EXHIBIT E: ENVIRONMENTAL REPORT

1. General Description of the Locale

Baker County, like most of northeast Oregon, is dominated by mountains. The Blue, Elkhorn, Lookout, Malheur, and Wallowa Mountain ranges rim or cross the county, and contain nearly half of Oregon's peaks above 7,000 feet. From highs of 10,000 feet, the county plummets down sheer rock walls into Hells Canyon, to the lowest elevation in the county of 1,600 feet. Between these geographic features lay productive but arid valleys. Four significant eastern Oregon streams rise in these mountains: the John Day River, the Grande Ronde, the Powder River and Burnt River. The Burnt River and the Powder River are the major drainages of the county.

The project area is located in the southeastern portion of the Blue Mountains Physiographic province (Franklin & Dyrness, 1988) near the southern end of the Elkhorn Range. Elevation in the project area ranges from 3,800 to 4,200 feet. Aspect is generally north, with slopes varying from 5% to more than 25%. Vertical rock walls and large rock outcrops are present in the vicinity of the dam.

The Phillips Reservoir area lies at the lower end of Sumpter Valley, a typical eastern Oregon "hanging valley" or basin draining into a rocky gorge. At the head of this gorge is Mason Dam. The land profile in the reservoir area is quite steep at the dam, with slopes to 100 percent. To the west, or head end of the reservoir, the surrounding land is nearly flat, except for mounds of dredge tailings. The north and south sides of the reservoir area are bench lands with gentle slopes frequently cut by small steep side drainages.

Wetland mapping was performed as part of the comprehensive vegetation surveys conducted by Baker County in 2007 and 2008 (EcoWest Consulting, 2009b). Herbaceous wetlands occur in three small patches (totaling 0.07 acres) within the Powder River riparian zone downstream of the dam. Riparian wetlands also occur along the extent of a small unnamed stream east of Black Mountain Road Additional details regarding wetland resources in the project area are provided in Section 3 below.

A variety of vegetation cover types occur in the Mason Dam project area. The powerhouse area consists mainly of bare disturbed ground. A narrow riparian zone on the banks of the Powder River begins at the downstream end of the Mason Dam stilling basin and continues for miles downstream. The route of the proposed transmission line and much of the land bordering Phillips Reservoir is dominated by dry coniferous forest, mainly Ponderosa pine. Additional details regarding vegetation resources in the project area are provided in Section 3 below.

The climate of the Project area is typical of the semiarid western intermountain area. It is characterized by warm sunny days and cool nights with light and variable precipitation through the summer months. Winter weather is erratic and occasionally severe. Average temperatures in

the Mason Dam area range from a high of about 82˚F in August to low of about 13˚F in January. The average annual precipitation in the project area is about 17 inches and the average annual snowfall is 38 inches (Table 10).

TABLE 10: AVERAGE TEMPERATURE AND PRECIPITATION DATA

WEATHER PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
Average Max. Temperature (F)	34.0	40.6	48.1	56.4	65.1	73.1	81.9	81.8	72.4	60.3	43.4	33.7	57.6
Average Min. Temperature (F)	12.8	15.8	22.6	28.7	35.2	40.6	44.3	44.3	37.4	29.9	23.9	14.8	29.2
Average Total Precipitation (in.)	1.92	1.36	1.54	1.25	1.79	1.73	0.86	0.89	0.82	0.95	1.85	1.98	16.94
Average Total Snowfall (in.)	11.4	5.6	2.6	0.2	0.1	0.0	0.0	0.0	0.0	0.0	5.1	13.1	38.1
Average Snow Depth (in.)	5	3	1	0	0	0	0	0	0	0	0	2	1

Source: Center, 2005

Mason Dam and Phillips Reservoir were constructed to supply water for irrigation downstream and for flood control. There is no history of past major flood events. Reclamation reserves 17,000 acre-feet in Phillips Reservoir for flood control. Because of this, major flood events are unlikely in the project vicinity. Minor seasonal flooding typically occurs within the narrow floodplain that flanks the Powder River.

Wallowa-Whitman National Forest owns most of the land surrounding the dam and reservoir and all project facilities are located on federal lands. The National Forest maintains a recreation area 1 mile below the dam but there are no other Forest Service developments within or near the project boundary. Idaho Power owns and maintains a 138 kV transmission line within a wide cleared corridor that runs along the south side of Phillips Reservoir about 1 mile south of the dam. Other smaller power lines owned by the local rural electric cooperative are also located in the area mostly north of Highway 7, which runs on the north side of Phillips Reservoir. Except for these features, the area around the project is mostly undeveloped and is used mainly for fish and wildlife habitat and dispersed recreation activities. Additional details regarding land development in the project area are provided below in Section 8 & 9 of the Report on Aesthetics and Land Management.

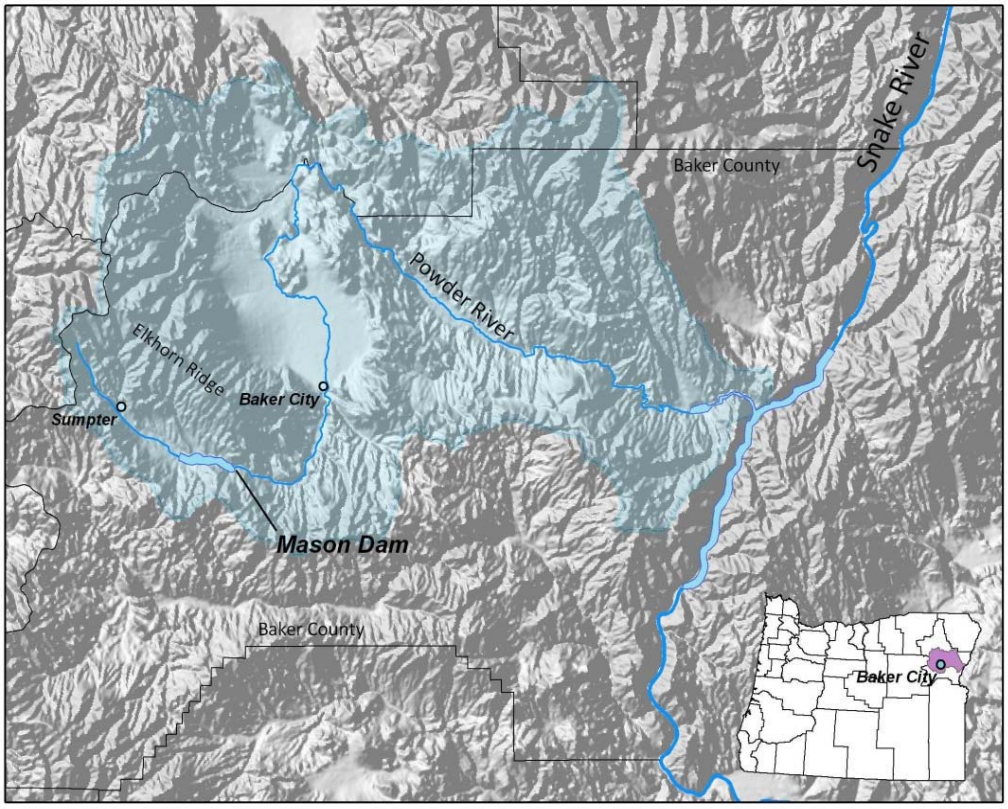
2. Report on Water Use and Quality

The Powder River is a tributary of the Snake River in northeastern Oregon. The Powder River watershed is bordered by the Blue Mountains to the west, the Wallowa Mountains to the northeast, the Malheur River basin to the south, and the Snake River canyon to the east (Figure 3). The river flows predominantly east, the headwaters start at an elevation of about 9,600 ft in the Elkhorn Mountains to about 2,000 ft at Brownlee Dam on the Snake River. The basin encompasses approximately 1,077 square miles, of which approximately 168 square miles occurs upstream of Mason Dam. Annual discharge from the basin averages 74,385 acre-feet.

Phillips Reservoir is located in the upper part of the basin behind Mason Dam at river mile 131 above the Powder River confluence with the Snake River. Phillips Reservoir and Mason Dam are Reclamation facilities used for flood control and irrigation storage. Phillips Reservoir is the largest reservoir in the Powder River basin, and the maximum water storage occurred in 1983 with 86,337 acre-feet stored.

The proposed Project is part of the Bureau of Reclamation's Baker Project and Phillips Reservoir and Mason Dam are owned by Reclamation. The Upper Division of the Baker Project, including all Mason Dam facilities, is operated by BVID through a formal agreement with Reclamation. BVID supplies water to approximately 19,000 acres of irrigated land along the Powder River. All Phillips Reservoir water rights are owned by Reclamation. Baker County would apply for a non-consumptive water right to utilize releases from Mason Dam for an additional beneficial use, power generation. This water right would be jointly held with Reclamation and would be junior to all existing water rights on the Powder River (Reclamation, 2009).

FIGURE 3. MAP SHOWING EXTENT OF POWDER RIVER WATERSHED



The irrigation season officially begins on March 1 and ends November 1, but in practice the season usually runs between April 15 and September 30. Primary irrigated crops are grain, alfalfa hay, pasture, and some grass seed. BVID has an agreement with the Oregon Department of Fish and Wildlife to release enough water to meet a 10 cfs minimum instream flow at Smith Dam, located roughly 10 miles below Mason Dam (RM 120.7).

2.1 Water Quantity

2.1.1 Existing Water Quantity

Releases from Phillips Reservoir are measured and recorded by the Bureau of Reclamation. Figure 3 shows average monthly flow releases from Phillips Reservoir based on Reclamation records for the period from 1968 to 2009. The flow pattern exhibited in Figure 3 is typical of western watersheds, with high spring and early summer runoff flows followed by a low base flow period beginning in late summer or fall. The effect of water storage and release at Phillips Reservoir is to lessen the magnitude of the runoff peaks and extend the period of time during which releases exceed the natural base flow.

2.1.2 Project Effects on Water Quantity

The proposed project would not alter water volumes currently used for irrigation or flood control purposes. The project would have no effect on the storage capacity of Phillips Reservoir or on

the amount and timing of water released from Phillips Reservoir into the Powder River. Water releases would continue to be guided by irrigation demands, flood control, and the 10 cfs minimum flow agreement. The hydroelectric project would simply generate power using existing water released for flood control, irrigation or in-stream flow as determined by water rights and other agreements currently in place, also known as "run of release."

2.1.3 Proposed Water Quantity Protection, Mitigation and Enhancement (PM&E) Measures

To assure that downstream water requirements would always be met during construction operations, an existing bypass pipe within Mason Dam would be used to route normal water flow past the construction area into the Powder River. The bypass pipe would be used during installation of the bypass valve on the main outlet conduit. To assure that downstream water requirements are always met during hydroelectric operations, the proposed project would contain measures to automatically initiate water bypass in the event of a turbine shutdown. The plant controls would include a synchronous bypass signal to initiate operation of the Reclamation high pressure slide gates simultaneously with turbine shutdown. A new HPU would be provided to increase the rate of the high pressure slide gates opening to more closely match the rate of flow lost when the turbine shuts down. The costs of the associated new HPU are included in the construction costs. Details of the project Bypass Plan are included in Appendix B.

2.2 Water Quality

The Powder River begins in the City of Sumpter at the convergence of McCully Fork and Cracker Creek. The Powder River continues east from Phillips Reservoir and turns north around Elkhorn Ridge, flowing towards Baker City. The uppermost site routinely monitored by Oregon Department of Environmental Quality and Reclamation is on the Powder River at Campbell Street in Baker City. There are no significant pollution point sources on the Powder River upstream of Baker City, so impacts to water quality at this monitoring site are due to non-point source pollution from logging, mining (dredge tailings), grazing, erosion, and field and urban runoff. Oregon Water Quality Index[1] scores for the Powder River at Campbell Street are good throughout the year, averaging 89 for summer, and 85 for fall-winter-spring (Oregon Department of Environmental Quality, 2009). To date, no Total Maximum Daily Load (TMDL) implementation plan has been developed for the Powder River.

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1 The Oregon Water Quality Index (OWQI) is a single number which expresses water quality by integrating measurements of eight carefully selected water quality parameters. OWQI values range from 10 (worst case) to 100 (ideal).

2.2.1 WATER QUALITY STANDARDS

Oregon water quality standards are based on designated beneficial uses and fish use designations. Table 11 shows the designated beneficial uses for the Powder River. The entire Powder River (including Phillips Reservoir) is designated for use by Redband and/or Lahontan Cutthroat Trout.

TABLE 11: DESIGNATED BENEFICIAL USES FOR THE POWDER RIVER BASIN

BENEFICIAL USES	**ALL BASIN WATERS**
Public Domestic Water Supply[1]	X
Private Domestic Water Supply[1]	X
Industrial Water Supply	X
Irrigation	X
Livestock Watering	X
Fish & Aquatic Life[2]	X
Wildlife & Hunting	X
Fishing	X
Boating	X
Water Contact Recreation	X
Aesthetic Quality	X
Hydro Power	
Commercial Navigation & Transportation	

[1] With adequate pretreatment (filtration & disinfection) and natural quality to meet drinking water standards.

