid-September and remained below 6.5 mg/L for 90 to 120 days each year depending on weather conditions (Pickett, 1998). Water quality problems associated with DO decrease with depth are therefore not likely a recent development for Hauser Reservoir and that pattern continues today. Seasonal patterns of DO levels in the Canyon Ferry tailrace for the period of 1999-2003 are shown in Figure 18.

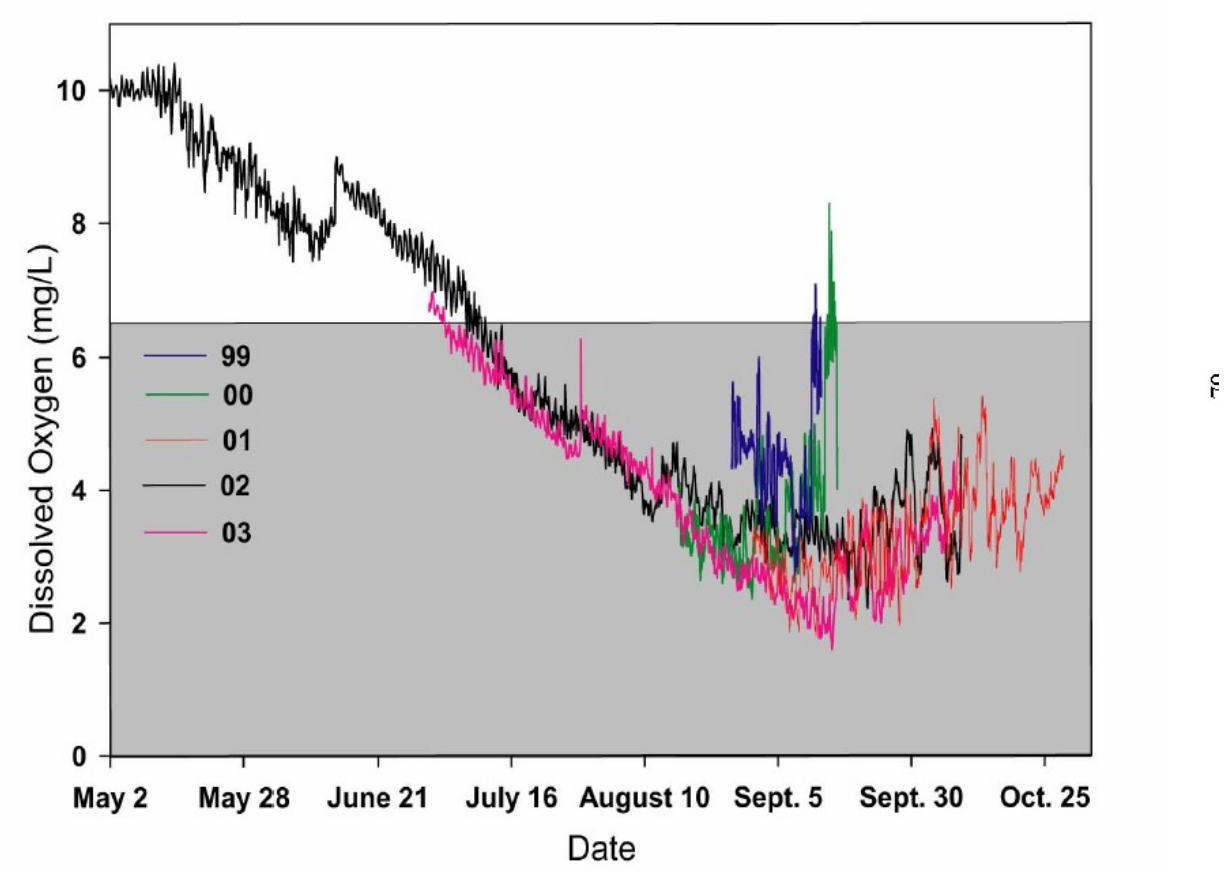

Figure 18. Seasonal Patterns of Decline in Dissolved Oxygen in the Canyon Ferry Tailrace as Measured at Riverside Campground. The gray area represents levels below the Montana Standard for Flowing Waters of 6.5 mg/L (Reclamation, 2004 - Figure 47).

Thermal stratification of Hauser Reservoir begins in June and typically the reservoir stratifies in July and August. During the summer months, surface waters to remain thermally isolated and results in greater productivity in the epilimnion. Development of thermal stratification as a result of seasonal warming and the perennially cold releases out of Canyon Ferry Reservoir are the principal reasons that water in the upper four meters of Hauser Reservoir (below Spokane Creek) remained relatively unaffected by the seasonal decline in DO levels discharged from Canyon Ferry Dam. By September, cooling of the surface waters along with seasonal highs in release temperatures from Canyon Ferry causes waters to destratify in Hauser Reservoir. Stratification of Hauser Reservoir is further shown by the temperature and dissolved oxygen profiles for the months of May through October 1999 (Figures 19 and 20).

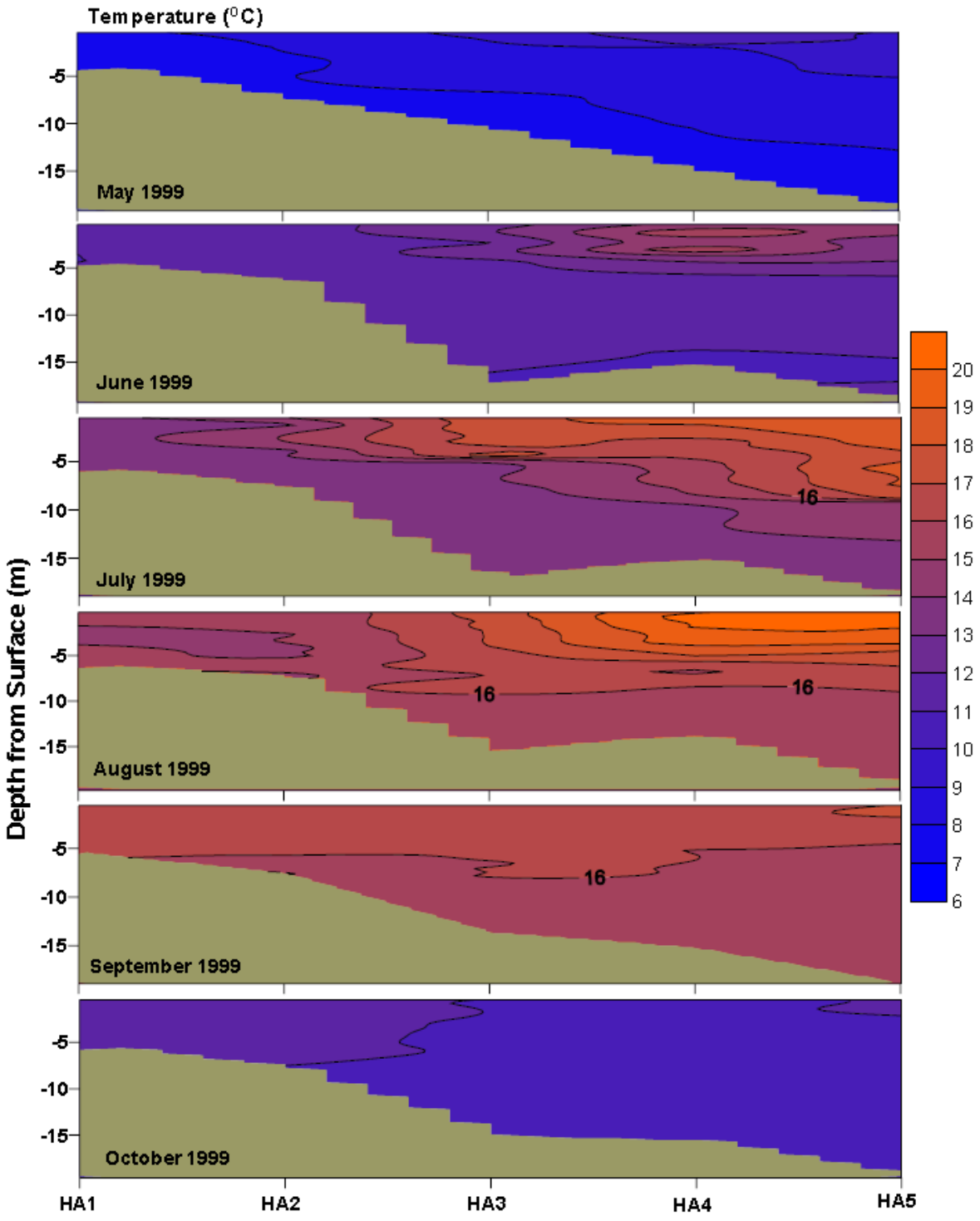

Figure 19. Longitudinal Cross Sections of Temperature Profiles for Hauser Reservoir, 1999 (Reclamation, 2004 - Figure 14).

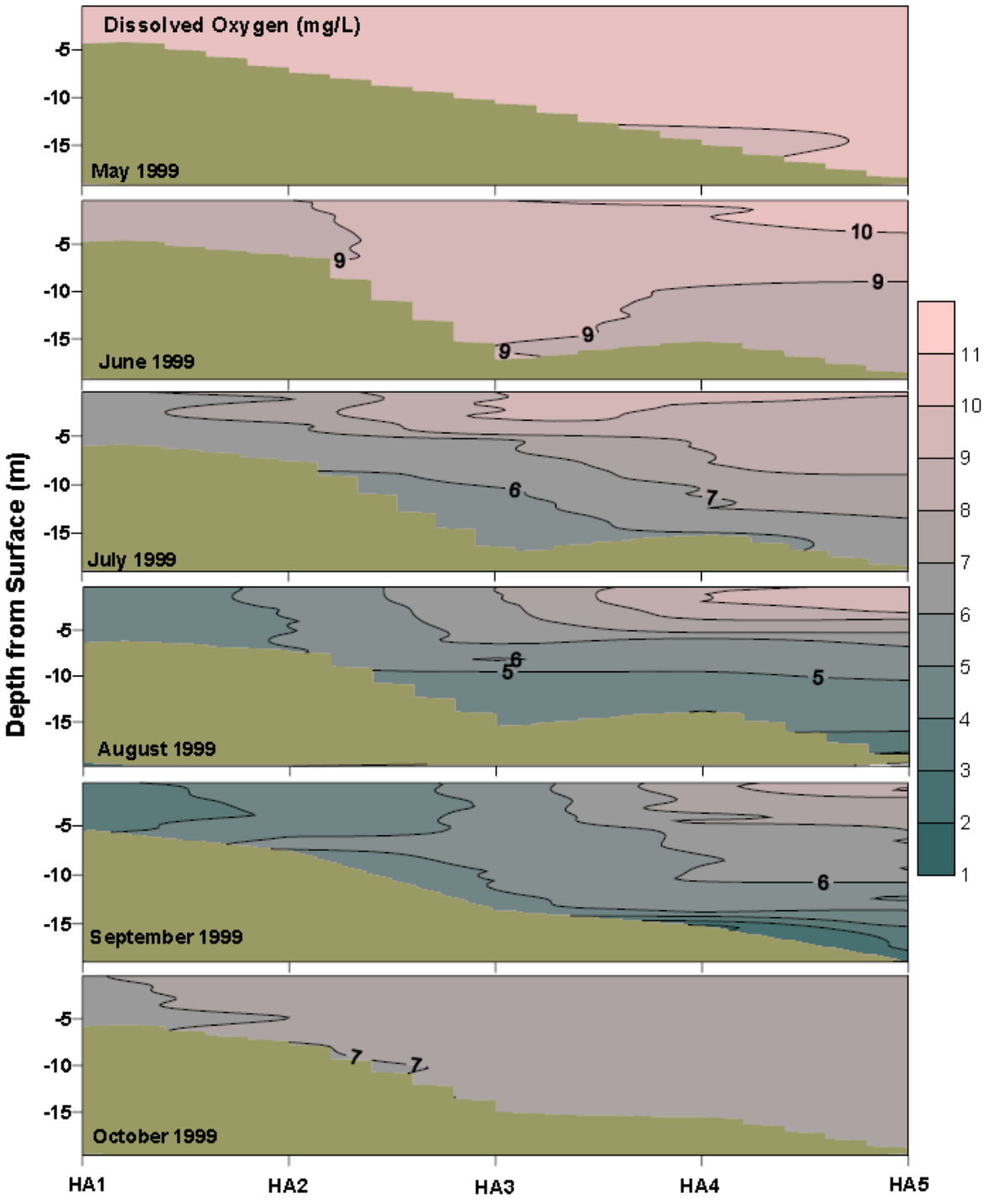

Figure 20. Longitudinal Cross Sections of Dissolved Oxygen Concentration Profiles for Hauser Reservoir, 1999. (Reclamation, 2004 - Figure 20).