[2] Designated for Redband Trout and/or Lahontan Cutthroat Trout

In general, hydroelectric facilities have no measurable effect on most water quality parameters including turbidity (except during construction), pH, nutrients, hydrocarbons and heavy metals. The primary hydropower related water quality impacts are with regard to dissolved oxygen (DO) and water temperature. Oregon Administrative Rule OAR-041-0028(4)(e) specifies the following water temperature standard for the Powder River in the project area:

Beneficial Use: Lahontan cutthroat trout or redband trout

Applicable Year round criteria: 20.0 °C, 7-day average maximum

Oregon Administrative Rule 340-041-0260 provides no specific information regarding the DO standard for the Powder River basin; rather, the rule states that water quality in the Powder River basin must be managed to protect designated beneficial uses and designated fish uses. The

complete Oregon DO standard is given in Figure 7. According to the Oregon Department of Environmental Quality (ODEQ), the waters of Phillips Reservoir and the Powder River 1 mile downstream of the reservoir are designated as "Cold Water" for purposes of applying DO standards. Thus, the DO standard for project waters may be summarized as follows:

Thirty day mean minimum: 8.0 mg/L or 90% saturation

Seven-day mean minimum: 6.5 mg/L

Absolute minimum: 6.0 mg/L

FIGURE 4: DISSOLVED OXYGEN CRITERIA

Class	Concentration and Period[1] (All Units are mg/L)				Use/Level of Protection
	30-D	7- D	7- Mi	Min	
Salmonid Spawning		11.0[2-3]		9.0[3]	Principal use of salmonid spawning and incubation of embryos until emergence from the gravels. Low risk of impairment to cold-water aquatic life, other native fish and invertebrates.
				8.0[4]	
Cold Water	8.0[5]		6.5	6.0	Principally cold-water aquatic life. Salmon, trout, cold-water invertebrates, and other native cold-water species exist throughout all or most of the year. Juvenile anadromous salmonids may rear throughout the year. No measurable risk level for these communities.
Cool Water	6.5		5.0	4.0	Mixed native cool-water aquatic life, such as sculpins, smelt, and lampreys. Waterbodies includes estuaries. Salmonids and other cold-water biota may be present during part or all of the year but do not form a dominant component of the community structure. No measurable risk to cool-water species, slight risk to cold-water species present.
Warm Water	5.5			4.0	Waterbodies whose aquatic life beneficial uses are characterized by introduced, or native, warm-water species.
No Risk	No Change from Background				The only DO criterion that provides no additional risks is "no change from background". Waterbodies accorded this level of protection include marine waters and waters in Wilderness areas.

Note:
Shaded values present the absolute minimum criteria, unless the Department believes adequate data exists to apply the multiple criteria and associated periods.

[1] 30-D = 30-day mean minimum as defined in OAR 340-41-006.
7-D = 7-day mean minimum as defined in OAR 340-41-006.
7-Mi = 7-day minimum mean as defined in OAR 340-41-006.
Min = Absolute minimums for surface samples when applying the averaging period, spatial median of IGDO.

[2] When Intergravel DO levels are 8.0 mg/L or greater, DO levels may be as low as 9.0 mg/L, without triggering a violation.

[3] If conditions of barometric pressure, altitude and temperature preclude achievement of the footnoted criteria, then 95 percent saturation applies.

[4] Intergravel DO criterion, spatial median minimum.

[5] If conditions of barometric pressure, altitude, and temperature preclude achievement of 8.0 mg/L, then 90 percent saturation applies.

For Phillips Reservoir, the following water quality standards are taken from Oregon Administrative Rule OAR-340-041-0061:

> *"(15) Reservoirs or managed lakes are deemed in compliance with water quality criteria for temperature, pH, or dissolved oxygen (DO) if all of the following circumstances exist.*
>
> *(a) The water body has thermally stratified naturally or due to the presence of an impoundment.*
>
> *(b) The water body has three observable layers, defined as the epilimnion, metalimnion, and hypolimnion.*
>
> *(c) A layer exists in the reservoir or managed lake in which temperature, pH, and DO criteria are all met, and the layer is sufficient to support beneficial uses.*
>
> *(d) All practicable measures have been taken by the entities responsible for management of the reservoir or managed lake to maximize the layers meeting the temperature, pH, and DO criteria.*
>
> *(e) One of the following conditions is met:*
>
> *(A) The streams or river segments immediately downstream of the water body meet applicable criteria for temperature, pH, and DO.*
>
> *(B) All practicable measures have been taken to maximize downstream water quality potential and fish passage.*
>
> *(C) If the applicable criteria are not met in the stream or river segment immediately upstream of the water body, then no further measurable downstream degradation of water quality has taken place due to stratification of the reservoir or managed lake."*

2.2.2 303D Listing

In ODEQ's 2010 Assessment, the Powder River from river mile 130 to 138.2 was changed to "cold water" criteria for dissolved oxygen and included as a 303(d) listed body of water (April 15th, 2013 ODEQ Website). Baker County was informed of this change two weeks prior to the License Application being submitted and is currently in discussions with ODEQ about the change from "cool" to "cold" water designation. For the purposes of this application, the current "cold water" standards are used, however should the criteria change back to "cool water", those standards will be followed.

2.2.3 Existing Water Quality - Phillips Reservoir

Temperature and DO measurements were made in Phillips Reservoir from May 2007 to September 2007, with some additional measurements made in October 2009 (EcoWest Consulting, 2009a). The measurements were made near the location of the Mason Dam intake

structure in an attempt to sample the water column that was being drawn through the dam and released into the Powder River below.

The 2007 temperature data show that Phillips Reservoir began to stratify by early May, developed distinct thermal stratification by July, and mixed back to uniform conditions by October (Figure 5). In the figure, the two dashed intake lines represent the upper and lower limits of the water intake structure. The epilimnion reaches a maximum temperature of about 23 C in July, while deep hypolimnion waters remain at 10 °C and below throughout the year. As the season progresses, the transition layer between the warm surface water and cool bottom water drops down and passes through the depth of the Mason Dam intake. As a result, water released from Mason Dam has characteristics of the bottom water from about November to June, surface water from late August to October, and is transitional between surface and bottom water during July to late August.

FIGURE 5: TEMPERATURE LEVELS FOR PHILLIPS RESERVOIR

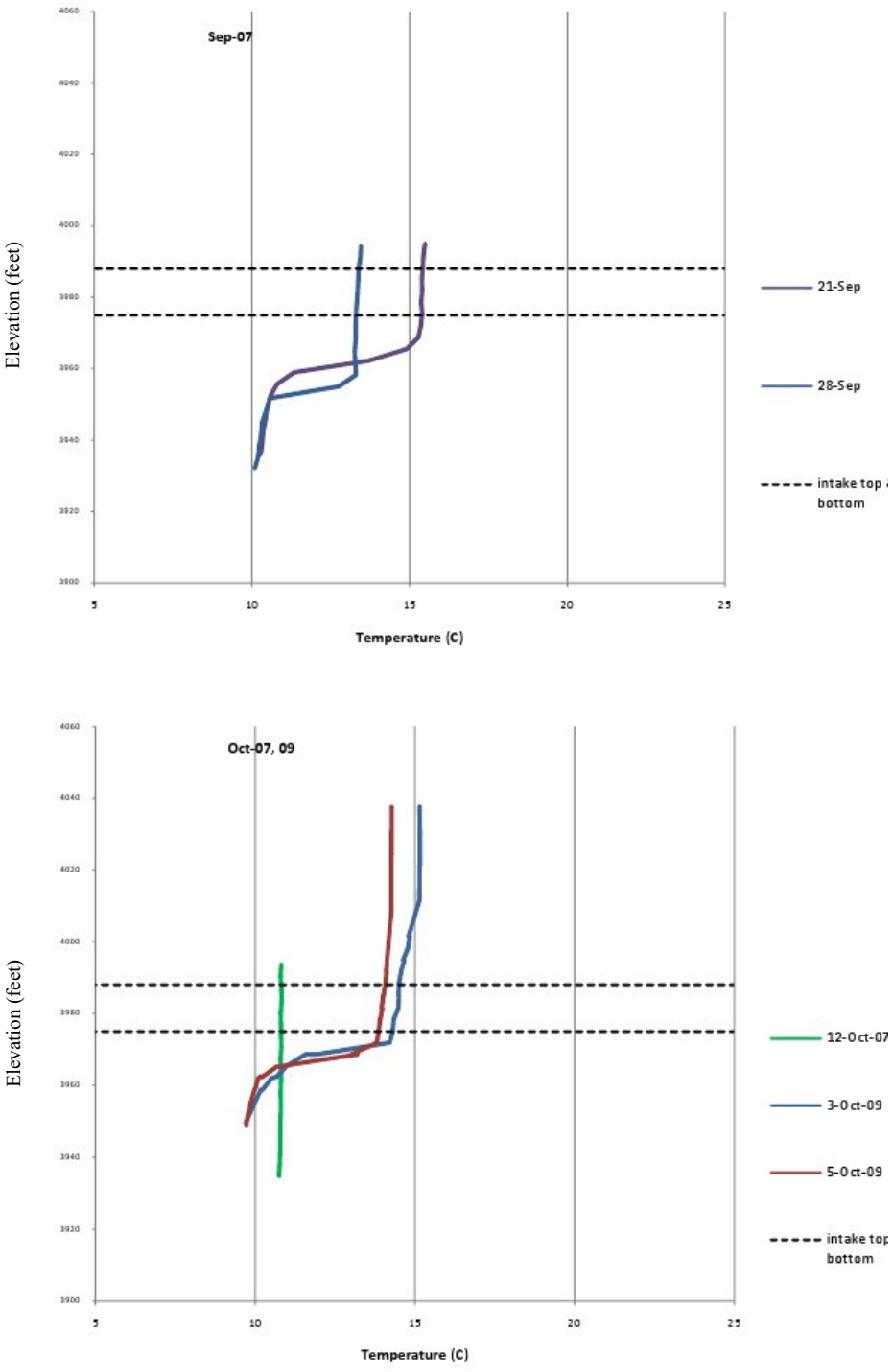
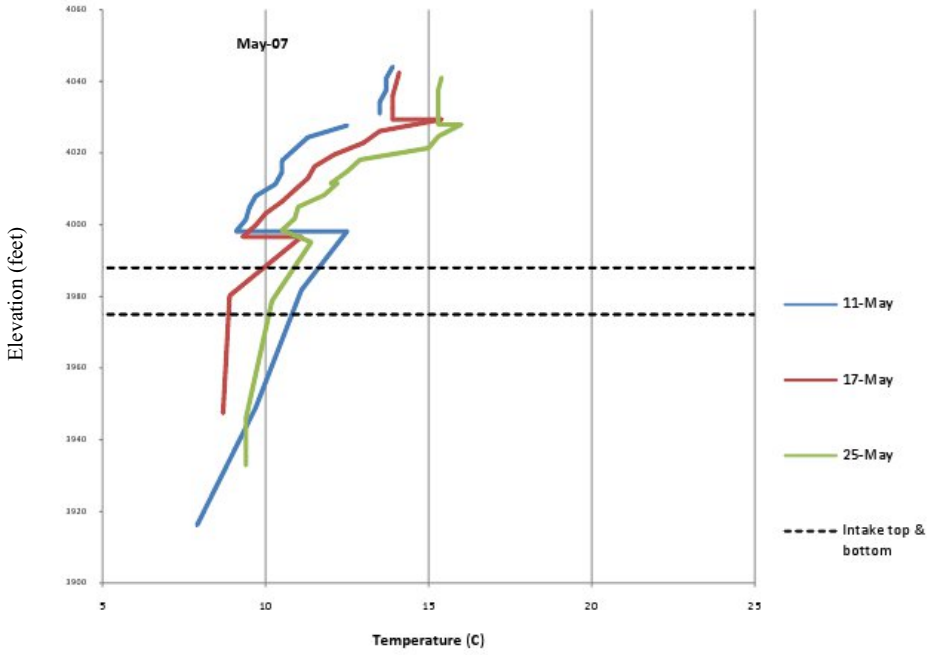