Beginning in September 19, 2005, a series of tests were conducted by Reclamation at Canyon Ferry Dam to determine the effectiveness of a blower system installed for the purpose of raising the level of dissolved oxygen in the tailrace. The installed blower could provide an estimated 6000 CFM of air, or approximately 6% by volume, when the turbine releases were at 1750 CFS and 17.5 MW. Dissolved oxygen levels in the releases at the start of this study averaged 4.6 mg/L. This level of dissolved oxygen extended downstream for several miles. Levels of DO observed prior to the tests are fairly similar to those observed during other years.

The addition of air via the blower system raised the tailwater DO to 6.2 mg/L immediately downstream of the dam. DO levels at Riverside hovered around 6 mg/L for most of the study. Within 24 hours the effects of air injection were noted to extend at least several miles downstream. The blower on Unit 3 was run for 24 hours then shut down for the following 24 hours to again check baseline conditions. Immediately following the shutdown, DO in the tailrace returned to a pre-test level of 4.6 mg/L. Within 24 hours, dissolved oxygen levels had decreased to that level several miles downstream of the dam (Reclamation, 2005).

The effect of low dissolved oxygen levels for Hauser Reservoir for fish populations is further described in the subsequent section on Fisheries.

No Action Alternative

Under the No Action Alternative, there would be no changes in water quality in either Canyon Ferry Reservoir or in Hauser Reservoir.

Preferred Alternative (Hydropower Plant and Substation)

Under the Preferred Alternative, there would be an operational change implemented by Reclamation where some of the existing releases from the outlet or spillway, when available, would be redirected to the HVID Pumping/Hydro Plant to allow for generation of electricity year around. The amount of water that would be redirected would not affect water levels in either Hauser Reservoir or Canyon Ferry Dam.

The issue, however, is whether or not the additional flows could affect water quality and dissolved oxygen concentrations and fisheries populations in Hauser Reservoir as discussed in the previous existing conditions section. There has been a history of low dissolved oxygen concentrations in Hauser Reservoir during the summer months.

In order to determine what potential affect the additional redirected flows could have on Hauser Reservoir, an analysis was made of the dissolved oxygen concentrations in Canyon Ferry Reservoir and a summary of the dissolved oxygen concentrations at three levels is presented in Table 3. As can be seen in the table, stratification occurs in early summer and the dissolved oxygen concentrations start to decline in June/July and remain low until October when the Reservoir starts to turn over and the dissolved oxygen concentrations start to increase.

Table 3. Dissolved Oxygen Concentrations from Canyon Ferry Reservoir 1999 (Reclamation 2014).

Month	**Dissolved Oxygen Concentrations (mg/l)**		
	Depth in Meters		
	25	**30**	**35**
May	9	9	9
June	7	6	5.8
July	6.8	5.5	4.8
August	4.5	3.8	2
September	3	2	0.5
October	6.2	6.2	6.2

Water to the HVID Pumping Plant comes from Canyon Ferry Reservoir at an elevation of approximately 3,690 feet (at a depth of 25 to 30 meters depending upon reservoir elevation) through the penstock to the turbines. An analysis was therefore completed to determine what potential impact the additional water redirected to the HVID Pumping Plant would have on the dissolved oxygen concentrations in Hauser Reservoir. When the existing water quality data for both Canyon Ferry Reservoir and Hauser Reservoir is reviewed, the dissolved oxygen concentrations decline in the summer months only because of the stratification and the dissolved oxygen concentrations remain high for the other seasons of the year. A comparison was therefore made of the dissolved oxygen concentrations in Canyon Ferry Reservoir at the HVID intake level (30 meters) with the historical dissolved oxygen concentrations in the Canyon Ferry tailrace as measured at Riverside Campground (Figure 21). What the analysis shows is that generally the dissolved oxygen levels in the Canyon Ferry Reservoir at the HVID intake level are basically the same as the historical dissolved oxygen concentrations reported in the tailrace and Hauser Reservoir. It can therefore be concluded that redirecting the additional flows to the HVID Pumping Plant would not have an adverse effect on water quality.

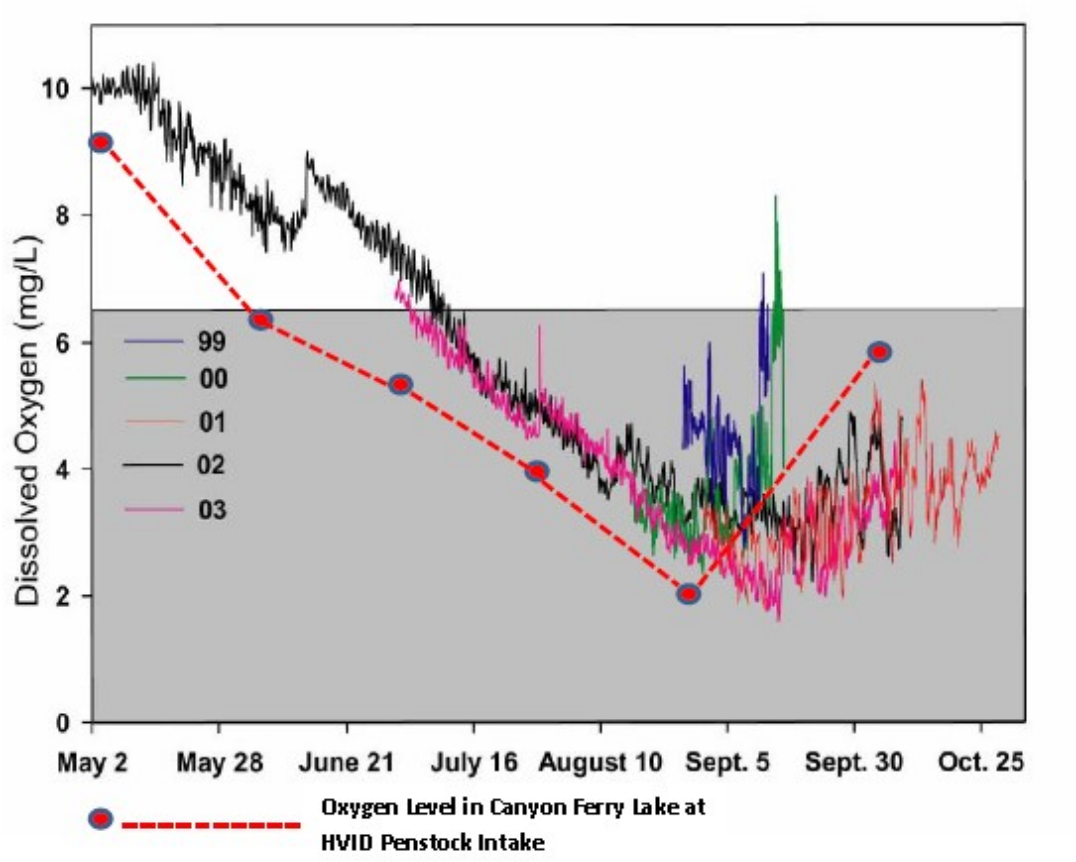

Figure 21. Comparison of Historical Dissolved Oxygen Levels in Canyon Ferry Tailrace with Oxygen Levels in Canyon Ferry Reservoir at the HVID Intake.

Alternative (Hydropower Plant and Electrical Distribution)

The potential water quality impacts associated with this alternative would be the same as described for the Preferred Alternative.

FISHERIES

Existing Conditions

Hauser Reservoir, which is located below Canyon Ferry Dam, has a surface area of 3,200 acres with a maximum depth of 70 feet and average depth of 26 feet. According to the Montana, Fish Wildlife & Parks' (MFWP) Montana Fisheries Information System (MFISH), Hauser Reservoir has a diverse population of fish (MFWP, 2015).

The diverse population of fish includes those species listed in Table 4. The dominant fish species are Common Carp, Longnose Sucker, Mottled Sculpin, Rainbow Trout, Walleye, White Sucker, and Yellow Perch. According to 2014 fishing logs, the dominant fish species caught were Rainbow Trout followed by Walleye and Yellow Perch (MFWP, 2015). Kokanee Salmon used to be dominant in the reservoir, but populations have steadily decreased.

Table 4. Fish Distribution in Hauser Reservoir (MFWP, 2015).

Species	**Abundance**
Brook Trout	Rare
Brown Trout	Common
Burbot	Common
Common Carp	Abundant
Fathead Minnow	Common
Kokanee Salmon	Rare
Longnose Sucker	Abundant
Mottled Sculpin	Abundant
Mountain Sucker	Not Applicable
Mountain Whitefish	Common
Northern Pike	Not Applicable
Rainbow Trout	Abundant
Smallmouth Buffalo	Rare
Utah Chub	Rare
Walleye	Abundant
Westslope Cutthroat Trout	Rare
White Sucker	Abundant
Yellow Perch	Abundant

From 1985 through 1996, Hauser Reservoir was formerly one of the most important Kokanee Salmon fisheries in Montana. In recent years, however, the species composition of this fishery has shown significant declines in Kokanee and Rainbow Trout. It is unknown if the decline is associated with the dam operations in Canyon Ferry Reservoir or related to changes in water quality or some other factor (Reclamation, 2004).

Montana Fish, Wildlife & Parks has an active fishing Rainbow Trout stocking program for Hauser Reservoir. For example, in 2014, 189,200 Rainbow Trout ranging in size between 6.34 to 9.25 inches were stocked in Hauser Reservoir (MFWP, 2015).

As discussed in the water quality section, Hauser Reservoir has a well-documented history of having low dissolved oxygen concentrations from July to October. Studies conducted by Reclamation have shown that the low dissolved oxygen levels and possibly higher temperatures in Hauser Reservoir do affect fish distribution (Reclamation, 2004).

Reclamation conducted acoustic studies to study fish distribution in Hauser Reservoir in relationship to dissolved oxygen levels. As far as spatial distribution of fish, the study showed that the numbers for all fishes decreased dramatically from about Trout Creek upstream to Canyon Ferry Dam. Seasonally in the

spring and summer, fish were concentrated near the lower reaches of Hauser Reservoir and in the Causeway Arm. There was some dispersal in the fall with more large and small fish being detected in upstream reaches of the reservoir in October than at other times of the year. Smaller fishes were always more predominant upstream than larger individuals. This is likely because the grouping of smaller fishes include many species that are more resistant to lower oxygen levels. Furthermore, during much of the year degraded water quality precludes cold-water, oxygen sensitive species such as salmon and trout from these reaches. Water quality data has shown that conditions upstream of Trout Creek can change rapidly with short term climatic events, which could result in mixing and subsequent water quality changes. While conditions, would not be considered lethal for salmonids, such changes may induce stress and fish may move away (downstream) from the impacted zone. Fish may simply avoid this zone during the summer because of the unpredictability of water quality, until conditions improve in the fall.

The vertical distribution of fish was also studied in Hauser Reservoir. It was determined that the vertical position of large fish in the water column did appear to be limited by dissolved oxygen. During spring and summer, larger fish were detected in the upper portion of the water column. When low oxygen minima appeared, most large fish apparently were avoiding areas of very low oxygen. Distribution of small fish was not as restricted and distributions were always wider. This is the same pattern that was observed with upstream downstream distributions, where larger fish were fewer in number in reaches of the reservoir with lower dissolved oxygen levels. During October when stratification breaks down, larger fish moved deeper into the water column. Canyon Ferry showed a similar vertical distribution of fish. During months of little stratification and higher deep water oxygen levels, fish were more widely dispersed in the water column as compared to late summer distribution of fish which became very surface oriented (Reclamation, 2004).

No Action Alternative

Under the No Action Alternative, there would be no changes in fisheries populations in either Canyon Ferry Reservoir or in Hauser Reservoir.

Preferred Alternative (Hydropower Plant and Electrical Distribution System)

Under the Preferred Alternative, there would be an operational change implemented by Reclamation where some of the existing releases from the outlet or spillway, when available, would be redirected to the HVID Pumping/Hydro Plant to allow for generation of electricity year around. As described in detail in the Water Quality section, it was concluded that this operational change would not affect existing water quality and dissolved oxygen concentrations in Hauser Reservoir. It can therefore be concluded that the operational change would not affect fish populations in Hauser Reservoir.

Construction of the Electrical Distribution System (poles and substation) would require some limited surface disturbance near Hauser Reservoir. Best Management Practices consisting of erosion control and sedimentation measures, however, would ensure that there would be no potential water quality impacts which would be detrimental to the fish population.

In addition, the overhead power line across the Missouri River would be around 70 feet above the river and would not interfere with river bank or boat fishing.

Alternative (Hydropower Plant and Electrical Distribution System)

The potential fisheries impacts associated with this alternative would be the same as described for the Preferred Alternative.

WILDLIFE AND VEGETATION

Existing Conditions

Wildlife

Canyon Ferry Reservoir and Hauser Reservoir offer a variety of habitats for wildlife. A summary of some of wildlife in the immediate Project area is summarized below:

Big Game
The Project area is located in Montana Fish, Wildlife and Parks' (MFWP) Hunting District 388. Based on information from the MFWP Hunting and Harvest Data reports (MFWP, 2015A) it appears as though the dominant big game species in the Project area is white tail deer, mule deer, antelope and elk (Table 5).

Table 5. Big Game Harvest in the Project Area (2012-2014).

	Total Harvest (Bucks and Does)		
Species	**2012**	**2013**	**2014**
Deer (Mule and White Tail)	286	238	231
Antelope	44	23	39
Elk	6	11	20

Birds (Raptors, Waterfowl, and Others)
The Project area has a wide diversity of bird populations as shown in Table 6.

Table 6. Montana Natural Heritage Program-Generalized Populations of Birds in the Sleeping Giant Project Area (MNHP, 2015).

Birds		
American Dipper	California Gull	Mountain Bluebird
American Pipit	Common Goldeneye	Northern Pintail
American White Pelican	Common Loon	Northern Shoveler
American Wigeon	Common Merganser	Osprey
American Robin	Common Raven	Red-breasted Merganser
Bald Eagle	Double-crested Cormorant	Ring-billed Gull
Black-legged Kittiwake	Gadwall	Tundra Swan
California Gull	Lesser Scaup	Turkey Vulture
Black-legged Kittiwake	Mallard	

Bald Eagle use of the 14 mile reach below Canyon Ferry Dam and within the Project area has been well documented and the Riverside Campground and Eagle Bay Drive were identified as critical habitat for Bald Eagles. Since 1991 bald eagle use of this reach has steadily declined which has been attributed to the drop of spawning kokanee salmon in this reach. The bald eagle is a year around resident in the Canyon Ferry Reservoir area and Hauser Reservoir and nesting sites are located downstream from the immediate Project area in the Eagle Bay Area (Reclamation, 2003).

During late fall, Canyon Ferry serves as a critical feeding ground to support the bald eagle migration south along the Rocky Mountain corridor from Canada to their winter nesting sites. Migrating eagles spot others feeding and stop to investigate. Such eagle congregations used to be large, but have significantly reduced in recent years.

In August of 2007, the bald eagle was removed from the federal list of Threatened and Endangered Species in Montana and most of the rest of the continental United States. Montana currently supports over 500 active bald eagle territories in the state, which far surpasses both the recovery goal of 99 breeding pairs cited in the 1986 Bald Eagle Recovery Plan and the estimated carrying capacity of 352 territories

identified by the Montana Bald Eagle Working Group in 1994. In 1978 there were 12 known breeding pairs of bald eagles in the state.

In the past, Reclamation closed selected areas downstream of Canyon Ferry Dam to limit conflicts with eagles and to provide interpretive information. Riverside Campground and Eagle Bay Drive were closed from October 15 to December 15, with the closure extending to December 31 when the eagle count remained above 50 individual eagles. That restriction has since been removed.

Vegetation

According to the Montana Natural Heritage Program the three primary ecological systems in the study area are Grassland Systems, Forest and Woodland Systems and Shrubland Steppe and Savanna Systems, (MNHP, 2015A). The Grassland System is the most dominant followed by the other two systems.

A summary of the ecological systems and the vegetation for each ecological system is presented in Table 7.

Table 7. Summary of Ecological Systems and Vegetation in Project Area.

Ecological System	**Vegetation and Land Cover**
Grassland System	Rocky Mountain Lower Montane, Foothill and Valley Grassland-This system is typified by cool-season perennial bunch grasses and forbs with a sparse shrub cover. Typical grasses consist of Rough fescue, Idaho fescue, Bluebunch wheatgrass, and Western wheatgrass.
Forest and Woodland Systems	Rocky Mountain Ponderosa Pine and Woodland and Savana- Ponderosa pine is the dominant conifer in this system. Understory vegetation is typically grasses and forbs.
Shrubland, Steppe and Savanna Systems	Montane Sagebrush Steppe- Dominant shrubs in this system are mountain big sagebrush, silver sagebrush, subalpine big sagebrush; three tip sagebrush and antelope bitterbrush. Grasses and forbs are also present with this system.

No Action

Under the No Action Alternative, no hydropower facilities would be constructed at the HVID Pumping Plant and there would not be a change in recreation use which would remain the same.

Preferred Alternative (Hydropower Plant and Electrical Distribution System)

Under the Preferred Alternative, a hydropower plant would be installed at the HVID Pumping Plant and an underground power line would extend from the hydropower facility along the service road about 900 feet, then an overhead power line would cross the river to a substation located on the east side of the Missouri River just north of the existing Bureau Paint shop. Surface disturbance would be associated with trenching of the underground line, installation of power poles, and the area for the substation. As described in Table 8 (Summary of Disturbance Associated with Preferred Alternative – Distribution Line and Substation) the short-term disturbance is 0.375 acres and the long-term disturbance is 0.344 acres.

Table 8. Summary of Disturbance Associated with Preferred Alternative – Distribution Line and Substation.

Preferred Alternative	Total Route Length or Area	Factor	Potential Surface Disturbance (acres)	
			Short-term 1	Long-term 2
Construction of a new underground line to the river crossing	900 feet	Trench is 18 inches wide	0.031	0
Construction of two steel poles	10 feet x10 feet per hole		0.004	0.004
Construction of a new substation	100 feet x - 150 feet	NA	0.34	0.34
Total Projected Disturbance			**0.375**	**0.344**

Disturbed land at the substation site would be contoured to prevent erosion. Topsoil, where available, would be stockpiled during construction for later use in re-vegetation. A seeding mix specifically designed for the impact area would be used and long-term weed control would be implemented. Additional information is found under the Environmental Commitments section.

The potential impacts of the Project on wildlife and vegetation are discussed in the subsequent sections.

Wildlife

Temporary impacts to wildlife and other vegetation would occur due to the construction of the power line and substation. Approximately 0.375 acres of land would be disturbed during construction activities. The underground trench and other areas of disturbance would be reseeded. Erosion-control Best Management Practices for drainage and sediment control would be implemented to prevent or reduce nonpoint source pollution during and following construction. Fuel storage, equipment, maintenance, and fueling procedures would be developed to minimize the risk of spills and the impacts from these incidents. A Spill Prevention Control and Countermeasure Plan (SPCC) would be prepared prior to construction to manage any potential release.

With these control measures in place, wildlife impacts are predicted to be minor for the wildlife species previously noted, and due primarily to direct disturbance associated with construction. Wildlife may avoid using the area during construction but overall, the Project would have minimal impacts on wildlife populations and not effect big game populations.

Construction of the overhead power line across the Missouri River to the substation on the east side would not remove or disturb any identified raptor nests. Those nests are located down river in the Eagle Bay Area. The power pole structures would meet or exceed current guidelines and recommendations outlined by the Avian Power Line Interaction Committee (APLIC 2012) raptor

1 There would be no short-term disturbance within the distribution line ROW as vehicular travel during transport of materials and line construction would be limited primarily to the existing HVID and Reclamation service road in the vicinity of the distribution line. There would be short-term disturbance associated with the trenching for the underground line. Short-term disturbance at the substation site would consist of a graveled footprint to accommodate equipment and clearing the substation site.

2 Long-term surface disturbance within the distribution line ROW would consist of construction of the two power poles. Assuming a disturbance of 100 ^{2} for each pole, the total would be 200 feet ^{2} divided by 43,560 feet ^{2} per acre = the total acreage disturbed by new poles (less than 0.004 acre). There would be no long-term disturbance associated with the maintenance activities as an existing HVID service and Reclamation road would be used. The long-term disturbance associated with the distribution line would therefore be minimal. Long-term disturbance at the substation site would consist of a graveled footprint to accommodate the substation.

protection. These standards are considered by the United States Fish and Wildlife Service ("USFWS") as preferred to minimize the potential for raptor electrocutions. The addition of the overhead line across the river would increase the potential for bird collisions with the power line. However, appropriate line marking devices would be added to the line to minimize and reduce potential bird collisions with the power line.

Vegetation

During construction of the Project approximately 0.375 acres vegetation would be impacted by the underground power line trenching, pole placement and construction of the substation. The disturbed area is primarily located in the Grassland Ecosystem and consists primarily of grasses as identified in Table 7. No trees would be removed for construction of the power line or substation. The trenched area would be reclaimed, and the long-term disturbance would be 0.34 acres. Therefore, the impacts of the Project on vegetation and habitat would be very minor.

Alternative (Hydropower Plant and Electrical Distribution System)

Under this alternative, the power line from the Hydro Plant would parallel the river for a distance, and then proceed northwest to a substation located near the Western 100 kV line. Surface disturbance would be associated installation of power poles and the area for the substation. As described in Table 9 (Summary of Disturbance Associated with Alternative– Distribution Line and Substation) the short-term disturbance is 0.34 acres and the long-term disturbance 0.34 acres.

Table 9. Summary of Disturbance Associated with Alternative - Distribution Line and Substation

Alternative	Total Route Length or Area	Factor	Potential Surface Disturbance (acres)	
			Short-term 3	Long-term 4
Construction of a new distribution line	1,800 feet	50-foot ROW	0	0
Construction of a new substation	100 feet x 150 feet	NA	0.34	0.34
Total Projected Disturbance			**0.34**	**0.34**

Disturbed land at the substation site would be contoured to prevent erosion. Topsoil, where available, would be stockpiled during construction for later use in re-vegetation. A seeding mix specifically designed for the impact area would be used and long-term weed control would be implemented. Additional information is found under the Environmental Commitments section.

The potential impacts of the Project on wildlife and vegetation are discussed in the subsequent sections.

3 There would be no short-term disturbance within the distribution line ROW as vehicular travel during transport of materials and line construction would be limited primarily to the existing HVID/Reclamation service road in the vicinity of the distribution line. Short-term disturbance at the substation site would consist of a graveled footprint to accommodate equipment and clearing the substation site.

4 Long-term surface disturbance within the distribution line ROW would consist of the diameter (3 feet) or 7 feet ^{2} feet of each new bore hole multiplied by the number of poles needed for each mile of new feet: 7 feet ^{2} of disturbance per pole x 11 poles = 77 feet ^{2} divided by 43,560 feet ^{2} per acre = the total acreage disturbed by new poles within the ROW (less than 0.001 acre). There would be no long-term disturbance associated with the maintenance activities because the existing HVID service road would be used. The long-term disturbance associated with the distribution line would therefore be minimal. Long-term disturbance at the substation site would consist of a graveled footprint to accommodate the substation.

Wildlife

Temporary impacts to wildlife and other vegetation would occur due to the construction of the power line and substation. Approximately 0.34 acres of land would be disturbed during construction activities. The underground trench and other areas of disturbance would be reseeded. Erosion-control Best Management Practices for drainage and sediment control would be implemented to prevent or reduce nonpoint source pollution during and following construction. Fuel storage, equipment, maintenance, and fueling procedures would be developed to minimize the risk of spills and the impacts from these incidents. A Spill Prevention Control and Countermeasure Plan (SPCC) would be prepared prior to construction to manage any potential release.

With these control measures in place, wildlife impacts are predicted to be minor for the wildlife species previously noted, and due primarily to direct disturbance associated with construction. Wildlife may avoid using the area during construction but overall, the Project would have minimal impacts on wildlife populations and not effect big game populations.