FIGURE 5A: TEMPERATURE LEVELS FOR PHILLIPS RESERVIOR



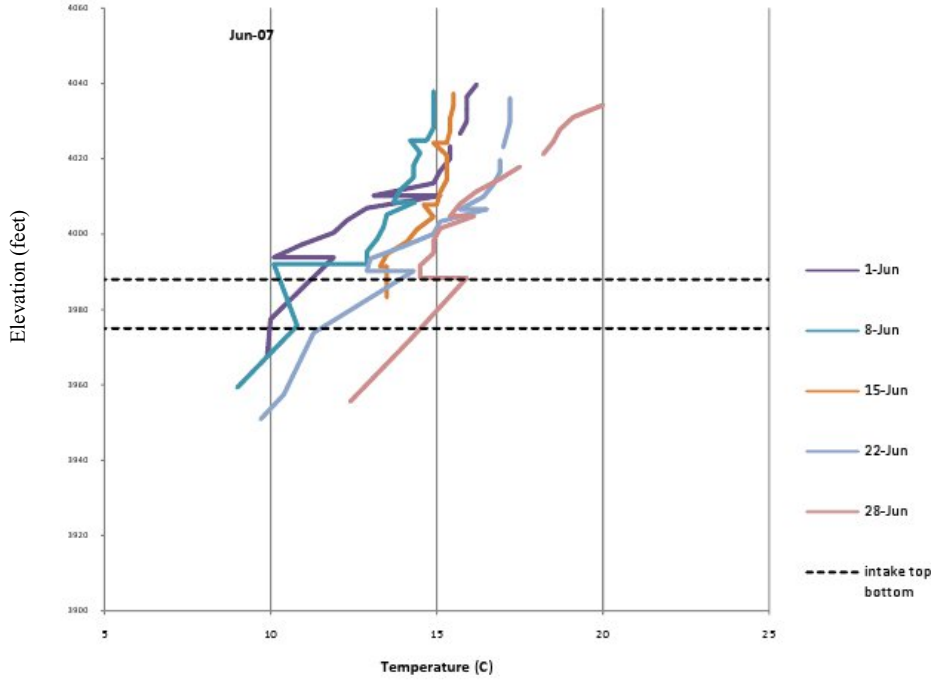


FIGURE 5B: TEMPERATURE LEVELS FOR PHILLIPS RESERVOIR

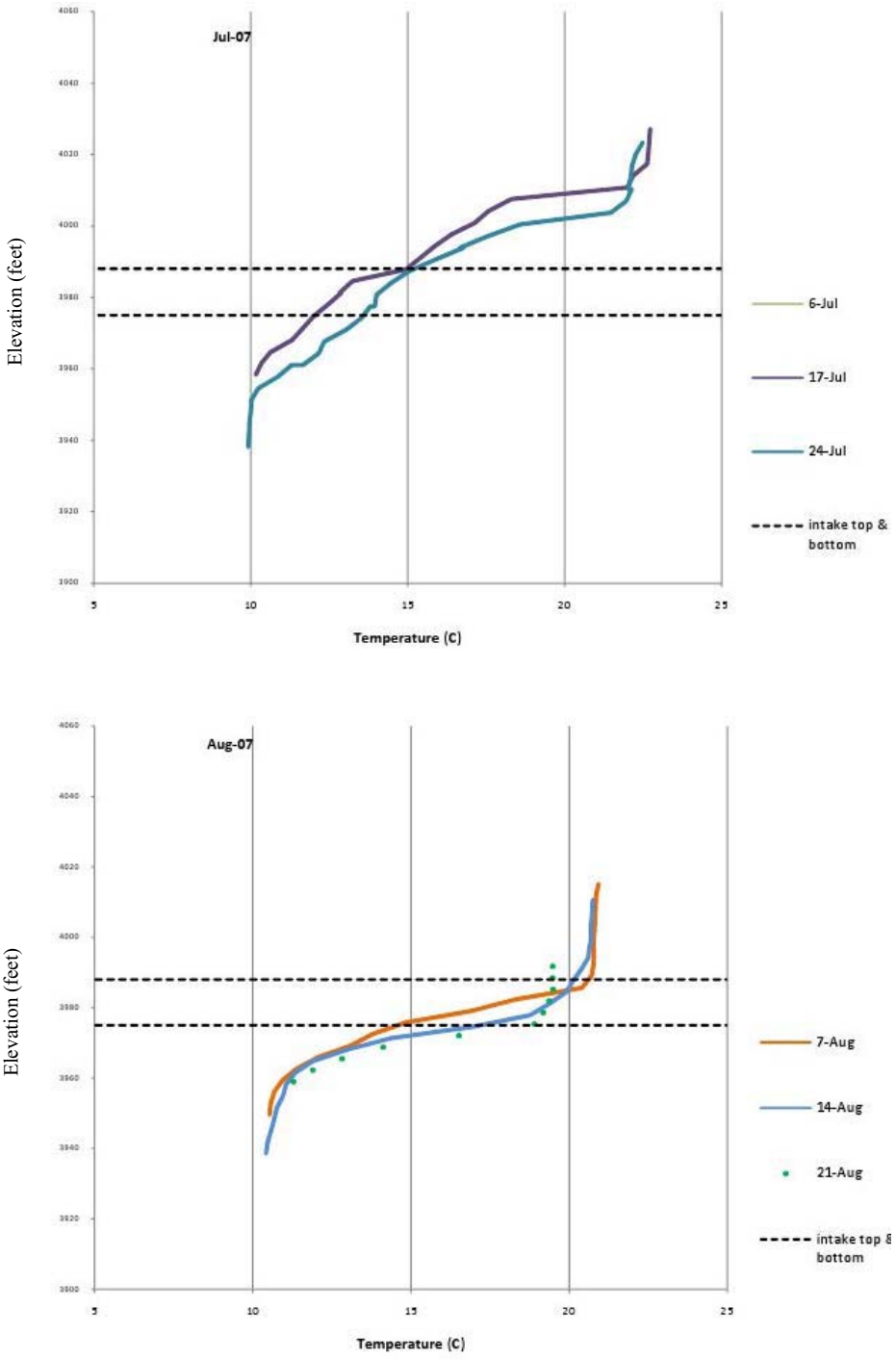


FIGURE 6: DISSOLVED OXYGEN LEVELS FOR PHILLIPS RESERVOIR

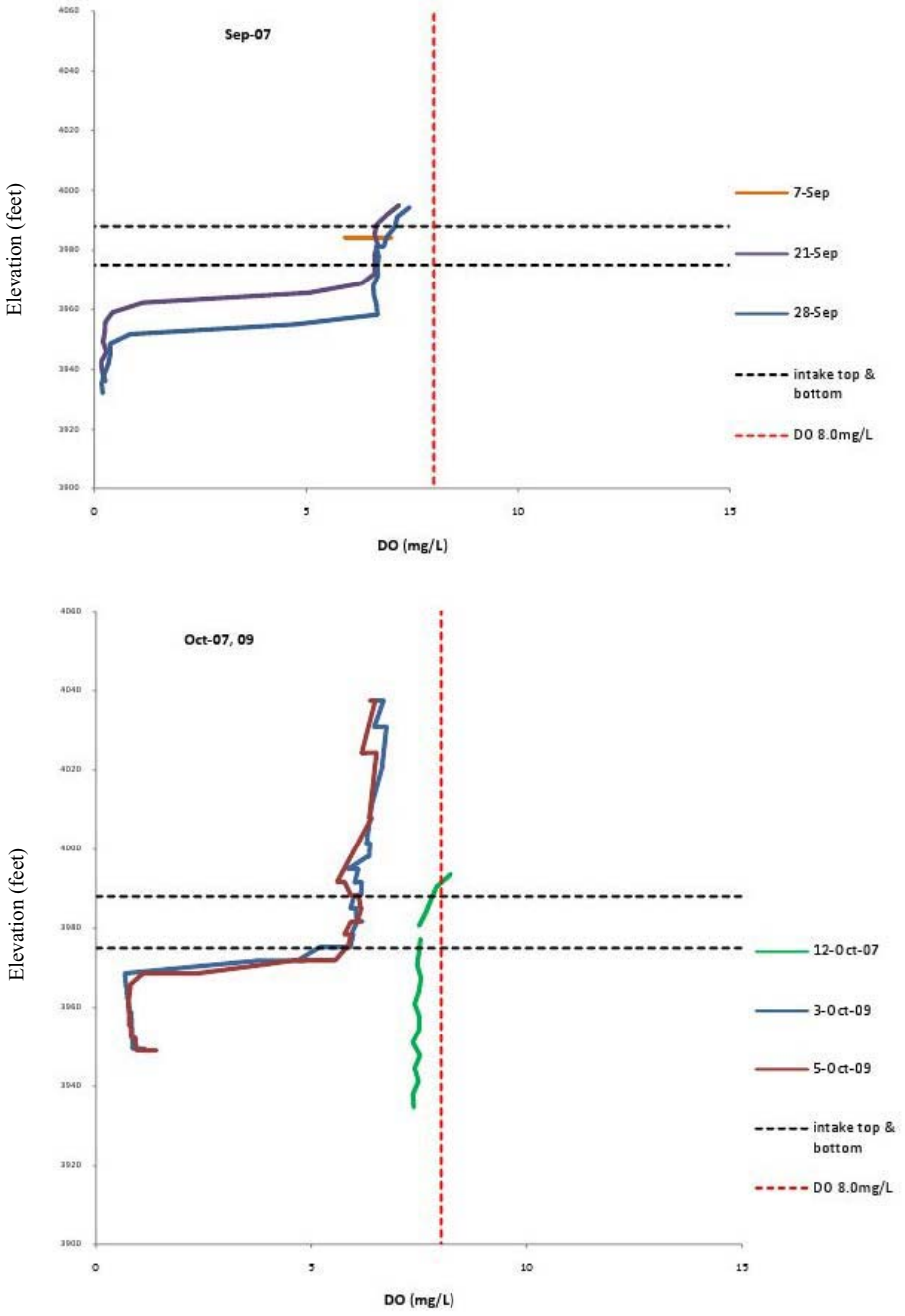
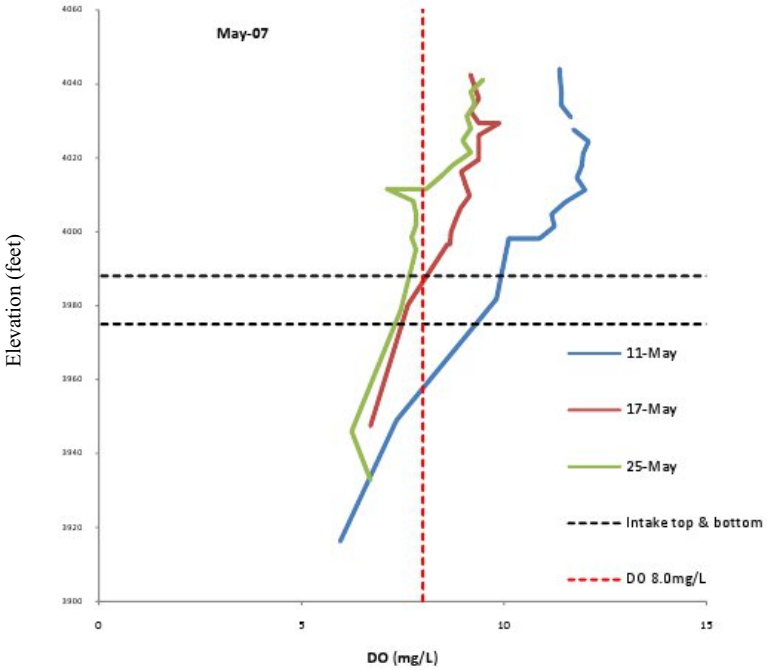