Construction of the overhead power line to the substation would not remove or disturb any identified raptor nests. Those nests are located down river in the Eagle Bay Area. The power pole structures would meet or exceed current guidelines and recommendations outlined by the Avian Power Line Interaction Committee (APLIC, 2012) raptor protection. These standards are considered by the United States Fish and Wildlife Service ("USFWS") as preferred to minimize the potential for raptor electrocutions. The addition of the overhead line would increase the potential for bird collisions with the power line. However, appropriate line marking devices would be added to the line to minimize and reduce potential bird collisions with the power line.

Vegetation

During construction of the Project approximately 0.34 acres vegetation would be impacted by the pole placement and construction of the substation. The disturbed area is located in the three ecosystems identified in Table 7 and result in disturbance of grasses, some trees along the right-of way and sagebrush at the substation site. It would be necessary to clear a limited number of trees from the power line right-of-way. The long-term disturbance would be 0.34 acres. Therefore, the impacts of the Project on vegetation and habitat would be very minor.

THREATENED AND ENDANGERED SPECIES

Existing Conditions

The U.S. Fish and Wildlife Service's Montana Ecological Services Field Office was contacted to obtain and official species list for the Project area. There are a total of seven threatened, endangered, or candidate species on species list (Table 10). There are no critical habitats for any of the species within the Project area (USFWS, 2015).

Table 10. Threatened, Endangered, or Candidate Species for the Project Area.

Birds	**Status**	**General Habitat**
Red Knot *(Calidris canutus rufa)*	Threatened	Tidal flats, shores, mudflats, sandy beaches. Nests on Arctic tundra
Sprague's Pipit *(Anthus spragueii)*	Candidate	Open grasslands
Conifers and Cyads		
Whitebark Pine *(Pinus albicaulis)*	Candidate	Subalpine Forest
Mammals		
Black-footed Ferret *(Mustela nigripes)*Population: entire population, except where EXPN	Endangered	Grasslands
Black-footed Ferret *(Mustela nigripes)*Population: U.S.A. (specific portions of AZ, CO, MT, SD, UT, and WY)	Experimental Population, Non- Essential	Grasslands
Canada Lynx *(Lynx canadensis)*Population: (Contiguous U.S. DPS)	Threatened	Subalpine forests
Grizzly Bear *(Ursus arctos horribilis)* Population: lower 48 States, except where listed as an experimental population or delisted	Threatened	Meadows, riparian and timber areas.

The Red Knot is known is a medium-sized shorebird that is truly a master of long-distance migration. On wingspans of 20 inches, some knots fly more than 9,300 miles from south to north every spring and repeat the trip in reverse every autumn, making this bird one of the longest-distance migrants in the animal kingdom. Surveys of wintering Knots along the coasts of southern Chile and Argentina and during spring migration in Delaware Bay on the U.S. coast indicate that a serious population decline occurred in the 2000's.

In the breeding season, the Red Knot nests in the Arctic, then migrates to coasts around the world. The Red knot has one of the longest migrations of any bird. While feeding in mudflats during the winter and migration, Red Knots are tactile feeders, probing for unseen prey in the mud. Their habitat includes tidal flats/shores and tundra (summer). In migration and winter on coastal mudflats and tidal zones, sometimes on open sandy beaches, their feeding techniques include the use of shallow probes into the mud while pacing along the shore. The Red Knot has not been observed in the project area (Table 6).

The Sprague's Pipit is a relatively small passerine endemic to the North American grasslands. It has a plain buff colored face with a large eye-ring. The Sprague's Pipit is a ground nester that breeds and winters on open grasslands. It feeds mostly on insects and spiders and some seeds. The Sprague's Pipit is closely tied with native prairie habitat and breeds in the north-central United States in Minnesota, Montana, North Dakota and South Dakota, as well as south-central Canada. Wintering occurs in the southern states of Arizona, Texas, Oklahoma, Arkansas, Mississippi, Louisiana, and New Mexico. The Sprague's Pipit has not been observed in the project area (Table 6).

Whitebark Pine is a five-needled conifer classified as a stone pine which includes five species worldwide. Stone pines are distinguished by large, dense seeds that lack wings and therefore depend upon birds and squirrels for dispersal across the landscape. It is typically found in cold, windy, high elevation or high latitude sites in western North America and as a result, many stands are geographically isolated. It is a stress-tolerant pine and its hardiness allows it to grow where other conifer species

cannot. The species is distributed in Coastal Mountain Ranges (from British Columbia, Washington, Oregon, down to east-central California) and Rocky Mountain Ranges (from northern British Columbia and Alberta to Idaho, Montana, Wyoming, and Nevada).

A study in the mid-2000s showed that Whitebark Pine had declined by 41% in the Western Cascades due to two threats: white pine blister rust and mountain pine beetles. Whitebark Pine is considered a keystone species because it regulates runoff by slowing the progress of snowmelt, reduces soil erosion by initiating early succession after fires and other disturbances, and provides seeds that are a high-energy food source for some birds and mammals.

Back-footed Ferrets are weasel-like in body shape and form but are heavier than other weasels. The torso is long with short legs and a long tail. The color of the body is a soft cream color with the ears, chin, and throat fading to white. The dorsal portion of the torso is darker than the rest of the body. The legs and tip of the tail are dark brown and a mask of the same color extends in a band from below each eye across the forehead. The Black-footed Ferret is 18 to 24 inches long, including a 5 to 6 inch tail. It weighs only one-and-a-half to two-and-a-half pounds, with males slightly larger than females. The Black-footed Ferret is well adapted to its prairie environment. Its color and markings blend so well with grassland soils and plants that it is hard to detect until it moves. Black-footed Ferrets are intimately tied to prairie dogs throughout their range and have only been found in association with prairie dogs. They are limited to the same open habitat used by prairie dogs: grasslands, steppe, and shrub steppe.

According to the Montana Natural Heritage Program, the Project area is located in the historic range for Black-footed Ferrets, but they have not been observed in either the summer or winter range (MNHP, 2015 B). In addition, during the site visit, there was no evidence of prairie dog hills.

The Canada Lynx is a medium-sized cat with silver-gray to grayish-brown upperparts and a white belly and throat. Lynx have long legs and a relatively short, compact body. A facial ruff surrounds the face except directly beneath the snout. The facial ruff is longest on either side of the snout and has black markings on these longest hairs. The ears are long and have a long, black tuft at the end. The backs of the ears are darker than the rest of the body and have a central white spot.

East of the Continental Divide the subalpine forests inhabited by Canada Lynx occur at higher elevations (1,650 to 2,400 meters) and are composed mostly of subalpine fir. Secondary habitat is intermixed Englemann spruce and Douglas fir habitat types where lodgepole pine is a major seral species. Throughout their range, shrub-steppe habitats may provide important linkage habitat between the primary habitat types described above. Typical snow conditions are important factors for the Canada Lynx, with occurrence primarily in habitats that also receive relatively uniform and moderately deep snowfall amounts.

According to the Montana Natural Heritage Program, the Project area is located in the year-round range identified for Canada Lynx (MNHP, 2015 C). However, the Project area is east of the Continental Divide and located at an elevation of between 1,122 and 1,188 meters, which is a lower elevation than the reported habitat of the Canada Lynx.

Grizzly Bears have a massive head with a prominent nose, rounded inconspicuous ears, small eyes, short tail, and a large, powerful body. The facial profile is concave and there is a noticeable hump above the shoulders. The claws on the front feet of adults are about four inches long and slightly curved. Grizzly Bears range widely in color and size. The most prevalent coloration of Grizzly Bears in Montana is medium to dark brown underfur, brown legs, hump and underparts, with light to medium grizzling on the head and back and a light patch behind the front legs.

In Montana, Grizzly Bears primarily use meadows, seeps, riparian zones, mixed shrub fields, closed timber, open timber, sidehill parks, snow chutes, and alpine slabrock habitats. Habitat use is highly variable between areas, seasons, local populations, and individuals. Historically, the Grizzly Bear was primarily a plains species occurring in higher densities throughout most of eastern Montana.

According to the Montana Natural Heritage Program, the Project area is located in the historic range identified for Grizzly Bears, but the Project area is not located in the present year-round range which is to the north and south (MNHP, 2015 D).

No Action Alternative

Under the No Action Alternative, no hydropower facilities would be constructed at the HVID Pumping Plant and economic opportunities associated with the Hydropower Project would be forgone.

Preferred Alternative (Hydropower Plant and Electrical Distribution System)

Under the Preferred Alternative, approximately 0.375 acres of land would be disturbed with construction activities. In the previous section, seven endangered, threatened, or candidate species were identified as potentially being in the study area. Based on the review of the habitat requirements and information on species distribution information, it has been determined that under the Preferred Alternative, there would be no effect on the endangered, threatened, or candidate species.

Alternative (Hydropower Plant and Electrical Distribution System)

The potential endangered species impacts associated with this alternative would be similar as described for the Preferred Alternative. It has been determined that under the Alternative, there would be no effect on the endangered, threatened, or candidate species.

WETLANDS AND RIPARIAN HABITAT

Existing Conditions

Wetlands at Canyon Ferry Reservoir are predominately located at the southern end of the reservoir. There are no identified wetlands downstream of Canyon Ferry Dam in the area of the existing HVID Pumping Plant and the power lines and substation. Riparian habitat along this reach of the river is very limited.

No Action Alternative

Under the No Action Alternative, no hydropower facilities would be constructed at the HVID Pumping Plant and there would be no change in wetlands or riparian habitat.

Preferred Alternative (Hydropower Plant and Electrical Distribution System)

Under the Preferred Alternative, a hydropower plant would be installed at the HVID Pumping Plant along with a power line and substation to connect the hydropower plant to the nearby Western 100 kV line. The construction activities would not impact any wetlands or riparian habitat.

Alternative (Hydropower Plant and Electrical Distribution System)

The potential wetland and riparian habitat impacts associated with this alternative would be the same as described for the Preferred Alternative.

RECREATION USE

Existing Conditions

Canyon Ferry Reservoir offers both residents and nonresidents a wide variety of recreation facilities.

There are a total of 13 designated campgrounds and 12 designated day-use areas located primarily in the northern end of the reservoir. Canyon Ferry Reservoir is the largest of the series of three reservoirs located on the Missouri River. Although the water-based recreation opportunities at each reservoir are similar, Canyon Ferry has adequate recreational access to its shoreline, while Hauser Reservoir has limited public access (Reclamation, 2003).

The Riverside Campground is located downstream from the Canyon Ferry Dam and across from the HVID Pumping Plant and has campgrounds, picnic sites, solid waste, sewage and water, and boating and swimming facilities.

A summary of visitation for the Riverside Campground over a seven-year period from 1995 through 2002 shows that there has been a decline in visitation since 1995 but was steady during the last few years of the seven-year reporting period.

Table 11. Riverside Campground Visitation (Reclamation, 2003).

Year	Visitation
1995	2,860
1996	2,414
1997	2,097
1998	1,871
1999	1,759
2000	1,112
2001	1,362
2002	1,370

The Missouri River below Canyon Ferry is an often used fishery from both banks as well as from boats. Bank fishing generally extends from the public closure cable downstream to about the boat ramp. Boat fishing occurs throughout the area including the downstream Hauser Reservoir. Fishing pressure is heaviest in the spring and early summer, tapers off through the fall, and begins to ramp back up in the winter as other waters freeze.

Angler days per year data for Hauser Reservoir as reported by the Montana, Fish Wildlife & Parks' (MFWP) Montana Fisheries Information System (MFISH) is presented in Table 12. As can be seen in the table, angler days per year has increased during the three-year reporting period (MFWP, 2015).

Table 12. Angling Days per Year for Hauser Reservoir.

	Total		Resident		Non Resident		Ranking	
Year	Days Fished	Trips	Days Fished	Trips	Days Fished	Trips	State	Region
2009	59,748	1,046	53,356	959	6,392	87	10	4
2007	47,696	697	40,529	599	7,167	98	7	3
2005	38,817	700	36,016	654	2,801	46	16	4

No Action

Under the No Action Alternative, no hydropower facilities would be constructed at the HVID Pumping Plant and there would not be a change in recreation use which would remain the same.

Preferred Alternative (Hydropower Plant and Electrical Distribution)

Under the Preferred Alternative, a hydropower facility would be installed at the HVID Pumping Plant and a power line would extend from the hydropower facility along the service road about 900 feet, then

cross the river to a substation located on the east side of the Missouri River just north of the existing Bureau Paint shop. The height of the power line crossing the river would be around 70 feet which would not interfere with bank or boat fishing in the immediate area. In addition, fishing and access would occur during all construction phases and would continue to occur in the immediate area of the proposed power line in the future.