FIGURE 6A: DISSOLVED OXYGEN LEVELS FOR PHILLIPS RESERVIOR



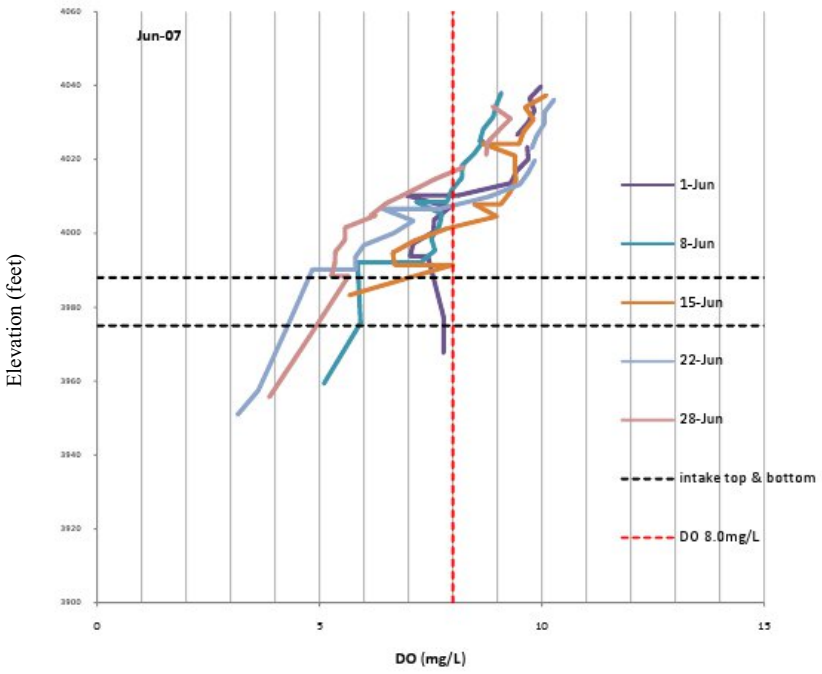


FIGURE 6B: DISSOLVED OXYGEN LEVELS FOR PHILLIPS RESERVIOR

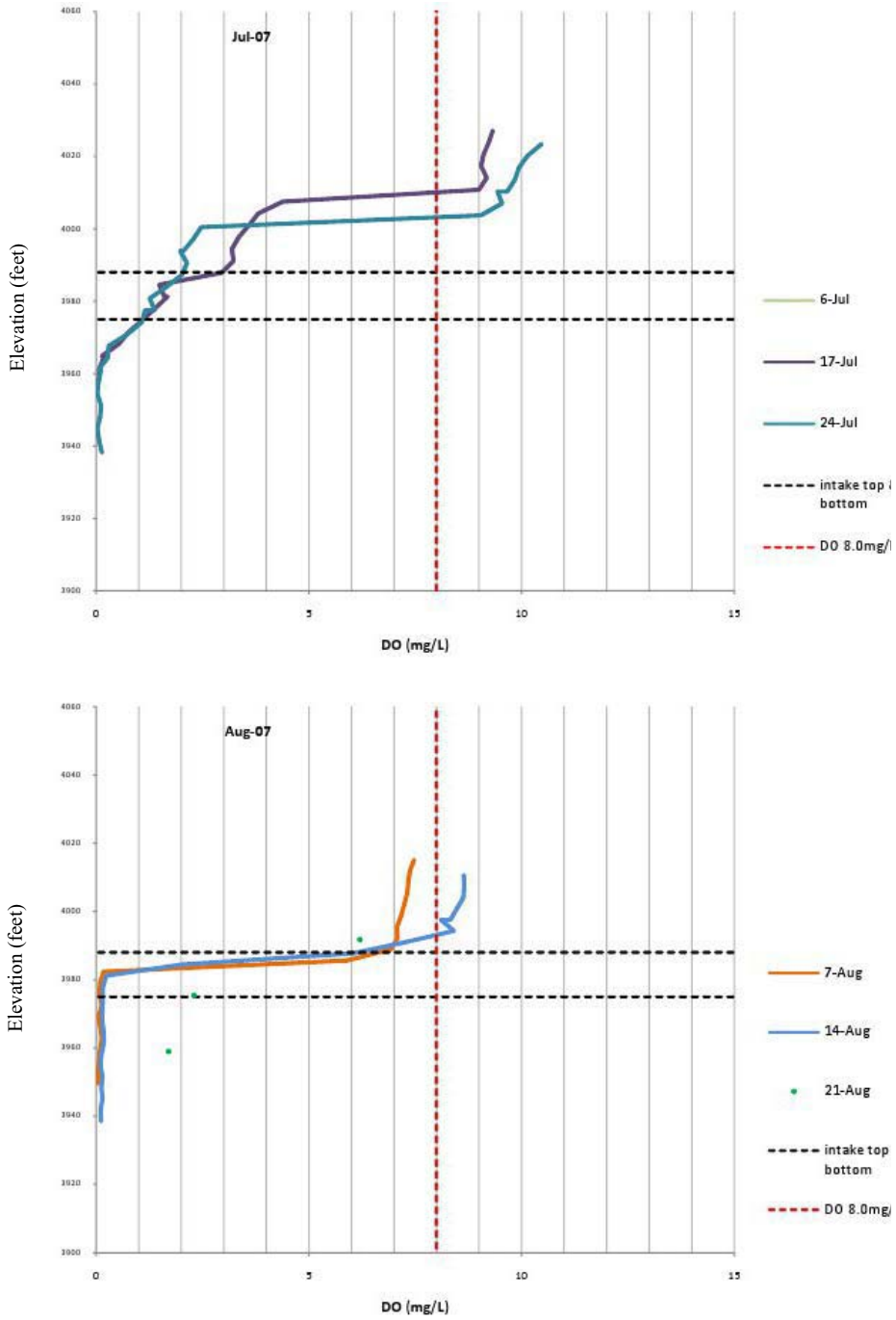


TABLE 12: AVERAGE 2007 MONTHLY TEMPERATURE AT THE MASON DAM INTAKE

MONTH	TEMPERATURE (°C)
May	10.1
June	11.9
July	12.7
Aug	16.9
Sep	17.0
Oct	10.8

The 2007 DO data show DO stratification similar to temperature stratification. In the case of DO, the transition between more oxygenated surface waters and less oxygenated bottom waters becomes sharp by mid-summer. The red dashed line in these graphs indicates the 30-day mean minimum DO standard of 8.0 mg/L (Figure 6). Anoxic conditions occur at the level of the Mason Dam intake by July and continue through August. By late August and September, oxygenated surface waters are once again present at the intake level (Table 13).

TABLE 13: AVERAGE 2007 MONTHLY DO AT THE MASON DAM INTAKE

MONTH	DO (MG/L)
May	7.8
June	5.5
July	1.8
Aug	0.8
Sep	6.7
Oct	6.4

2.2.4 Existing Water Quality - Powder River

Temperature and DO measurements were made in the Powder River below Mason Dam from May to October 2007 (EcoWest Consulting, 2009a). Currently, water is released from Phillips Reservoir through two 33-inch adjustable high pressure gate valves and one 12-inch pipe fitted with a sleeve valve on the downstream end. The intake for these penstocks is at an elevation of about 3,975 – 3,988 ft.

During 2007 monitoring, Powder River water temperatures between the current stilling basin (Station 4) and the end of the water quality study area, 2.8 river miles downstream of the dam (Station 1), did not exceed the temperature water quality standard of 20 °C. Water temperature reached a high of about 19 °C during mid to late August (Figure 10).

2007 DO concentrations throughout the river from the stilling basin (Station 4) to 2.8 miles downstream (Station 1) generally remained in the range from 7.5 mg/L to 11 mg/L. DO was highest in May, reached a low in June, and then gradually increased from July to October.

FIGURE 7: 2007 TEMPERATURE DATA FOR THE POWDER RIVER

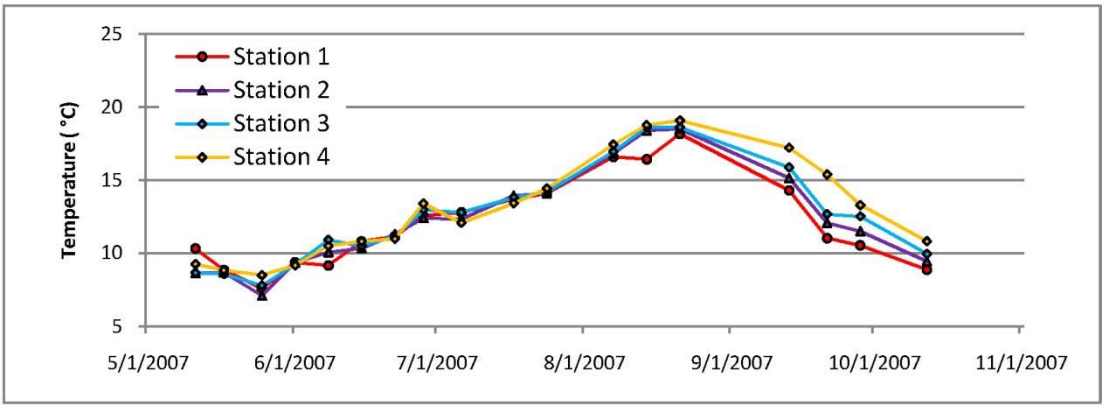


FIGURE 8: 2007 DISSOLVED OXYGEN DATA IN MG/L FOR THE POWDER RIVER

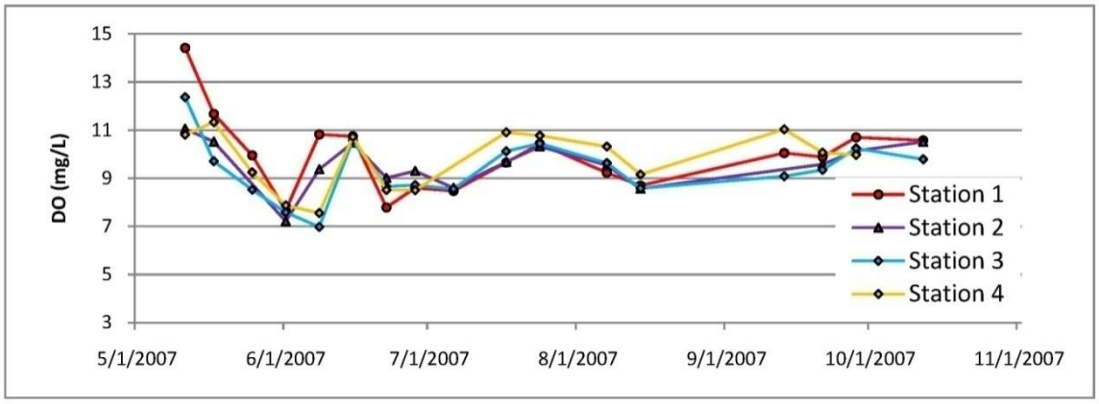
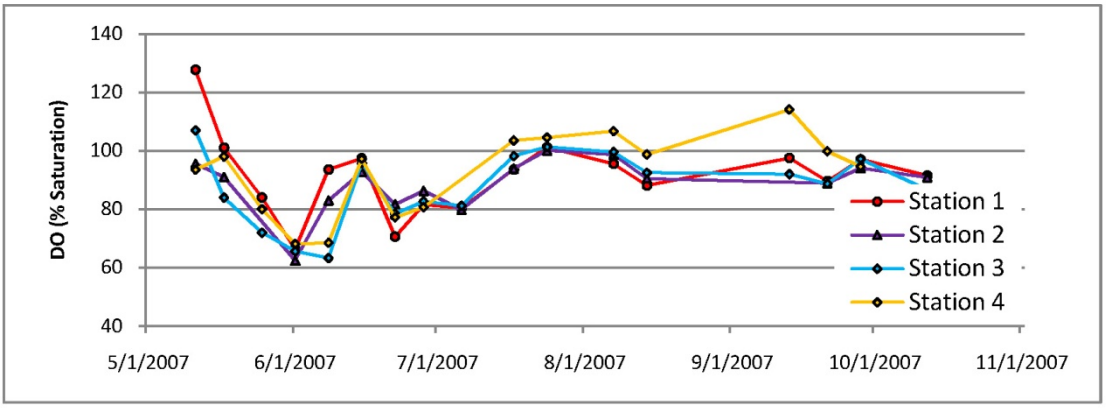


FIGURE 9: 2007 DISSOLVED OXYGEN DATA IN % SATURATION FOR THE POWDER RIVER



Comparing Figure 9 with Figure 6, it appears that DO in the Powder River below Mason Dam does not closely relate to DO in Phillips Reservoir. Comparing Table 1 to Figure 9 it is seen that discharge has a similar pattern to DO, i.e. high in May, low in June and then steadily increasing through the summer months. A plausible explanation for the correlation between flow and DO is that water exiting the dam is re-aerated during passage through the high pressure slide gate valve openings and that the amount of re-aeration increases with increasing flow.

2.2.5 Project Effects on Water Quality

The project would have no effect on water quality in Phillips Reservoir. No facilities would be located in the reservoir and no construction would occur upstream of Mason Dam.

Project construction, particularly activities related to construction of the powerhouse foundation, have the potential to produce small, temporary sedimentation increases in the Powder River downstream from Mason Dam. The project would implement an Erosion and Turbidity Control Plan to minimize sediment influx into the Powder River during construction. Incidental travel outside of approved construction areas would be prohibited. Silt fences or fiber rolls would be installed between construction areas and adjacent wetlands or streams to prevent construction sediment from entering these areas. Tailrace construction within the Powder River would occur under dewatered conditions, with a cofferdam placed in the stilling basin if necessary. The agency reviewed Erosion and Turbidity Control Plan is included in Appendix B.

Hydraulic oil is used in the powerhouse turbines. However, even if it were to leak or spill from the turbines, it would be fully contained in the powerhouse. Because the powerhouse is above water, there is no chance that oil would be able to leak and contaminate the Powder River.

Project operation would potentially change temperature and DO conditions in the Powder River below the dam. For all other water quality parameters, water quality discharged from the powerhouse would be the same as water quality entering the powerhouse from Phillips Reservoir.

Temperature

By conservation of energy principles, it can be shown that the hydroelectric project would decrease water temperature slightly compared to existing conditions. Currently the potential energy of the water is converted to frictional heat within the turbulent flow created during passage through the dam's high pressure slide gate valves. Under hydroelectric operations, the energy would instead be converted to electricity. The amount of the decrease, neglecting turbine/generator efficiency losses, is 0.0011 °F per foot of head. The extraction of the water's potential energy as electricity rather than heat (from turbulence) would reduce water temperature by about 0.12 – 0.18 °F compared to existing conditions, which would provide a small positive benefit for Powder River aquatic species.

DISSOLVED OXYGEN (DO)

No DO data was recorded during the majority of the salmonid spawning period from 1-Jan to 15-May when the state DO standard is 11.0 mg/L or 95% saturation. A comparison of reservoir DO on 11-May (Figure 9) with Powder River DO for the same date (Figure 11) shows that the high pressure slide gate valves provide only incremental re-aeration. It is therefore expected that DO in the Powder River would most likely continue to meet the salmonid spawning standard if the project were constructed, at least until reservoir stratification begins to develop.