The introduction of the powerline and substation would change the visual landscape in the Riverside Campground and the immediate area below Canyon Ferry Dam. The visual changes are described in more detail in the Visual Section. The outdoor experience, however, for the angler or camper should not be significantly compromised with the addition of the power line and substation.

The Preferred Alternative would therefore not have an effect on recreational use.

Alternative (Hydropower Plant and Electrical Distribution System)

Under this alternative, the power line from the hydro facility would parallel the river for a distance, then proceed northwest to a substation located near the Western 100 kV line. As there would be no powerline crossing the river with this alternative, any potential impacts to fishing and fisherman access to the Missouri River would not occur. The visual impacts associated with the substation could affect the outdoor experience for campers or fishermen in the immediate Project area or at Riverside Campground.

INDIAN TRUST ASSETS

Existing Conditions

Indian Trust Assets (ITAs) are legal interests in property held in trust by the United States for federally-recognized Indian tribes or individual Indians. Land assets held in trust for individual Indians are more specifically referred to as allotments, or as in the case of allotments created out of public domain lands – Public Domain Allotments (PDAs). An Indian trust has three components: (1) the trustee, (2) the beneficiary, and (3) the trust asset. ITAs can include lands, minerals, federally reserved hunting and fishing rights, federally reserved water rights, and in-stream flows associated with a reservation, rancheria, or PDA. Beneficiaries of the Indian trust relationship are federally-recognized Indian tribes and individual Indians with trust land; the United States is the trustee.

The Project area comprises a reach of river downstream from Canyon Ferry Dam. There are no Indian Trust lands located in the Project area and there are no actions potentially affecting the Indian Trust Assets.

No Action Alternative

Under the No Action Alternative, no hydropower facilities would be constructed at the HVID Pumping Plant and there would be no effect on Indian Trust Assets.

Preferred Alternative (Hydro Plant and Electrical Distribution System)

The proposed Project would not impact any Indian Trust Assets. Reclamation would continue to consult with Tribes in accordance with ITA Policy.

Alternative (Hydro Plant and Electrical Distribution System)

The potential Indian Trust Assets impacts associated with this alternative would be the same as described for the Preferred Alternative.

ENVIRONMENTAL JUSTICE

Existing Conditions

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, dated February 11, 1994, requires agencies to identify and address disproportionately adverse human health or environmental effects of their actions on minorities and low-income populations and communities, as well as the equity of the distribution of the benefits and risks of their decisions. The analysis method for complying with the order has three parts: (1) the geographic distribution of low-income and minority populations in the affected area is described; (2) an assessment of whether the impacts of construction and operation of the Project would produce impacts that are high and adverse is conducted; and (3) if impacts are high and adverse, a determination is made as to whether these impacts would disproportionately impact low-income or minority populations. To comply with the environmental justice policy established by the Secretary, all Departments of the Interior agencies have to identify and evaluate any anticipated effects, direct or indirect, from the proposed Project, action, or decision.

The majority of Lewis and Clark County residents, 94.1% of the population, are Caucasian and Minority (non-white) percent is 6.4%. From 2009 – 2013 the percentage of residents that lived below the poverty level for Lewis and Clark County was 10.4% compared to 15.2% for Montana (Table 13).

Table 13. Population and Poverty Level for Lewis and Clark County.

	Lewis and Clark County	**Montana**
Total Population (2014)	65,856	1,023,579
White	94.1%	89.4%
Hispanic	3.0%	3.5%
American Indian and Alaska Native	2.2%	6.6%
Black or African American	0.5%	0.6%
Asian	0.7%	0.6%
Minority (Non-White)	6.4 %	11.3%
Persons Below Poverty Level (2009-2013)	10.4%	15.2%

U.S. Census Bureau, 2015.

No Action

Under the No Action Alternative, no hydropower facilities would be constructed at the HVID Pumping Plant and there would not be a change in population or income levels which would affect environmental justice.

Preferred Alternative (Hydropower Plant and Electrical Distribution System)

Development, construction, and operation of the proposed Project in Lewis and Clark County would produce direct and indirect socioeconomic and environmental justice impacts. The Project's socioeconomic benefits are positive as a result of increase in income and employment. Therefore, any impacts to minority or disadvantaged communities would likely improve the local standard of living and would not result in adverse environmental justice impacts.

Alternative (Hydropower Plant and Electrical Distribution System)

The potential environmental justice impacts associated with this alternative would be the same as

described for the Preferred Alternative.

CULTURAL AND PALEONTOLOGICAL RESOURCES

Existing Conditions

Federal laws are enacted to protect historic properties, also referred to as cultural resources, from damage or loss due to federally funded or permitted activities. These laws include the Antiquities Act of 1906, Historic Sites Act of 1935, Executive Order (EO) 13007, the National Historic Preservation Act (NHPA) of 1966, as amended, the Archeological and Historic Preservation Act of 1974, the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA), and the Archeological Resources Protection Act of 1979 (ARPA). EO 11593 also provides necessary guidance on protection and enhancement of cultural resources.

As defined on the Advisory Council on Historic Preservation (ACHP) website at www.achp.gov, "In the Section 106 [of the National Historic Preservation Act] process, a historic property is a prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places. This term includes artifacts, records, and remains that are related to and located within these National Register properties. The term also includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization, so long as that property also meets the criteria for listing in the National Register."

The Paleontological Resources Preservation Act (PRPA) is to manage and protect paleontological resources on Federal land using scientific principles and expertise. As defined in PRPA, "The term `paleontological resource' means any fossilized remains, traces, or imprints of organisms, preserved in or on the earth's crust, that are of paleontological interest and that provide information about the history of life on earth,…"

Prehistoric cultural resources include physical properties resulting from human activities predating written records. They typically consist of isolated artifacts and sites. Prehistoric isolates (as defined in the State of Montana) consist of four or less artifacts within a 50-meter (m) square area. Prehistoric sites contain artifacts (e.g., stone tools and ceramic sherds), features (e.g., campfires and tipi rings), and plant and animal remains that exhibit evidence of cultural utilization. Prehistoric site types common to the region include lithic scatters, cultural material scatters, animal kill/processing sites, and stone feature sites.

Historic cultural resources consist of physical properties that were created after the advent of written records in the region (post-1805). Historic property categories include architectural buildings (e.g., log cabins and houses), architectural structures (e.g., dams, bridges) and archeological features (e.g., trails and trash dumps). Historic cultural resources expected in the vicinity of the project area include buildings, structures, homesteads, transportation features, and refuse dumps.

Traditional Cultural Properties are properties which affected Tribes may attach religious and/or cultural significance. If identified, such sites would include traditional cultural properties that are associated with the cultural or religious practices of a particular Tribal community. The populations anticipated to have interest in the APE include the Blackfeet, Salish, Kootenai, Crow, Shoshone, and Bannock. Although neither the construction nor operation of the proposed project would cross any Native American reservations, various Native American populations may identify traditional cultural properties within the project area. The Tribal Governments referenced will be consulted in addition to the Montana State Historic Preservation Office (MTSHPO) pursuant to the NHPA prior to initiation of the proposed undertaking.

To ascertain whether the proposed undertaking would affect cultural resources, Ethnoscience examined MTSHPO manuscripts for Section 4 of T10N R1W in Lewis and Clark County. Historic literature and maps were also studied to identify possible site leads.

The MTSHPO manuscript and site files for Section 4, T10N R1W, Lewis and Clark County list 17 documents relevant to the project area. There is also a recent inventory that is not yet placed in the manuscript files (Wagers 2015). Only four projects cross the areas of potential effect. These inventories have surveyed both the Preferred Alternative and the Alternative at least once.

The file search Conducted by Ethnoscience indicates there are four previously documented historic sites and one paleontological site within Section 4 of T10N R1W in Lewis and Clark County. The exact location and significance of the paleontological site is unknown at this time with Reclamation attempting to locate it. The historic sites are: Canyon Ferry Dam and associated structures, determined NRHP eligible; the Helena Valley Irrigation Unit (including the Pump Station), determined NRHP ineligible; and a Western Area Power Administration Line that would be recommended NRHP ineligible during the consultation phase of this proposed undertaking. Another site represents an 1868-1876 hydraulic placer mining operation that is undetermined regarding NRHP eligibility with a previous recommendation of eligible. The defined site boundaries are based on the area surveyed, but the site likely extends farther. An 1870 General Land Office (GLO) Map for T10N R1W shows the location of a mining community just west, and patent records show three mine claims for a total of 154.05 acres within Section 4. The map also shows a ferry crossing existed along the east edge of the Missouri River; however, evidence of this site was likely destroyed by the development of Riverside Campground.

No prehistoric sites are identified; however, river valleys were commonly used as travel corridors for the tribes in the region. The potential exists for prehistoric sites within the project area. Nabokov and Loendorf note that the Flathead name for the Missouri was known as "*ep iyu ntwe?tkwus*, which meant '*river of red paint*'… [here] they often dug out the reddish hematite which they used in ceremonial activities and to paint their tipis" (2002:86). Although the exact location is unknown, the Flathead were known to obtain red paint from a vermillion source "between the ridge back of East Helena and Townsend" (Stone, 1996).

The tribes may attach religious and/or cultural significance to sites that may be affected by the proposed undertaking. While the presence of an ethnographic landscape was not identified, consultation may result in the identification of such sites.

No Action

No project-related impacts would occur under the No Action Alternative. If prehistoric sites are present, they are likely in a stable environment and would remain undisturbed. Historic sites would continue to deteriorate due to natural and non-project related forces.

Preferred Alternative (Hydropower Plant and Electrical Distribution System)

The Area of Potential Effects (APE) for cultural and historical resources is defined as the geographic area or areas within which the Preferred Alternative may directly or indirectly cause changes in the character or use of historic properties. The APE of the Preferred Alternative is 1142.77 feet long by 50 feet wide for the distribution line (does not include the portion over water). The location and size of the substation is not determined; however, it is anticipated that it would be placed somewhere in a 5.5 acre area on the east side of the river.

The Preferred Alternative has moderate potential to adversely affect a cultural resource. The APE encompasses 7.55 acres. Although this is larger than the area for the Alternative and therefore has a higher potential for sites, it also allows greater latitude in the placement of the substation and distribution lines to avoid sites. Two acres were previously inventoried, but the inventory is 30 years old and would have to be investigated again. Based on the available evidence, this alternative has the potential to directly affect four previously documented sites within the section. These consist of the Helena Valley Irrigation Unit, the Canyon Ferry Dam site, the Western Area Power Administration Transmission Line,

and paleontological site.

The Helena Valley Irrigation Unit is determined NRHP ineligible. As such, modifications of this site do not constitute an adverse effect.

The Canyon Ferry Dam site is determined eligible for listing on the NRHP. In addition to the dam itself, the site boundary extends along the right bank of the Missouri River to encompass the foundations of the contractor shop and the office building. It is unlikely the foundations would be considered contributing elements to the site's NRHP eligibility, but this needs to be determined. During the final site selection of the project the substation would be sited outside the site boundaries to avoid adverse effects.

The distribution line would connect to the Western Area Power Administration Power line. The NRHP eligibility of this site is undetermined, though recommended ineligible. The connection of a distribution line would not adversely affect this site if determined ineligible.

The location of the paleontological find is only vaguely known and its significance is undetermined at this time with Reclamation attempting to locate it. Despite this, its presence indicates the potential for Cretaceous mammal bones in the vicinity.

Since consultation with tribes has not occurred, it is unknown whether any affected tribe may attach religious and/or cultural significance to any historic properties that may be affected by the distribution line. Reclamation would consult with affected tribes to ascertain if such Traditional Cultural Properties are present and determine their NRHP eligibility. If present, Reclamation would work with the tribes and the MTSHPO to either avoid or mitigate adverse effects to sites or landscape.

Alternative (Hydropower Plant and Electrical Distribution System)

The APE for direct affects for the Alternative is estimated to be 1776.83 feet long by 45 feet wide for the power line, and 0.34 acres for the potential substation. The area of indirect affects is expected to be 50 feet.

This alternative would unlikely impact prehistoric or historic cultural resources. All but 0.83 acres of the 4.5 acres associated with this alternative were investigated in 2015. The only sites identified within this alternative were the Helena Valley Irrigation Unit and the Western transmission lines.
The Helena Valley Irrigation Unit is determined NRHP ineligible. As such, modifications of this site do not constitute an adverse effect.