During the summer months when Phillips Reservoir becomes stratified, water would be released through the powerhouse turbine rather than through the existing high pressure slide gate valves. As a result, the aeration benefit provided by the high pressure slide gate valves would be lost. In order to make up for this the project would implement a tiered plan to ensure that state DO standards are met at all times. The agency reviewed Dissolved Oxygen Compliance Plan is included in Appendix C. The plan contains six primary elements, as follows:

1. Description of a DO monitoring device that will provide continuous measurement of dissolved oxygen and water temperature, with capabilities for providing real time or periodic data output;
2. Specifications for installing the DO monitoring device at designated monitoring locations in the Powder River below Mason Dam;
3. A procedure for compiling, correcting and analyzing DO data to determine if DO levels meet the requirements;
4. A procedure for modifying project operations to increase DO levels in the event that they fall below the required standards; and
5. A procedure for reporting DO conditions and corrective actions to consulting agencies.
6. A procedure for installation of rock weirs in the Powder River below Mason Dam to provide additional aeration if needed

The agency reviewed DO Compliance Plan that is attached in Appendix C was developed prior to the water quality standards changing from “cool water” to “cold water.” In the original plan there were two location that the DO would be monitored downstream of the project. The upstream station (WQ-1) would have served to measure compliance with the year round “cool water” standards (6.5 mg/L) from 16-May to 31-Dec. The downstream station (WQ-2) would have served to measure compliance with the salmonid spawning standard (11.0 mg/L or 95% saturation) and would be used from 1-Jan to 15-May.

Baker County would now like to request consideration of the compliance point for the "cold water" standard (8.0 mg/L or 90% saturation) be at the same location as the spawning compliance point (WQ-2). Due to the timing of the information received about the change in criteria and the submittal of the License Application Baker County has not had the opportunity to revise the DO Compliance Plan and submit it to the agencies for their review.

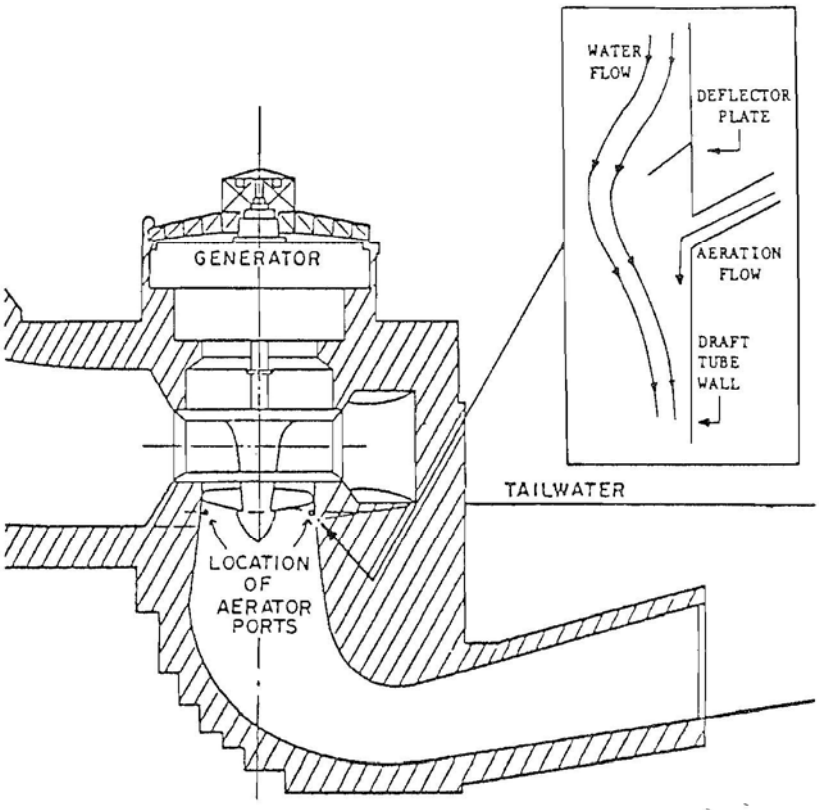
DO would be measured and compared with the applicable water quality standard in conformance with the DO Compliance Plan developed through consultation with ODEQ. As described in the DO Compliance Plan, several steps may be taken to increase DO if necessary to meet state standards. These steps include draft tube aspiration, draft tube air injection, rock weirs and opening of the original high pressure slide gate valves.

The DO Compliance Plan stipulates that the existing high pressure slide gates would be opened if draft tube aeration was unable raise DO levels to meet state standards. Opening the high pressure slide gates would reduce the amount of flow passing through the turbine and increase the amount of flow passing through the high pressure slide gate valves and re-aerating the discharge. This measure assures that the hydropower project would always discharge water with DO levels that either meets the state standards or is at least equivalent to the existing conditions in the Powder River (i.e. without the hydropower project).

2.2.6 Proposed Water Quality PM&E Measures

In order to insure that DO levels always meet state standards, Baker County is prepared to implement mitigation measures that include an aerating system for water passing through the turbine as well as rock weirs (if necessary). $100,000 has been allocated for installation of an aerating system for the turbine and for the potential construction of aerating rock weirs to be placed in the Powder River downstream of Mason Dam. Capabilities for draft tube aeration (Figure 9) would be installed in the draft tube during initial project construction. It is considered likely that draft tube aspiration would be adequate to meet state DO standards (both cold water and salmonid spawning) under the conditions likely to be encountered during most water years.

FIGURE 9: GENERALIZED DRAWING OF DRAFT TUBE VENTING USED FOR RE-AERATION OF DO DEPLETED WATER.



The proposed aeration weirs would be constructed from large rocks placed in the stream channel below Mason Dam. See Figure 10 for possible locations of these weirs. Rocks would be arranged to produce a small drop (about 2 ft) across the river channel but with openings and crevices to allow small fish passage through the structure (Figure 11). Typical rock weirs create deep water pools on the upstream side and have small plunge pools on the downstream side, which would contribute to the diversity of aquatic habitat. The amount of oxygen that can be added to water at an aeration weir depends on the amount of drop and the DO deficit in the water entering the weir. EPRI (1990) provides a calculation indicating that DO can be increased by up to 2 mg/L over a 2 ft weir when oxygen deficits are large (>4 mg/L below saturation).

FIGURE 10: DISSOLVED OXYGEN MONITORING STATIONS AND POSSIBLE ROCK WEIR LOCATIONS

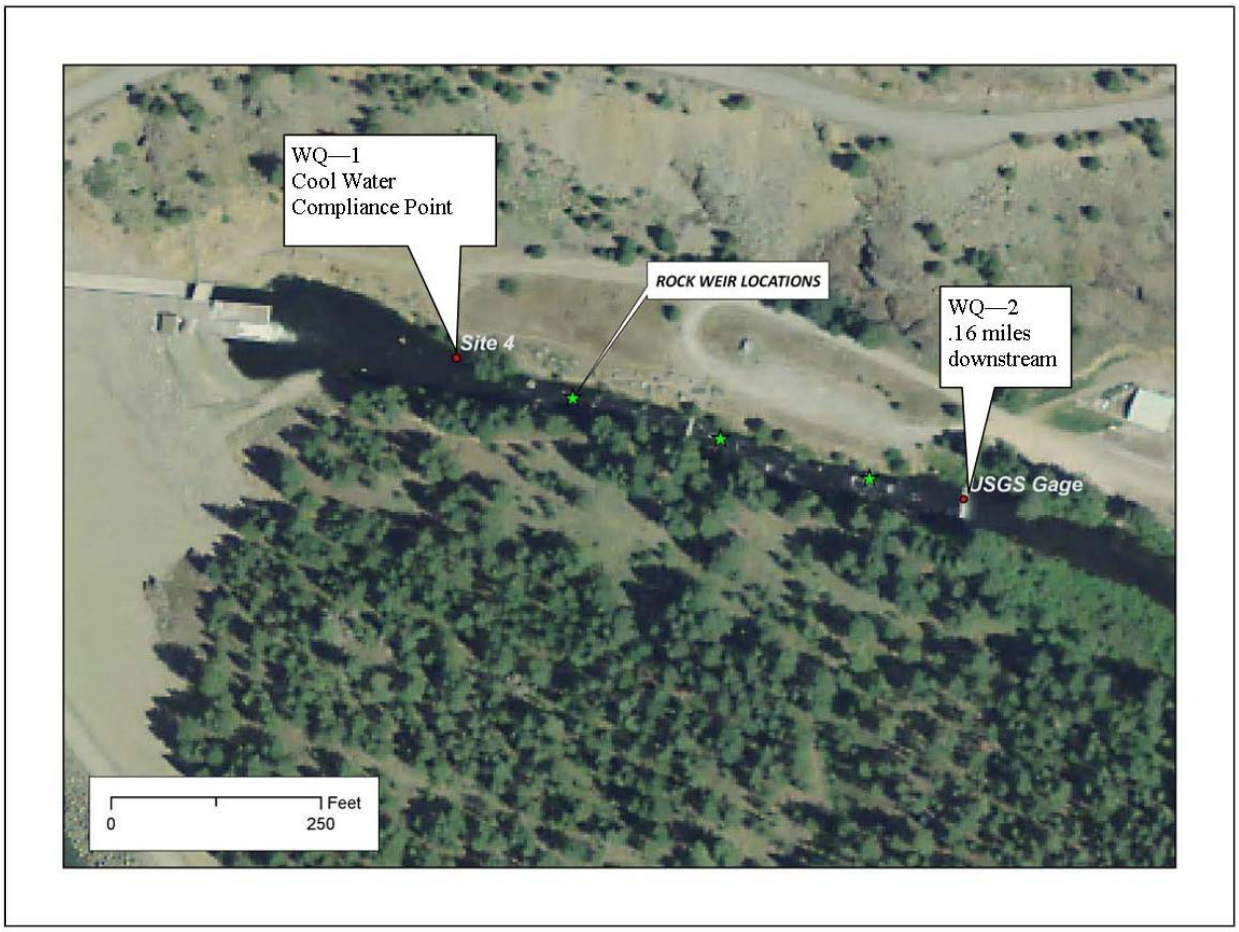
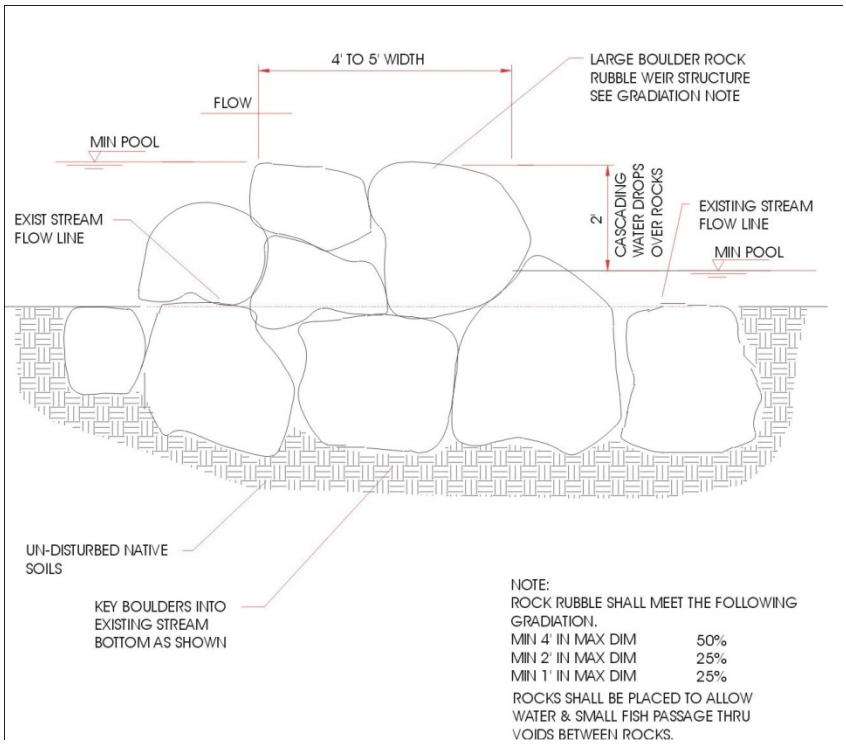


FIGURE 11: GENERALIZED DRAWING OF AERATING ROCK WEIR



3. Report on Fish, Wildlife, and Botanical Resources

3.1 Fishery Resources

3.1.1 Existing Resources

An aquatic habitat evaluation was performed for 850 feet of the Powder River below Mason Dam, which possesses approximately 0.8 acres of open water habitat. During the fall, the wetted channel averages 30 feet in width, bordered by 10 to 15 feet of bare cobble on each side of the channel. This zone of fluctuation is bordered on the upslope side by a narrow vegetated riparian zone that averages 10 feet in width. During summer the wetted channel width increases to 50 to 60 feet, with portions of the vegetated riparian zone under water. Between midsummer and fall, water surface level decreases by approximately 3.5 feet (1.53 at the gauging station which is at a wider, shallower river section). In contrast, the water level in the Powder River above Phillips Lake changes 0.13 feet during the same time period. The stream bed substrate is large cobble with scattered boulders. There is little to no sediment accumulation within the active channel. Exceptions occur along the downstream sides of boulders where up to an inch of sediment deposition (mostly sand) can be found. There are aquatic vascular plant/algal beds within the portion of the channel containing permanent pools. These beds are dominated by water buttercup (*Ranunculus aquatilis*) along with green algae, blue green algae and aquatic mosses. There is no habitat complexity (e.g., large woody debris, undercut banks, side channels) within this portion of the river. Caddisfly and mollusk surveys in this reach identified a distinct lack of aquatic macroinvertebrates (EcoWest 2009a). Habitat complexity and macroinvertebrate abundance

begin to increase just below the end of the study area, between 0.5 to 1 mile downstream of Mason Dam.