The distribution line would connect to the Western Area Power Administration Power line. The NRHP eligibility is undetermined, though recommended ineligible. The connection of a distribution line would not adversely affect this site if determined ineligible.

Since consultation with tribes has not occurred, it is unknown whether any affected tribe may attach religious and/or cultural significance to any historic properties that may be affected by the distribution line. Reclamation would consult with affected tribes to ascertain if such Traditional Cultural Properties are present and determine their NRHP eligibility. If present, Reclamation would work with the tribes and the MTSHPO to either avoid or mitigate adverse effects to sites or landscape.

AIR QUALITY AND GREENHOUSE GASES

Existing Conditions

The air quality in the Project area is generally good and is located in an air quality attainment area. The immediate East Helena Area, however, which is west of the Project area, is a non-attainment area for lead and sulfur dioxide (EPA, 2015 and MDEQ, 2015). Agricultural operations and construction activities

can be sources of dust pollution during wind events in the general region.

No Action Alternative

Under the No Action Alternative, no hydropower facilities or electrical distribution facilities would be constructed at Drop 4 and there would not be a change in air quality.

Preferred Alternative (Hydropower Plant and Electrical Distribution System)

There would be short-term dust impacts during excavation work and construction for the power poles and substation, although this is predicted to be minimal because dust abatement Best Management Practices would be followed during construction and operation of the hydropower facilities and associated electrical distribution facilities. Reclamation would require watering to minimize/control dust from cleared areas and along roadways, if necessary. There would be no long-term adverse impacts on air quality due to operation and maintenance of the hydropower facilities. As with other hydropower projects, there would be a beneficial offset of emissions of carbon dioxide (CO_2) and other greenhouse gases.

According to the U.S. Energy Information Administration (EIA), in 2012 "the average annual electricity consumption for a U.S. residential customer was 10,837 kWh." With an average annual energy generation of 13,000,000 kWh, the Sleeping Giant Hydropower Project would provide enough clean energy to power 1,652 homes each year. Table 14 has been modified to demonstrate the number of pounds of CO_2 that could be removed annually for the average U.S. household utilizing steam-electric generators in 2012 for the specific fuels identified (EIA, 2015). Reclamation estimates that Carbon Dioxide emissions would be reduced by an estimated 26,910,000 to 28,210,000 pounds per year based on the size of the Hydropower Project and the Energy Information Administration's reduction numbers.

Table 14. Sleeping Giant Hydropower Project Associated Carbon Reduction

Fuel Type: Coal	Pounds of CO_2 per Million Btu	Heat Rate (Btu per kWh)	Pounds of CO_2 per kWh	Pounds of CO_2 Removed When Using Clean Energy
Bituminous	205.300	10,089	2.07	26,910,000
Sub-bituminous	212.700	10,089	2.15	27,950,000
Lignite	215.400	10,089	2.17	28,210,000

Last updated: (EIA, 2015) March 30, 2015. http://www.eia.gov/tools/faqs/faq.cfm?id=74&t=11.

Alternative (Hydropower Plant and Electrical Distribution)

The potential air quality and greenhouse gas impacts associated with this alternative would be the same as described for the Preferred Alternative.

NOISE

Existing Conditions

There are no major noise sources or problems in the Project area. The primary sources of noise in the Project area include the noise from the HVID Pumping Plant, the noise of flowing water in Hauser Reservoir, and noise associated with vehicle traffic traveling across Canyon Ferry Dam.

No Action

Under the No Action Alternative, no hydropower facilities would be constructed at the HVID Pumping Plant and there would not be a change in noise levels which would remain the same.

Preferred Alternative (Hydropower Plant and Electrical Distribution)

Under the Preferred Alternative, a hydropower facility would be installed at the HVID Pumping Plant. The existing Pumping Plant would be enclosed.

There would be minor noise impacts during for the installation of the generators and construction of the power poles and substation as well as from construction traffic. During operation, the turbines and generators would produce machinery noise, representing a new potential noise source. Such equipment would be fully enclosed, however, and located a considerable distance from any dwellings and should therefore have no discernible impact.

Alternative (Hydro Plant and Electrical Distribution System)

The potential noise impacts associated with this alternative would be the same as described for the Preferred Alternative.

EMF AND SAFETY

Existing Conditions

One safety issue that needs to be addressed is transportation. Under the existing conditions there is existing access to the HVID Pumping Plant via Eagle Bay Drive. For the substation located on the east side of the river, there is access via the Riverside Road. For the substation located on the west side of the river, there is access via Eagle Bay Drive and a service road maintained by HVID to maintain the irrigation tunnel.

The other potential safety issue deals with potential electric and magnetic fields associated with generation and distribution of electricity from the Hydropower Project. Several years ago concern was raised about the possible health effects of electric and magnetic fields (EMF) from appliances, home wiring, and power lines. Many studies on this subject have been done throughout the world with conflicting results that are often difficult to interpret and sometimes confusing.

The results from studies on general health, cancer, leukemia, reproduction, and physiology in humans do not establish the clear existence of any adverse health effects and do not support a change in current public health practices regarding transmission and distribution lines. EMF research studies are generally divided between laboratory and epidemiological studies. Laboratory studies primarily involve exposing tissue, cells, and animals to either magnetic or electric fields under controlled conditions. In epidemiological studies, researchers try to establish a statistical association between selected human populations with EMF exposure and certain types of diseases. The evidence at this time is insufficient to conclude that exposure to EMF poses an imminent health risk.

Under the existing conditions, there are two potential sources of EMF presently in the Project area. These include Western's 100 kV transmission line and Reclamation's electrical switchyard on Canyon Ferry Dam.

No Action

Under the No Action Alternative, no hydropower facilities would be constructed at the HVID Pumping Plant and there would not be a change in EMF and safety which would remain the same.

Preferred Alternative (Hydropower Plant and Electrical Distribution System)

Under the Preferred Alternative, the Hydropower Plant, distribution line, and substation would be constructed in accordance with the requirements of the National Electrical Safety Code (NESC) and

good design and construction practices of the electric utility industry. The NESC specifies the required vertical clearance from ground and vertical and horizontal clearance from buildings and other structures for overhead and underground electric lines. These clearances were developed to provide a safe distance of energized facilities from humans. Therefore, the Preferred Alternative would not represent any negative human health effects on humans in the Project area associated with potential EMF.

From a transportation standpoint, the two existing access roads in the Project area to the HVID Pumping Plant and substation are adequate to handle construction equipment and operations vehicles. Therefore, there would be no adverse safety effect on transportation in the Project area.

Alternative (Hydropower Plant and Electrical Distribution System)

Under this alternative, the potential EMF effects would be similar to those for the Preferred Alternative.

From a transportation standpoint, the existing access road in the Project area to the HVID Pumping Plant is adequate to handle construction equipment and operations vehicles. However, the existing maintenance road to the substation would need to be improved to enhance the safety of providing access for the construction equipment. This would represent a minor adverse effect.

SOILS

Existing Conditions

Based on the Custom Soil Resource Report for the Project Area (NRCS, 2015), there are three soil units in the project area (Table 15). These soils are primarily channery loams and extremely channery loams and unweathered bedrock. Slopes range from 8 to 60 percent. These soils are well drained and have a moderately high to high runoff potential. None of the soils are identified as prime farmlands.

Table 15. Soil Units in the Project Area.

Map Unit Name	Slope	Preferred Alternative	Alternative
Holter-Castner channery loams	8 to 45 percent	No	Yes
Hauz-Sieben-Tolman channery loams	8 to 45 percent	Yes	No
Castner-Holter-Rock outcrop complex	15 to 60 percent	Yes	Yes

Preferred Alternative (Hydropower Plant and Electrical Distribution System)

Under the Preferred Alternative approximately 0.375 acres would be temporarily disturbed by the construction activities associated with trenching the underground powerline; installation of power poles and building the substation. Construction would create an intermixing of soils and a slight increase in the potential for water and wind erosion in the construction areas. Any increase in erosion should be minimal, short in duration and restricted to the construction phase of the projects. To mitigate erosion potential, the amount of land disturbance would be minimized where possible. Erosion and surface run-off would be controlled by using Best Management Practices (BMP's) such as straw wattles. The disturbed areas would be reseeded to further reduce the erosion potential. Long-term disturbance to soils would be approximately 0.344 acres and is primarily associated with the area of the substation location. Therefore, there would be minor impacts to soils for the Preferred Alternative.

Alternative (Hydropower Plant and Electrical Distribution System)

The impacts for the Alternative would be similar to those described for the Preferred Alternative except that area of disturbance would be slightly smaller (0.34 acres). However, the power line from the Hydropower Plant to the substation would have to be located in an area with steep slopes which could increase the potential for additional short-term erosion during construction activities. The BMP's previously described would help mitigate the potential. Therefore, there would be minor impacts to soils

for the Alternative.

VISUAL RESOURCES

Existing Conditions

Canyon Ferry Reservoir appears remote and, for the most part, undeveloped with great scenic views. As visitors approach Canyon Ferry Reservoir from Helena on Canyon Ferry Road they descend to the shoreline roads from the north into Yacht Basin; they are greeted by Ponderosa Pine-studded hills. The hills vary in their height and shape. The reservoir stretches serenely from the foreground to the distant background offering the visitor an exciting and scenic viewshed.

As the viewer proceeds north on Canyon Ferry Road, the view of the dam becomes apparent and represents a physical interruption to the character of the area. However from the dam itself, the views to the east, south, and west are fairly unobtrusive because development is masked by topography and vegetation.

As the viewer looks north and northwest from the dam toward the Project area located below, the viewshed is dominated by the Missouri River and steep terrain on both sides of the river with ponderosa pines. There is limited development in the study area but the visual quality is interrupted by the presence of buildings and the Riverside Campground on the east bank; the Western 100 kV transmission line over the Missouri River and transmission poles on both sides of the river and houses further down river along Eagle Bay Drive on the west bank. The HVID Pumping Plant itself blends into the existing landscape of the Canyon Ferry Dam while the existing irrigation tunnel is an apparent visual feature in the overall viewshed down river from the dam.

No Action

Under the No Action Alternative, no hydropower facilities would be constructed at the HVID Pumping Plant and there would not be a change in the visual quality of the Project area.

Preferred Alternative (Hydropower Plant and Electrical Distribution)

Under the Preferred Alternative, a hydropower plant would be installed at the HVID Pumping Plant and an underground power line would extend from the hydropower facility along the service road about 900 feet, then an overhead power line would cross the river to a substation located on the east side of the Missouri River just north of the existing Reclamation Paint shop. In addition, the existing Pumping Plant would be enclosed.

The visual impacts associated with the addition of these features into the existing visual landscape would be partially mitigated because of the Project design. The Pumping Plant would be painted with color that would be consistent with the dam to blend into the landscape. The substation would be painted a beige or neutral color to blend into the existing landscape. In addition, the two steel poles used to support the overhead line across the river would be weathered steel poles, which turn reddish brown over time. In addition, the substation would be located near the existing Bureau Paint Building, which already represents a visual intrusion into the landscape. The addition of the power line across the Missouri river would definitely represent a new feature in the visual landscape. The visual effects of the power line would be similar to the existing effects associated with the existing 100 kV Western transmission line, which crosses the river.

The potential area of visibility associated with the Preferred Alternative would be limited by the terrain in the area. The substation would be visible from the Dam area and Riverside Campground but not by many of the homes along Eagle Bay Road. The potential area of visibility based on field observations would be limited to approximately 60 acres.

In summary, the addition of the Project features associated with the Preferred Alternative would add structures into the existing visual landscape. The impacts to the visual landscape would be partially mitigated by the design changes described. Therefore, the Preferred Alternative would represent a minor to moderate impact on visual resources in the Project area.

Alternative (Hydropower Plant and Electrical Distribution System)

Under this alternative, the overhead power line from the hydro power plant would parallel the river for a distance, and then proceed northwest to a substation located near the Western 100 kV line. In addition, the existing Pumping Plant would be enclosed.

The visual impacts associated with the addition of these features into the existing visual landscape would be partially mitigated because of the Project design. The Pumping Plant would be painted with color that would be consistent with the dam to blend into the landscape. The substation would be painted beige or neutral color to blend into the existing landscape as much as possible but it would be located on top of a hill which would be visible from a great distance. The addition of the overhead power line along the river and northwest up the hill to a substation on top of the hill would also represent a new feature in the visual landscape.

The potential area of visibility impact associated with the Alternative would be large. The potential area of visibility based on field observations would be approximately 200 acres.

In summary, the addition of the Project features would add structures into the existing visual landscape. The impacts to the visual landscape would be partially mitigated by the design changes described. Therefore, the alternative would represent a major impact on visual resources in the Project area.

CUMULATIVE IMPACTS

Cumulative impacts are impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. There is one potential foreseeable future action that has been identified and is discussed in the following section.

The operation of the facility proposed is described in the “Operations” section of this Environmental Assessment and involves using releases that would have been made through the River Outlet or Spillway to generate electricity, also known as the “Base Case”. Future operations have been contemplated by the Project team which would increase electrical generation at the Project.

The opportunity for increased generation stems from the fact that, even if the reservoir is not so high as to need to be spilled, the turbines driving the pumps typically operate at partial wicket gate settings, 30% to 40% gate for example. This can result in low (below 50%) turbine efficiencies. Simultaneously, the Canyon Ferry turbines may be operating at capacities in excess of (to the right of) their best efficiency points. Overall generation of the Canyon Ferry Hydroelectric Plant and the HVID Pumping Plant would be increased by running all of the turbines at roughly the same point on the efficiency curve. The HVID turbines would not only generate efficiently, but also pump more efficiently at more efficient wicket gate settings. Less water would thus be required for pumping. The Canyon Ferry turbines would operate nearer their best efficiency point.

This plan for future operations would not change the timing or quantity of releases at Canyon Ferry. Flows that historically were released through the Canyon Ferry Turbines would be redirected through the HVID turbines. This reallocation of releases would allow both turbines to operate more efficiently, thus producing more electricity with the same amount of water.

Preliminary estimates indicate that without efficiency improvements to the HVID turbines, total generation (at Canyon Ferry and HVID combined) could be increased by approximately 1% annually on average (3,500 MWh). This arrangement would require a mutually agreed to metering agreement between Reclamation, HVID, and possibly Western. The metering would be arranged such that power which would have been generated by the Canyon Ferry Turbines would continue to be credited to Reclamation. This proposed future operation would not decrease the federal power production of the facility.

Overall, the construction of the hydropower plant, along with the future potential change in operations would not result in substantial cumulative impacts.

SUMMARY AND ENVIRONMENTAL COMMITMENTS

The primary purpose of the Preferred Alternative would be to develop a renewable energy resource. There would be some short-term environmental impacts associated with construction and the long-term environmental impacts identified are minimal to non-existent.

There would be short-term economic benefits due to construction expenditures and employment. The Project would produce 13,000,000 kWh annually which would reduce overall carbon emissions, and would provide a long-term economic benefit for the Project Sponsors.

Mitigation Measures and Environmental Commitments

The following measures would be implemented and followed by the Project Sponsors and their contractors. The LOPP requires that these commitments be followed and met. An environmental commitment plan would be prepared to document how environmental commitments and mitigation measures would be implemented during design, construction, and operation of the Project.

- The construction and operation of the Hydropower Project is required to be operated in a manner that does not interfere with the irrigation supplies or maintenance of the HVID Pumping Plant.
- Existing access roads would be used to access the construction areas. No new access roads would be constructed.
- Erosion-control Best Management Practices for drainage and sediment control be implemented to prevent or reduce nonpoint source pollution during and following construction.
- All construction equipment shall be power-washed and free of soil and debris prior to entering the construction site to reduce the spread of noxious and unwanted weeds.
- Topsoil, where available, would be stockpiled during construction for later use in re-vegetation.
- Disturbed areas would be contoured to reduce erosion and facilitate re-vegetation. Disturbed areas would be re-seeded with a Reclamation approved seed mixture. The plan for re-vegetation and related erosion control/re-contouring and implementation would require approval by Reclamation.
- Dust abatement Best Management Practices would be undertaken in all areas disturbed during construction.
- Fuel storage, equipment maintenance, and fueling procedures would be developed to minimize the risk of spills and the impacts from these incidents. A Spill Prevention Control and Countermeasure Plan (SPCC) would be prepared prior to construction.
- In the event of discovery of threatened or endangered species, the Project sponsor would immediately cease all ground-disturbing activities in the vicinity and notify Reclamation. Work would not be resumed until approved by Reclamation.
- All new power lines and power poles would follow the recommended standards as outlined in the *Avian Protection Plan Guidelines* developed by the US Fish and Wildlife Service and Industry (Edison Electric Institute 2012). A copy these standards can be viewed at:

http://www.aplic.org/uploads/files/2634/APPguidelines_final-draft_Aprl2005.pdf.

- In the event of discovery of evidence of possible cultural or paleontological resources, the Project sponsors would immediately cease all ground-disturbing activities in the vicinity and notify Reclamation. Work would not be resumed until approved by Reclamation.
- During final Project design, the LOPP applicant would ensure the substation would be sited outside the site boundaries of the Canyon Ferry Dam.
- If any additional areas of impact (for example: access roads, borrow pits, or waste areas) are identified during the course of the undertaking, they would be inventoried for cultural resources and consulted on with the SHPO and Tribal Governments. No construction work would occur at or near the additional impact area until this consultation is completed.
- Substation would be non-reflective and painted to blend with the Project area background.
- Fishing in the river would be allowed during construction activities; unless certain temporary area closures are necessary for public safety.
- Irrigation supplies and canal maintenance access would be maintained during construction at all times.
- Disturbance to nearby shrubs and other ground cover would be kept to a minimum, with disturbance occurring only in those areas which are absolutely necessary for Project construction.

CHAPTER 4 – CONSULTATION & COORDINATION

GENERAL

At the initiation of the project, Reclamation sent a letter introducing the project to a several public officials and interest groups. A copy of the letter and interested parties list can be found in Appendix B.

In addition, Reclamation will consult with the Montana State Historic Preservation Officer and Tribal Governments under Section 106 of the National Historic Preservation Act. Results of these consultations will be incorporated into the project analysis and discussions in Chapter 3.

Availability of the draft Environmental Assessment (EA) would be announced through a press release and through a distribution letter sent to interested agencies and parties. A draft EA would be distributed for agency review and comment.

A public meeting will be held in Helena during the public review period. The public meeting would be used to provide an opportunity for the public to identify issues and concerns with the proposed project.

DISTRIBUTION LIST

The draft EA was also announced in a distribution letter to an updated mailing list as shown in Appendix B.

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APPENDIX A – PRELIMINARY LEASE OF POWER PRIVILEGE

United States Department of the Interior

BUREAU OF RECLAMATION
Great Plains Regional Office
P.O. Box 36900
Billings, MT 59107-6900

AUG 24 2015

IN REPLY REFER TO:
GP-4100
WTR-4.00

CERTIFIED – RETURN RECEIPT REQUESTED

Helena Valley Irrigation District
Attn: Jim Foster, District Manager
3840 N. Montana Avenue
Helena, MT 59602

Subject: Transmittal of Fully Executed Preliminary Lease Agreement No. 15AG670045 (Agreement), Helena Valley Unit Project, Pick-Sloan Missouri Basin Program, Montana

Dear Mr. Foster:

Enclosed is the fully executed duplicate original of the Agreement between the United States and Helena Valley Irrigation District for the further development of the base case presented in the application for development of an 8 megawatt hydroelectric facility at the Helena Valley Pumping Plant.

If you have any questions, please contact Skyler Cozzens at 406-247-7731 or scozzens@usbr.gov.

Sincerely,

L. Ann Petersen
Supervisory Repayment Specialist

Enclosure

DUPLICATE ORIGINAL

Agreement No. 15AG670045

PRELIMINARY LEASE AND FUNDING AGREEMENT
BETWEEN THE
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
GREAT PLAINS REGION
and
HELENA VALLEY IRRIGATION DISTRICT

This Preliminary Lease and Funding Agreement (Agreement) made this 20TH day of August, 20 15, pursuant to the Act of June 17, 1902 (32 Stat. 388), and acts amendatory thereof and supplementary thereto, particularly the Townsites and Power Development Act of April 16, 1906 (43 U.S.C § 522), Section 9c of the Reclamation Project Act of 1939 (43 U.S.C. § 485h(c)), the Bureau of Reclamation Small Conduit Hydropower Development and Rural Jobs of 2013 Act of August 9, 2013 (127 Stat. 498), the Sundry Civil Expenses Appropriations Act for 1922 (43 U.S.C. § 395); Reclamation Act of 1902 (Act of June 17, 1902; 32 Stat. 388), as amended and supplemented; Reclamation Extension Act (Act of August 13, 1914; 38 Stat. 686), Fact Finders Act of 1924, Subsection N (Act of December 5, 1924; 43 Stat. 704), The Omnibus Adjustment Act (Act of May 25, 1926; 44 Stat. 636), and Reclamation Project Act of 1939 (Act of August 4, 1939; 53 Stat. 1187) is between the U.S. Department of the Interior, Bureau of Reclamation (Reclamation), and Helena Valley Irrigation District (hereinafter referred to as "HVID"). The United States and HVID hereinafter are each sometimes individually called "Party," and sometimes collectively called the "Parties." The purpose of this Agreement is to recognize that HVID has priority for a Lease of Power Privilege (LOPP), and define the cost reimbursability, roles and responsibilities of Reclamation and HVID for completion of activities necessary to implement the LOPP.

EXPLANATORY RECITALS

The following statements are made in explanation:

a. WHEREAS, the United States has constructed the Helena Valley Unit of the Pick-Sloan Missouri Basin Program, Montana, pursuant to the Act of December 22, 1944 (58 Stat. 887), as set forth in House Document 475 and Senate Document 191, as revised and coordinated by Senate Document 247, 78th Congress, Second Session, for the use of the waters of the Missouri River from storage in Canyon Ferry Reservoir for irrigation, and municipal and industrial water supply; and

b. WHEREAS, Reclamation has the authority to issue a LOPP pursuant to the Townsites and Power Development Act of April 16, 1906 (43 U.S.C § 522), and Section 9c of the Reclamation Project Act of 1939 (43 U.S.C. § 485h(c)); and

c. WHEREAS, the United States in the years 1957 through 1959 constructed the Helena Valley Pumping Plant, a Project feature, and its appurtenant facilities; and

d. WHEREAS, the HVID is responsible for the operation, maintenance, and replacement of the Helena Valley Pumping Plant and appurtenant facilities under Agreement No. 04XX670132; and

e. WHEREAS, the United States and the HVID are joint owners of Water Right No. 40I 40820-00 for irrigation, and Water Right No. 40I 40819-00 for power generation; and

f. WHEREAS, the Bureau of Reclamation Small Conduit Hydropower Development and Rural Jobs of 2013 Act of August 9, 2013 (127 Stat. 498) provided preference to Irrigation Districts on small conduit hydropower development; and

g. WHEREAS, on September 13, 2013, the HVID formally requested to initiate Reclamation's LOPP process for the Helena Valley Pumping Plant; and

h. WHEREAS, on October 11, 2013, the Federal Energy Regulatory Commission determined that jurisdiction over power development at the Helena Valley Pumping Plant resided with Reclamation in accordance with the original authorization of the Helena Valley Unit under the Flood Control Act of 1944; and

i. WHEREAS, on September 29, 2014, the HVID submitted an application for development of an 8 Megawatt hydroelectric facility at the Helena Valley Pumping Plant; and

j. WHEREAS, the proposal was reviewed by Reclamation staff and was determined to be acceptable and issuance of a Preliminary Lease may proceed; and

k. WHEREAS, this Preliminary Lease is only granted for further development of the "base case" presented within the application, as modified below; and

l. WHEREAS, Reclamation has the authority for the acceptance of non-federal funds through the following authorities: The Sundry Civil Expenses Appropriations Act for 1922 (43 U.S.C. § 395); Reclamation Act of 1902 (Act of June 17, 1902; 32 Stat. 388), as amended and supplemented; Reclamation Extension Act (Act of August 13, 1914; 38 Stat. 686), Fact Finders Act of 1924, Subsection N (Act of December 5, 1924; 43 Stat. 704), The Omnibus Adjustment Act (Act of May 25, 1926; 44 Stat. 636), and Reclamation Project Act of 1939 (Act of August 4, 1939; 53 Stat. 1187); and

m. WHEREAS, the electricity generated by the hydropower plant located on Helena Valley Pumping Plant will provide a clean, renewable energy source; and

n. WHEREAS, Reclamation shall follow previously established processes, timelines and guidelines as outlined within Directive and Standard FAC 04-08; and

o. WHEREAS, in accordance with the Anti-Deficiency Act (31 U.S.C. 1341 et seq.) funds must be provided to Reclamation in advance of activities performed by Reclamation personnel.