Fish species in Phillips Reservoir include bull trout (*Salvelinus confluentus*), rainbow trout (*Oncorhynchus mykiss*), crappie (*Pomoxis spp*), smallmouth and largemouth bass (*Micropterus dolomieui, M. salmoides*), yellow perch (*Perca flavescens*), walleye (*Sander vitreus*), adfluvial redband trout, northern pikeminnow, bridgelip sucker, and largescale sucker (Nowak, Powder River Subbasin Plan, 2004) (Baker County, 2009). Yellow perch and walleye were introduced in the 1980's and yellow perch have subsequently dominated the lake fishery.

The Powder River subbasin holds 4 distinct populations of redband trout. These occupy the Powder River from the mouth to Thief Valley Dam, Eagle Creek, the Powder River from Thief Valley Dam to Mason Dam, and the Powder River above Mason Dam (Nowak, 2004). There are no known population statistics for redband trout in the subbasin. Fingerling trout and catchable trout are stocked annually. The fingerling trout have clipped adipose fins, but the catchable trout do not. All rainbow trout without clipped fins are considered to be redband trout by ODFW, whether they are long term resident fish, recently stocked fish, or offspring of fin-clipped stocked fish (Baker County, 10 Dec, 2009).

3.1.2 Threatened and Endangered Aquatic Species

Table 14 shows the federal and state listed aquatic species that are potentially present in Baker County (Oregon Natural Heritage Information Center, 2007; US Fish and Wildlife Service, 2009). Only one of these species, bull trout, is federally listed as a threatened, endangered or candidate species and therefore discussed in this document. All of the species in Table 14 as well as Forest Service special status aquatic species were evaluated for potential adverse project impacts in a study performed for Baker County by EcoWest Consulting (EcoWest, 2009).

TABLE 14: FEDERAL AND STATE LISTED FISH AND AQUATIC INVERTEBRATES THAT COULD POTENTIALLY OCCUR IN BAKER COUNTY.

COMMON NAME	SCIENTIFIC NAME	HERITAGE RANK	FEDERAL STATUS	STATE STATUS	ORNHIC LIST
FISH					
Bull trout (Columbia River population)	Salvelinus confluentus	G3T2Q,S2	LT	SC	1
Pacific lamprey	Lampetra tridentata	G5,S3	SOC	SV	4
Inland Columbia Basin redband trout	Oncorhynchus mykiss gairdneri	G5T4,S3	SOC	SV	4
INVERTEBRATES					

COMMON NAME	SCIENTIFIC NAME	HERITAGE RANK	FEDERAL STATUS	STATE STATUS	ORNHIC LIST
Blue Mountain caddisfly	Crytochia neosa	Rejected – too common	SOC	-	-

KEY: LT – Listed Threatened; SOC = Species of Concern; SC = State Critical; SV = State Vulnerable; ORNHIC 1 = threatened with extinction throughout entire range; ORNHIC 4 = taxa of conservation concern but not currently threatened or endangered

Bull Trout Distribution

Within rivers and streams, bull trout require a combination of the following habitat elements, although not all occupied habitats contain all of these elements (FWS, 2002):

1. Relatively cool water temperatures (0 - 22 °C, with 2 - 15°C preferred)
2. Complex channels
3. Specifically sized substrate with a minimum of fine material
4. A natural hydrograph
5. Cold water sources to contribute to surface flow
6. An abundant food base (terrestrial invertebrates, aquatic macroinvertebrates, forage fish)
7. Permanent water of sufficient quantity and quality
8. Migratory corridors

The average monthly temperature in the Powder River for 2.8 miles downstream of Mason Dam do not exceed the maximum bull trout tolerance of 22 ° C, but the temperatures exceed the preferred bull trout upper temperature range of 15 ° C in August and September throughout this reach (see Figure 7). Potential habitat is further limited by large fluctuations in reservoir releases over the growing season and the lack of habitat complexity (EcoWest Consulting, 2009b). These factors are most limiting between Mason Dam and the USGS gauging station (850 feet downstream of the dam), although the stilling basin itself provides some potential habitat. Habitat complexity increases between 0.5 to 1.0 mile downstream of the dam. There is a potential food base in terms of prey fish for adults, but juvenile habitat is limited between the dam and the more complex habitat reach. Overall, it is expected that adult bull trout could survive below Mason Dam, but the study reach contains no areas suitable for spawning or rearing (EcoWest Consulting, 2009b).

Within lakes and reservoirs, bull trout inhabit the cold, deeper sections and primarily occur within the upper hypolimnion. Bull trout also forage in cool, shallow, littoral zones which tend to occur in the upper reservoir arms where tributaries enter the reservoir. However, bull trout location within a given lake or reservoir varies by season and type of lake. Within oligotrophic lakes (i.e., low nutrient, well oxygenated lakes) bull trout tend to migrate seasonally between the littoral zone (spring and fall) to just below the thermocline in summer. In meso and eutrophic lakes, oxygen levels tend to be depleted during the summer. In these types of lakes, bull trout

migrate out of the lake between April and May, returning in the fall and using the water body primarily as overwintering habitat.

There are no known bull trout in the Powder River between Mason Dam and Baker City. The historic distribution of the bull trout within the Powder River subbasin is unclear. Nowak (2004) identified that the species was thought to be widespread within the Powder River basin, with at least seasonal connections to the Snake River prior to 1960. Passage above RM 70 on the Powder River was blocked in 1932 by construction of Thief Valley Dam, which has no upstream passage. Mason Dam, constructed in 1968, isolated bull trout in the upper Powder River from bull trout in the North Powder River and other Powder Valley tributaries. The FWS 2010 Bull Trout Critical Habitat Justification describes populations within the Powder River Basin as follows:

> *"The draft revised recovery plan (Service 2004a, p. 21) identified nine local populations in the Powder River Basin, although another local population (in Rock Creek) was added during the 2008 core area assessments. All are located in headwater streams draining the Elkhorn Mountain Range and persist in areas where the habitat is still suitable." (USFWS, 2010)*

These upstream populations include:

Powder River tributaries upstream of Mason Dam (Silver Creek, Little Cracker Creek; Lake Creek)

Powder River tributaries between Mason Dam and the North Powder River (Salmon Creek, Pine Creek, Rock Creek, Big Muddy Creek)

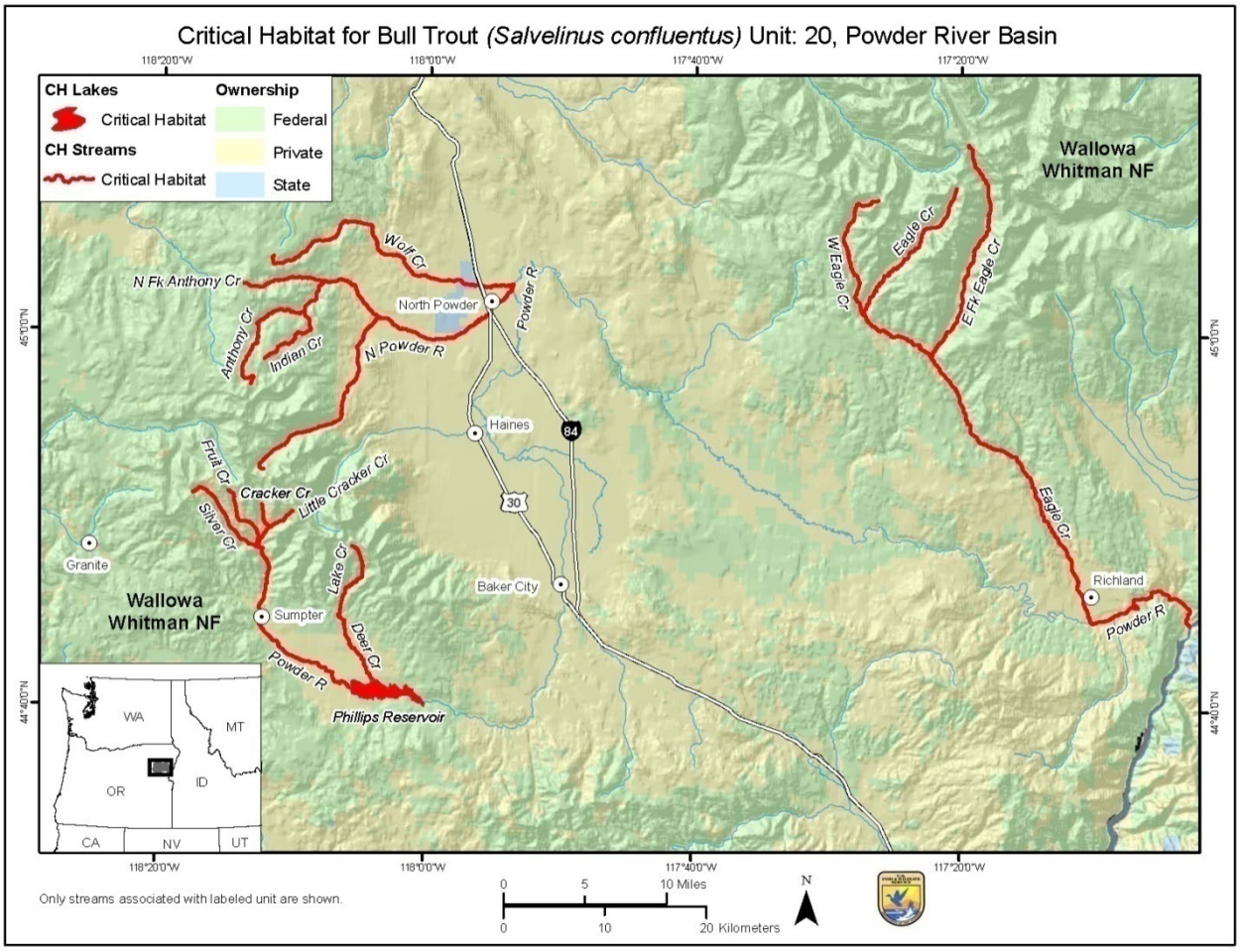
North Powder River and some of its tributaries

In 2008, the U.S. Fish and Wildlife Service estimated a total of 250 to 1000 individuals within the Powder River subpopulations, with the majority of the bull trout within Silver Creek (FWS, 2008). Bull trout subpopulations are generally isolated from each other by a number of physical and water quality barriers such as dams, diversions, channel characteristics, and water temperature (FWS, 2002), though Phillips Reservoir does potentially provide a pathway for upper Powder River bull trout populations to mix with reservoir tributaries populations

Bull Trout Critical Habitat

Phillips Reservoir and upstream tributaries have been included in the most recent designation of bull trout critical habitat (Figure 12). The Powder River downstream from Mason Dam was not included in the new 2010 habitat designation.

FIGURE 12: 2010 BULL TROUT CRITICAL HABITAT DESIGNATIONS



3.1.3 PROJECT EFFECTS ON FISHERIES RESOURCES

The primary project effects on aquatic resources are the potential for adverse impacts to dissolved oxygen conditions and potential increased mortality for fish entrained through Mason Dam. Project impacts on dissolved oxygen is discussed in section 2.2.5, where it is shown that state dissolved oxygen standards would always be met.

The project would not change the amount or timing of releases from Mason Dam. Because neither the water intake through the dam nor the water volumes exiting the reservoir would be changed from current conditions, fish entrainment would not be altered by the proposed project. Mason Dam has no fish passage facilities; therefore, any fish species potentially entering the reach below Mason Dam via entrainment would have no upstream access.

The proposed project would change the manner in which water and entrained fish exit the dam. Currently, water passes through the dam and exits through two high-pressure slide gate valves. The proposed project would instead divert some or all of the water through a turbine. An analysis of fish mortality was conducted on both types of structures (see Appendix G), and it was

determined that conversion to a turbine structure would potentially reduce entrained fish mortality rates from the estimated current 41% to an estimated new level of 25% (Ecowest, 2013). Estimates of entrained fish mortality currently are 11,878 total fish during an average water year. After project construction fish mortality is estimated to be 7,185 during an average water year. This is a decrease of 4,693 in the number of killed fish.

Project Effects On Bull Trout

Although Phillips Reservoir is included in the current critical habitat designation for bull trout, current bull trout use of the reservoir is unknown. The Powder River below Mason Dam lacks many of the required habitat features required by bull trout including a natural hydrograph and migration corridors to upstream spawning areas that is designated as bull trout habitat. The FWS has concluded that the operation and maintenance of Mason Dam by Reclamation was "not likely to adversely affect" the bull trout. The hydroelectric project would not change the operation of Mason Dam.

Due to the temperature, dissolved oxygen levels, and flow characteristics of the intake at Mason Dam, the Fish Entrainment and Mortality Study (EcoWest, 2013) states that bull trout are "not likely to be entrained." The proposed project would not alter entrainment rates. However, in the event that bull trout do become entrained through Mason Dam, a larger number would be likely to survive passage through the project turbine than do currently through the high pressure slide gate valves.

Fish surviving entrainment would have no access to upstream spawning areas because Mason Dam has no fish passage facilities. Therefore, changes in fish mortality introduced by the proposed project would not affect upstream reproducing bull trout populations. If entrained fish were able to reproduce downstream of the dam, the proposed project would be beneficial to bull trout by increasing entrainment survival compared with existing conditions.

3.1.4 Proposed Protection, Mitigation and Enhancement (PM&E) for Fisheries

It is expected that the project will not have an adverse affect on fishery resources, therefore no mitigation measures are proposed.

3.2 Wildlife Resources

3.2.1 Existing Wildlife Resources

Wildlife inhabiting the project area is typical for the predominant habitat types present, consisting of dry coniferous forest with small, interspersed riparian areas. Wildlife resources include large and small mammals, reptiles, waterfowl, raptors, game birds and a variety of songbirds. Table 15 lists the animal species observed during 2007 and 2008 habitat assessment surveys (EcoWest Consulting, 2009b).

Twenty-nine wildlife species/sign (22 birds, 7 mammals) were observed during the habitat assessments. There were no raptor nests observed in the study area, although there is an active osprey nest near the study area, on the north side of Highway 7. The only bird nests located within the study area during either survey were a robin nest and a hummingbird nest in the planted horticultural trees in the recreation area in 2007. A rock wren was observed with a young brood on the dam face in 2008, indicating nesting in the area. No other bird nests or evidence of nesting were observed in 2008, and the planted trees have since been removed.

TABLE 15: WILDLIFE SPECIES OR SIGN OBSERVED IN THE MASON DAM STUDY AREA DURING 2007 AND 2008 SURVEYS

COMMON NAME	OPEN WATER	RIPARIAN	CONIFEROUS & MIXED FOREST	GRASSLAND	ROCK/ TALUS
Golden eagle			X		
Red-tailed hawk	X				X
Bald eagle	X				
Osprey	X				
Mallard	X				
Common merganser	X				
American dipper	X	X			
Stellar's jay			X		
Black-capped chickadee			X		
Mountain chickadee			X		
Black-billed magpie				X	
Raven					X
Downy woodpecker			X		
Red-breasted nuthatch			X		
Pygmy nuthatch*			X		
Brown creeper			X		
Red-naped sapsucker				X	
American robin*				X	

COMMON NAME	OPEN WATER	RIPARIAN	CONIFEROUS & MIXED FOREST	GRASSLAND	ROCK/ TALUS
Hummingbird*				X	
Rock wren					X
Vaux's swift					X
Caspian tern	X				
Mule deer	X	X	X	X	X
Elk*			X	X	
Beaver*		X			
Badger*			X		
Yellow pine chipmunk			X		
Douglas squirrel			X		
Northern pocket gopher*				X	

**sign only (tracks, scat, nests, other)*

3.2.2 Threatened and Endangered Animals

Table 16 shows the federal listed threatened, endangered or special status animal species that are potentially present in Baker County (Oregon Natural Heritage Information Center, 2007; US Fish and Wildlife Service, 2009). Three of these species – bald eagle, gray wolf and California wolverine – are either state or federally listed as threatened or endangered species or have been recently delisted and are subject to special management. The North American wolverine is a candidate species that was recently added and is discussed below. Of these four species only the bald eagle is known to occur in the project vicinity. All of the species in Table 16 as well as Forest Service special status species were evaluated for potential adverse project impacts during 2007 and 2008 field surveys conducted by EcoWest Consulting (EcoWest Consulting, 2009b).

TABLE 16: FEDERALLY LISTED THREATENED, ENDANGERED OR CANDIDATE SPECIES THAT MAY OCCUR IN BAKER COUNTY

COMMON NAME	SCIENTIFIC NAME	HERITAGE RANK	FEDERAL STATUS	STATE STATUS	ORNHIC LIST
REPTILES AND AMPHIBIANS					
Columbia spotted frog	Rana luteiventris	G4,S2S3	C	SU	2
Rocky Mountain tailed frog	Ascaphus montanus	G4,S2	SOC	SV	2

COMMON NAME	SCIENTIFIC NAME	HERITAGE RANK	FEDERAL STATUS	STATE STATUS	ORNHIC LIST
Northern sagebrush lizard	Sceloporus graciosus graciosus	G5T5,S5	SOC	SV	4
BIRDS					
Bald eagle	Haliaeetus leucocephalus	G5, S4B,S4N	DELISTED	DELISTED	4
Northern goshawk	Accipiter gentilis	G5,S3B	SOC	SC	4
Western burrowing owl	Athene cunicularia hypugaea	G4T4,S3B	SOC	SC	4
Greater sage-grouse	Centrocercus urophasianus	G4,S3	SOC	SV	2
Ferruginous hawk	Buteo regalis	G4,S3B	SOC	SC	4
Olive-sided flycatcher	Contopus cooperi	G4,S3B	SOC	SV	4
Willow flycatcher	Empidonax traillii adastus	G5T5,S3S4B	SOC	SU	4
Yellow-breasted chat	Icteria virens	G5,S2B,S3N	SOC	-	2
Mountain quail	Oreortyx pictus	G5,S4	SOC	SU	4
White-headed woodpecker	Picoides albolarvatus	G4,S2S3	SOC	SC	2
MAMMALS					
Gray wolf	Canis lupus	G4,SH	DELISTED	DELISTED	2-ex
California wolverine	Gulo gulo luteus	G4T3Q,S1?	SOC	LT	2
Pallid bat	Antrozous pallidus	G5,S2	SOC	SV	2
Pygmy rabbit	Brachylagus idahoensis	G4,S2	SOC	SV	2
Townsend's big-eared bat	Corynorhinus townsendii	G4,S2	SOC	SC	2
Silver-haired bat	Lasionycteris noctivagans	G5,S3S4	SOC	SU	4

COMMON NAME	SCIENTIFIC NAME	HERITAGE RANK	FEDERAL STATUS	STATE STATUS	ORNHIC LIST
Western small-footed myotis	Myotis ciliolabrum	G5,S3S4	SOC	SU	4
Long-eared myotis	Myotis evotis	G5,S4	SOC	SU	4
Fringed myotis	Myotis thysanodes	G4G5,S2	SOC	SV	2
Long-legged myotis	Myotis volans	G5,S3	SOC	SU	4
Preble's shrew	Sorex preblei	G4,S3?	SOC	-	3

KEY: LT – Listed Threatened; SOC = Species of Concern; SC = State Critical; SV = State Vulnerable; SU = Undetermined status; ORNHIC 2 = threatened with extirpation from the State of Oregon; ORNHIC 4 = taxa of conservation concern but not currently threatened or endangered

COLUMBIA SPOTTED FROG

The Columbia spotted frog is candidate for federal listing as threatened or endangered. The range of the species has declined substantially in the past 50 years, with the decline thought to be associated with wetland loss and introduction of nonnative predators, such as bullfrogs and bass. Populations in eastern Oregon are part of the Great Basin subpopulation of the Columbia spotted frog, which is one of four recognized subpopulations of the species.

The spotted frog is an aquatic species that is associated with open, non-turbid, slack or ponded water. It is often found in association with seeps and springs, open water with floating vegetation, and larger bodies of ponded water such as lakes and stream backwaters. Habitats tend to have relatively constant water levels and temperatures (Bull E. , 2005). Breeding occurs in these open water areas with egg masses being laid in shallow water fringes (generally 6 to 12 inches or less) where they can float freely. Breeding occurs in late winter or early spring, generally between late March to April in mid-elevation areas.

The spotted frog tends to forage in adjacent wet meadows (i.e., wetland areas containing sedges, grasses and rushes), but can also be found hiding under decaying vegetation or upland habitats near water with dense cover to allow protection from predators and ultraviolet radiation. The frog is relatively inactive during winter, generally hibernating or aestivating in deep silt or muck substrates, spring heads, or undercut perennial streambanks with overhanging vegetation. The key feature of overwintering habitat is a microhabitat that is protected from freezing. The frogs can use different wetlands for breeding, foraging and overwintering and are sensitive to fragmentation of their travel routes among different wetland habitats.

There are a number of known breeding sites in northeastern Oregon in Union, Baker, Wallowa, Grant and Umatilla counties (Bull E. , 2005). One of the known sites occurs immediately upstream of Phillips Reservoir in the series of ponds that have developed in the Sumpter mine tailings (Bull E. , 2005). These ponds are not connected to the river and have no fish or bullfrogs as predators. The spotted frog also occurs in wetlands adjacent to the campgrounds on the south shore of Phillips Reservoir (A Kuehl, BLM, pers. comm).

Field surveys were conducted in October 2007 when frogs had already initiated hibernation. Therefore, the wetlands in the study area were evaluated for the potential as spotted frog habitat based on the criteria listed below:

- Provides semi-permanent or permanent shallow water with a relatively constant water level
- Known to lack, or likely lack frog or fish predators
- Provides cover (wetland or upland, or dense litter)
- Within a potential travel route to or from the above habitat
- Able to provide hibernating habitat (deep silt or muck substrate, undercut streambank, or spring head)

None of the riparian wetlands along the Powder River within the study area meet any of the above criteria. The wetlands directly border the Powder River, which has fish predators. The wetlands also are subject to substantial water level fluctuation during the frog's active season. Herbaceous or other low-to-the ground cover (such as litter) necessary for thermal and other protection is minimal. There are no adjacent wetlands meeting the above criteria, so the riparian corridor does not function as a regular travel corridor. There is no hibernating habitat as there is no deep substrate, or cut stream banks with overhanging cover to provide protection from freezing.

Further downstream on the Powder River (0.5 to 1.0 miles downstream of dam) habitat complexity increases and the banks contain potential hibernating habitat. However, this reach meets only two of the five habitat criteria identified above.

The wetlands along the unnamed tributary lack fish predators, and provide much greater cover than the Powder River wetlands. The tributary is spring-fed, but also subject to seasonal water level fluctuations of 6 to 12 inches. As a result of the seasonal flooding, there is little to no litter accumulation and not much sediment deposition. Riparian soils are shallow to cobble. The tributary spring head approximately 350 feet upstream of the study area contains deep soils with small areas of permanent water. This spring is outside of the study area and was not investigated in detail, but does contain some suitable spotted frog habitat elements. However, the actual use by the frog is likely limited by substantial horse trampling associated with the adjacent dispersed campsite. According to Bull (2005), spotted frog use of streams and creeks is rare (less than 2% of the breeding sites) and restricted to slow moving creeks. The relatively high water level fluctuations limit the tributary as potential breeding habitat with hibernating habitat limited by

lack of deep soils or other substrate to protect against freezing. The upstream spring might provide spotted frog habitat if protected but in its current condition does not. As a result, there are no known suitable habitats within at least 0.2 miles limiting the stream's value as a regular travel corridor.