NOW, THEREFORE, in consideration of the mutual and dependent covenants herein contained, it is hereby mutually agreed as follows:

I. BACKGROUND AND OBJECTIVES

The Helena Valley Pumping Plant was completed in 1959 as part of Reclamation's Pick-Sloan Missouri River Basin Program, Helena Valley Unit, which was authorized by the Flood Control Acts of 1944 and 1946 (58 Stat. 887 and 60 Stat. 641). Helena Valley Pumping Plant is located in Lewis and Clark County, Montana, approximately 15 miles east of Helena, MT. The Helena Valley Pumping Plant is owned by the United States, while HVID provides operation, maintenance, and replacement through formal agreement with Reclamation.

The proposed project would use Reclamation's existing Helena Valley Pumping Plant penstock, hydraulic turbine driven pumping units, and discharge pipe, and would include installation of two new electrical generators and other related equipment, a new enclosure and appurtenant power transmission equipment and facilities. The new facility would have a total installed capacity of 8 megawatts (MW) though actual capacity would vary with irrigation requirements. The proposed project would be operated in a run-of-release mode, using the sum of (i) the maximum water available to the HVID from Canyon Ferry to pump water to the Helena Valley Reservoir (subject to terms and limitations under the HVID water right for power generation (41I 40819 00)), and (ii) any water that would otherwise be released at the Canyon Ferry Reservoir spillway or though the river outlet gates, to the extent possible and practicable, as determined by Reclamation.

This Agreement will, at a minimum, define the various responsibilities of each of the Parties, provide for the necessary coordination and access to the facilities, and establish a reimbursable account to which HVID would advance funds to cover Reclamation's cost for work activities completed in support of the LOPP.

II. PURPOSE, NEED AND COORDINATION

As the Preliminary Lease activities move forward, mutual coordination of information and design data shall be required of both Parties. As such, those tasks completed by Reclamation in support of HVID's pursuit of hydroelectric development at Helena Valley Pumping Plant need to be delineated and accounted for.

Reclamation and HVID recognize the need to develop mutual contact points for efficient and timely coordination and information flow. The Parties also recognize that information pertaining to Helena Valley Pumping Plant is considered sensitive and must be appropriately safeguarded. All information pertaining to Helena Valley Pumping Plant provided to HVID shall be for HVID's use only, and HVID shall not distribute any such information to other entities without prior written consent and approval by Reclamation. Reclamation reserves the right to refuse to release information to HVID for any lawful reason.

III. ACTIVITIES COVERED AND REIMBURSABLE COSTS

A. Reclamation Activities: HVID shall fund Reclamation for all costs incurred as a result of Reclamation's participation in activities associated with this Agreement. Reclamation's reimbursable activities and associated costs shall include, but not be limited to, the following activities:

1. Provide arrangements and coordination activities for access to the Federal facility or reservation to conduct studies, investigations, and pre-construction activities.
2. Provide project management and coordination activities associated with Reclamation's involvement with the proposed project.
3. Be the lead agency for ensuring compliance with the National Environmental Policy Act (NEPA), Endangered Species Act (ESA) and National Historic Preservation Act (NHPA);
4. Review HVID plans, reports, designs and studies necessary to ensure the following:
    a. Completion of NEPA, NHPA, ESA and other statutory requirements.
    b. Ensuring that the efficiency of Reclamation generated power or water deliveries will not be impaired.
    c. Ensuring public safety and the continued safe operation and structural integrity of Reclamation facilities is maintained.
5. Conduct site visits and attend meetings as necessary and appropriate with HVID and other agencies and groups regarding the development of the proposed project.
6. Provide information to HVID including copies of reports, drawings, technical data, operational data, geological data, and other data as requested.
7. Draft the final LOPP for the proposed project to establish conditions for construction and operation, maintenance, and replacement of the hydroelectric facility in order to assure that the operations, safety, integrity, and environment of the Federal facility are protected.
8. Request advancement of funds from HVID with estimates for each proposed activity to be undertaken with the understanding that unexpended or unobligated funds previously advanced shall be returned to HVID should they be determined unnecessary.
9. Provide an accounting of expenses and an estimate of future expenses when requesting additional funds from HVID.
10. Establish a specific account (Federal Account) and receive funds advanced by HVID.
11. Advise HVID in writing if additional funds in excess of the initial advance and/or the cost estimate are needed. Reclamation will also advise HVID of any anticipated significant expenses that may be required beyond the initial estimate. Such notification will be made in advance of such expenditures.
12. Perform any other activity or activities, as mutually agreed upon by HVID and Reclamation.

B. HVID Activities:

1. Develop a mutually agreeable schedule of activities anticipated to be completed under this Agreement.
2. Complete and transmit to Reclamation for review any associated draft plans, reports, designs and studies necessary for the following:
    a. Ensuring that the efficiency of Reclamation generated power or water operations will not be impaired.
    b. Ensuring public safety and the continued safe operation and structural integrity of the Reclamation facilities is maintained.
3. Assist Reclamation, as requested, with completion of activities required to comply with NEPA, NHPA, ESA and other statutory requirements.
4. Assist Reclamation in arranging public involvement, including meeting places and notices to the public.
5. Pay costs pursuant to Section III.A. and V, herein.

IV. TERM OF AGREEMENT

A. This Agreement shall terminate upon the earliest occurrence of any of the following: (i) the date of execution of the LOPP; (ii) fifteen (15) months from the date of issuance of this Agreement unless otherwise extended by Reclamation; or (iii) upon mutual agreement of the Parties.

B. This Agreement may be extended or modified only in a writing signed by each Party.

V. ADVANCEMENT OF NON-FEDERAL FUNDS/PAYMENT FOR SERVICES

In accordance with Anti-Deficiency Act (31 U.S.C. § 1341 et seq.), funds must be provided to Reclamation in advance of activities performed by Reclamation personnel. HVID shall advance funds in the amount of $50,000 to Reclamation to accommodate Reclamation's expenditures for the work defined in Section III upon signing of this Agreement. A minimum balance of $10,000 will be maintained in this Federal Account to ensure a positive account balance. Unless Reclamation and HVID agree to otherwise, whenever the balance falls below the minimum, Reclamation shall notify the HVID, who shall promptly submit an additional advance which will be estimated at that time.

In the event that funds advanced to Reclamation are not required to complete the planned work, such unused funds shall be returned by Reclamation without interest, within 60 days of completion of the work defined in Section III, unless otherwise agreed upon. In the event the authorized representatives agree on additional work consistent with the commitment of this Agreement, such excess funds may be retained by Reclamation for additional work as approved by HVID.

In the event that Reclamation is contractually obligated to a subcontractor to perform a duty within this Agreement, early termination settlement cost may be owed to the subcontractor in addition to Reclamation expenditures. Such an early termination settlement may also extend the 60 days Reclamation has to return any unused funds, which may be used to pay such early termination settlement costs.

There will be no Federal funding associated with the work covered by this Agreement.

VI. INDEMNITY

HVID agrees to indemnify Reclamation for, and hold Reclamation and all of its representatives harmless from, all damages resulting from suits, actions, or claims of any character brought on account of any injury to any person or property arising out of any act, omission, neglect, or misconduct in the manner or method of performing any activities relating to this Agreement.

VII. REPORTING

Reclamation will provide monthly reports to HVID summarizing expenditures charged against funds advanced and to-date expenditures. HVID will be entitled to challenge any expenses that it deems to be excessive or unreasonable. If a challenge is asserted, Reclamation and HVID will promptly meet to resolve the concerns and agree on an appropriate adjustment, if any.

VIII. REQUIRED CLAUSES

During the performance of this Agreement, the Parties agree to abide by the terms of Executive Order 11246 on non-discrimination, and will not discriminate against any person because of race, color, religion, sex, national origin, age, or disability. The Parties will take affirmative action to ensure that applicants are employed without regard to their race, color, religion, sex, national origin, age, or disability.

No member or delegate to Congress, resident Commissioner, or official of HVID shall benefit from this Agreement, other than as a water user or landowner in the same manner as other water users or landowners.

IX. POINT OF CONTACT

The following representatives will be responsible for coordinating activities included under this Agreement:

Reclamation
Chris Gomer
Bureau of Reclamation
P.O. Box 36900

Billings, MT 59107-6900
(406) 247-7616
E-mail: cgomer@usbr.gov

Helena Valley Irrigation District
Mr. Jim Foster
District Manager
Helena Valley Irrigation District
3840 N. Montana Ave.
Helena, MT 59602
(406) 442-3292
E-mail: jimfoster@hvid-mt.com

In witness whereof, the Parties hereto have executed this Agreement on the last date and year written below;

UNITED STATES
BUREAU OF RECLAMATION

Michael J. Ryan
Great Plains Regional Director

8/20/15
Date

HELENA VALLEY IRRIGATION DISTRICT

Jim Foster
District Manager

3-11-15
Date

APPENDIX B – BUREAU OF RECLAMATION INTERESTED PARTIES LETTER AND LIST

United States Department of the Interior
BUREAU OF RECLAMATION
Great Plains Region
Montana Area Office
P.O. Box 30137
Billings, Montana 59107-0137

IN REPLY REFER TO:
ENV-1.10
MT-200

SEP 21 2015

Interested Parties (See Enclosed List)

Subject: Proposed Hydroelectric Project on the Helena Valley Pumping Plant

Dear Ladies and Gentlemen:

The Bureau of Reclamation (Reclamation) has received a proposal from the Helena Valley Irrigation District (District) requesting approval to develop a hydroelectric project (Project) at the existing Helena Valley Pumping Plant (Pumping Plant) located in Lewis and Clark County, Montana, immediately downstream of Canyon Ferry Dam (Figure 1). Under the proposed action, Reclamation would execute a Lease of Power Privilege (LOPP) license with the District.

The LOPP would authorize the use of Federal lands, facilities, and water to construct, operate, and maintain an 8.8 megawatt (MW) hydropower facility. Reclamation and Western Area Power Administration (Western) would also issue appropriate agreements to allow the construction, operation, and maintenance of the substation and overhead 12.5 kV three-phase distribution lines (up to 0.5 miles) to connect the proposed hydroelectric facility to the existing electrical grid.

The Project will be developed to include the following:

1) a retrofit of the Pumping Plant's existing mechanical water pumping equipment and the addition of new electrical generators and other related equipment;

2) enclosure of the existing structure or "building" above the Pumping Plant; and

3) overhead distribution lines and right-of-way corridors from the proposed hydroelectric facility to an interconnect with Western's existing transmission lines via a new 100 to 12.5 kilovolt ("kV") substation.

The substation is proposed to be constructed on Federal property adjacent to the Missouri River downstream of Canyon Ferry Dam (Figure 1) or an alternate location on Federal land overlooking the Missouri River (Figure 2). A purchase power agreement has been executed to sell the power to NorthWestern Energy located nearby. Electric generation will use existing water flow patterns currently required to operate the Pumping Plant for irrigation purposes; as well as a portion of seasonal runoff water that would have flowed through the Canyon Ferry Dam river outlet gates and/or spillway when available (water in excess of the capacity of the Canyon Ferry Powerplant).

Reclamation is the lead Federal agency with Western being a cooperating agency. The Environmental Assessment (EA) is being prepared by a private contractor in accordance with the National Environmental Policy Act, the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500-1508), and the U.S. Department of the Interior's regulations (43 CFR Part 46). The EA evaluates the environmental effects of issuing the LOPP for construction and operation of the Project and evaluates other alternatives as well.

Figure 1. Hydro Plant, Distribution Line and Substation Preferred Alternative Figure 2. Hydro Plant, Distribution Line and Substation Alternative

This letter is being sent to you for your information at this time. It is anticipated that the Environmental Assessment (EA) would be completed in October and made available for public review at that time. If you have any questions or preliminary comments please don't hesitate to contact Mr. Justin Kucera at 406-247-7330.

Sincerely,

Jeff Baumberger
Manager, Resource Management Division

Enclosure-(See Enclosed List)

cc: Bob McDonald Sr.
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