Bald Eagle

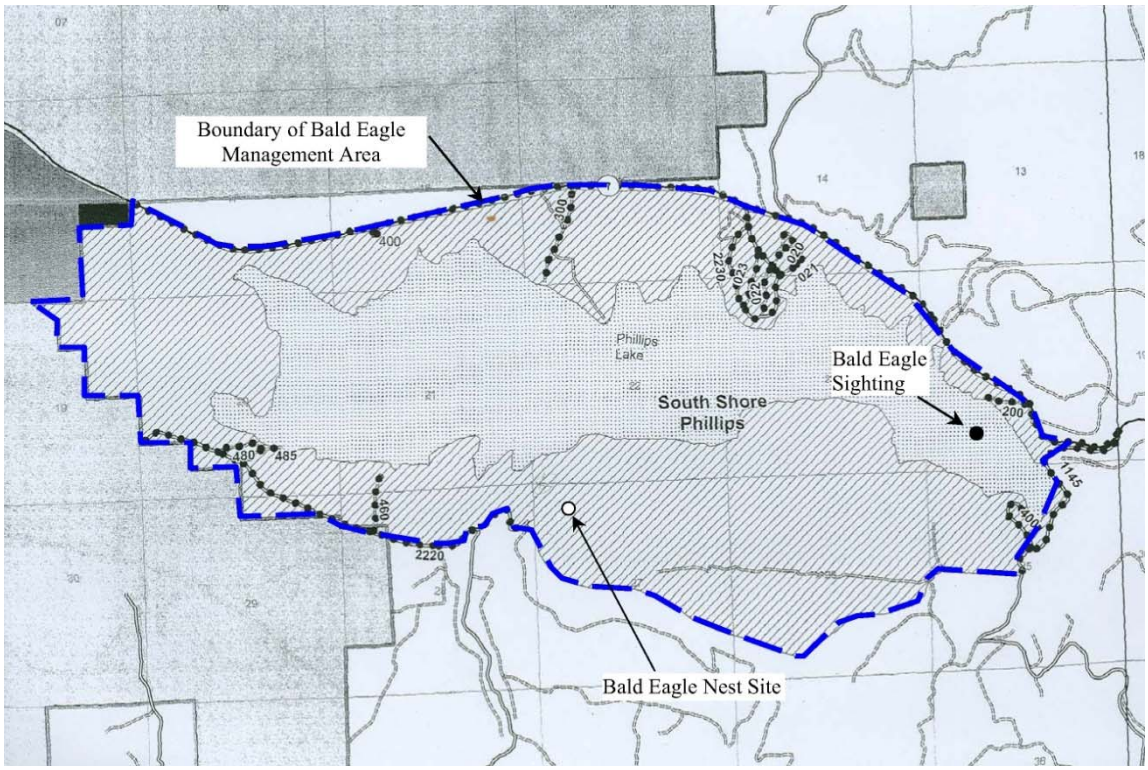
The bald eagle is known to both nest and overwinter around Phillips Reservoir upstream of the Mason Dam project area, although the wintering eagles may move to other locales, such as Unity Reservoir, elsewhere on the Powder River, the Burnt River or nearby agricultural fields, according to prey availability. Between zero to four eagles have been documented wintering at Phillips Reservoir and Unity Reservoir, with up to 15 eagles documented using the Powder and Burnt River watersheds during the winter (US Fish and Wildlife Service, 2005). The eagles tend to forage along the rivers in January and early February while the lakes are still frozen, and move to agricultural areas in February and March where they feed on cow after-birth. In addition, wintering eagles also feed on carrion.

The Phillips Reservoir bald eagle population consists of a single breeding pair of eagles along with a variable number of wintering eagles. An accurate record of nesting outcome has been kept since 1989. The history of this nesting territory prior to 1989 is unknown. The eagle nest has been used annually since 1989. Reproductive success has generally been good, with between one to two young fledged most years. However, even though the eagles returned to the nest in 2004, 2005 and 2007, no young were produced (Isaacs & Anthony, 2007). The causes of nest failure in these years are unknown.

The bald eagle breeding season generally extends from January through August. The eagles arrive at Phillips Reservoir in January, with mating during January and February. Egg laying occurs from mid-February through April, hatching from late March through early May, and fledging from late June through mid-August. The adults generally leave the nest at the end of August, after fledging occurs.

The Wallowa Whitman National Forest manages the nesting pair of eagles under The Bald Eagle Management Area plan (BEMA) for the Phillips Reservoir Bald Eagle Nest Site (USDA Forest Service. 1993). This Plan defines the boundaries of the BEMA to encompass the nest site, alternative nest sites, foraging areas and eagle flyways. The outline of the BEMA is depicted in Figure 13. The nest site is on the south shore of Phillips Reservoir. Most of the BEMA is closed year round to motorized vehicles, with no restriction on over-snow vehicles as long as the snow depth is greater than 12 inches. There are no boat use restrictions on the reservoir. The bald eagle was observed flying over Phillips Reservoir during wildlife surveys and it is known to nest and winter there.

FIGURE 13: BALD EAGLE NEST SITE AND BOUNDARY OF THE BALD EAGLE MANAGEMENT AREA



GRAY WOLF

The Rocky Mountain gray wolf occurs or has the potential to occur in the eastern third of Oregon, defined as east of the boundary of Highways 395/78/20. The Rocky Mountain gray wolf population was delisted on May 4, 2009 from federal endangered status. However, they are still listed as endangered under Oregon state law. Although historically present in Oregon, wolves were not specifically re-introduced to Oregon. Instead, the gray wolf naturally dispersed into the state from Idaho. Wolves that enter the state are managed under ODFW's Wolf Plan (Oregon Department of Fish and Wildlife, 2005).

The wolf can occur in a number of different habitat types, with key features being relatively low road density/human access and an abundant food supply. The key habitat feature seems to be an abundance of prey, with the primary prey being ungulates (deer, elk and moose), and territory size can vary considerably depending on changes in prey availability and distribution. Secondary prey food sources include smaller animals such as rabbits, beavers, grouse, ravens, skunks, coyotes, porcupines, eagles and fish. When necessary, wolves also would eat insects, nuts and berries.

Since 1999, there have been numerous wolf occurrences in northeast Oregon. Recent occurrences include a female wolf observed near the Eagle Cap Wilderness in January 2008, a pack in northern Union County in July 2008, the Imnah pack in the greater Zumwalt area in January 2011, and the Wenaha pack in the Wenaha unit in January 2011. The ODFW suspects that additional wolf packs occur near the Oregon border. The other occurrences have been in the

Blue Mountains near the North Fork John Day River, Highway 84 south of Baker, and unknown locations in Union County and between Ukiah and Pendleton. These occurrences represent either dead or relocated wolves.

There are no known wolf occurrences in the vicinity of Mason Dam, with the nearest known occurrences being near the Eagle Cap Wilderness and northern Union County. The wolf can occur in a number of different habitat types, with the Oregon occurrences all in forested habitats. According to ODFW, all of the Blue Mountains could provide suitable habitat (Oregon Department of Fish and Wildlife, 2005). The Mason Dam area provides suitable forested habitats with an abundance of deer prey, along with secondary prey such as beavers, ravens, eagles and fish. As such, the wolf could enter the Mason Dam area and occupy it in the future.

WOLVERINE

CALIFORNIA WOLVERINE

The California wolverine is an Oregon-threatened species that is found in California, Oregon, Washington, and part of southern British Columbia. The wolverine is a high elevation species that is found in subalpine forest and alpine meadows. In Oregon, the species has been recorded from Mount Hood, McKenzie Valley, near Three Fingered Jack Mountain and Steen's Mountain in Harney County. The Mason Dam project area does not provide suitable habitat for the California wolverine.

NORTH AMERICAN WOLVERINE

In 2010 the North American wolverine was identified as a candidate species. The FWS identified the wolverine as a Proposed Threatened species on February 1, 2013 and the state has also listed is at threatened. Recently, three wolverines were confirmed in the Eagle Cap Mountain (Wallowa, Baker and Union counties) (FWS 2013, Magoun etal. 2013). Wolverine habitat in Oregon consists entirely of high elevation habitats as the female requires deep snow for denning. The FWS considers high-elevation forests of the Cascade, Blue Mountains, Wallowa Mountains, and Ochoco Mountains to provide suitable habitat. Other than the Eagle Cap Mountains, other likely areas with suitable habitat include Mt. Jefferson, Mt. Washington, and Three Sisters wilderness areas (Hiller and McFadden-Hiller 2013). Habitats are typically remote, and the species is generally elusive. As a result, little is known about the species life history other than it is solitary, wide-ranging and territorial, with generally low reproduction and life expectancy of 10 to 12 years. The Mason Dam project area does not provide suitable habitat for the North American Wolverine.

3.2.3 PROJECT EFFECTS ON WILDLIFE RESOURCES

The project would result in permanent loss of less than one acre of dry grassland habitat due to construction of the new substation located in the Idaho Power corridor. Minimal tree clearing would be required for transmission line construction and would not significantly impact the

amount and quality of forest habitat in the project area. Both grassland and forest habitat types are prevalent in the project area and the projected habitat loss is not expected to have a significant long-term adverse effect on wildlife.

The proposed construction of an overhead power line introduces a potential risk for avian collisions and electrocution, especially in the 150 ft open corridor near the base of the dam. In order to avoid these risks, all overhead lines will be constructed using Avian Line standards.

Noise and activity during project construction could result in short term displacement of some project area wildlife. Displaced animals would be expected to move to nearby areas having similar habitat characteristics.

Project Effects On Spotted Frogs

There is no spotted frog habitat between Mason Dam and the gauging station, but there is potential habitat beginning at a point 0.5 mile downstream. During both construction and operation all water quality standards will be met resulting in no impact to possible populations of spotted frogs.

Project Effects on Bald Eagles

Except for a small area to the west of Black Mountain Road, the BEMA is outside of the direct Mason Dam project area. The majority of the BEMA is in the area of indirect project influence. Specific BEMA management prescriptions that apply to indirect impacts include noise and flyway disruption. Other activities such as stand age management within the BEMA are not pertinent to this project.

Bald eagles are sensitive to disturbance at any time, but particularly so during the breeding season especially when returning to the area to mate. As a result, nesting occurs most commonly in areas free of human disturbance. Nesting sites are often chosen to be more than 0.75 miles (approximately 4,000 feet) from low-density human disturbance and more than 1.2 miles (approximately 6,400 feet) from medium- to high-density human disturbance (USDA Forest Service, 1993). There is no set buffer around the eagle nest specified in the BEMA. Buffer zones of approximately 500 to 1,000 feet from active nests have been recommended in the Northwest (Grubb & King, 1991; Nowak, Powder River Subbasin Plan, 2004). Some recommend larger buffer zones in which general human activities are restricted within 0.5 miles of nests (2,640 feet) between January and August, with logging, road building, boat launch facilities and other relatively loud activities prohibited within 0.25 miles (1,320 feet) of nests.

Project construction is not expected to adversely affect bald eagle nesting and breeding since the known nest site at Phillips Reservoir is approximately 2.5 miles (13,200 feet) from the base of Mason Dam. Any potential noise disturbance would be to roosting or foraging eagles, not to nesting eagles. Construction activity may cause bald eagles to avoid foraging near the dam on a temporary basis. The project is expected to have no significant adverse effect on bald eagles.

Project Effects on Gray Wolves

The proposed project would not cause loss of any significant amount of habitat suitable for wolves or for wolf prey animals; therefore, the project is expected to have no significant adverse effect on the gray wolf.

Project Effects on California Wolverines

The project area contains no habitat suitable for the California wolverine and is expected to have no effect on this species.

Project Effects on North American Wolverines

The project area contains no habitat suitable for the North American Wolverine and is expected to have no effect on this species.

3.2.4 Proposed Protection, Mitigation and Enhancement (PM&E) Measures for Wildlife Resources

It is expected that the project will not have an adverse affect on wildlife resources; therefore no mitigation measures are proposed.

3.3 Vegetation Resources

3.3.1 Existing Vegetation Resources

Vegetation mapping was performed by EcoWest Consulting during 2007 and 2008. The study area extends for 100 feet beyond the perimeter of the proposed powerhouse, tailrace and substation facilities and 50 feet on each side of Black Mountain Road. Features of each encountered habitat were recorded in a manner that permitted habitat classification according to various classification methods in common use (EcoWest Consulting, 2009b). A summary of the vegetation communities found within the project area is provided in Table 17 and Figure 14. Detailed habitat descriptions may be found in the EcoWest Study Plan 2 & 3 report, which is on file with FERC.

TABLE 17: SUMMARY OF PROJECT AREA VEGETATION TYPES

HABITAT TYPE	**ACRES**	**LOCATION WITHIN PROJECT AREA**	**DESCRIPTION**
Open Water	0.78	Powder River below Mason Dam	Open waters of dam tailrace and Powder River

HABITAT TYPE	ACRES	LOCATION WITHIN PROJECT AREA	DESCRIPTION
Powder River riparian	0.59	Both sides of Powder River below Mason Dam	Narrow zone on river banks; primarily shrub/cottonwood wetland dominated by black cottonwood and alder; includes small herbaceous wetlands dominated by creeping bentgrass and big leafed sedge
Unnamed spring riparian	1.04	Along spring at south end of transmission route	Narrow zone flanking 1- 3 ft wide water channel; dominant species are creeping bentgrass, alder and dogwood; shaded by adjacent dry coniferous forest habitat type
Dry grassland	4.14	Along access road to tailrace; beneath Idaho Power transmission line	Mostly non-native species including intermediate and bearded wheatgrass; scattered Ponderosa pine, sagebrush and rabbitbrush also occur, with Oregon grape beneath transmission line
Rock/talus slope	5.93	Hillside above north bank of Powder River	Steep slope area below Black Mountain Road; 10 – 15% Ponderosa pine cover, 17% shrub cover dominated by serviceberry; patchy herbaceous layer
Bare	7.33	Face of dam; roadways	Disturbed areas
Mixed coniferous forest	7.52	Upper portion of transmission line route	Canopy dominated by Douglas fir (45%) with Ponderosa pine sub-dominant (15%) and small amount of larch and grand fir; shrub cover variable from 15% to 35% cover, dominated by young conifers and snowberry; herabecous layer a mixture of pine grass, elk sedge, and blue wild rye
Dry coniferous forest	31.97	Hillside above south bank of Powder River; transmission line route; lands flanking Idaho Power transmission line right-of-way	Relatively open canopy (≤ 50%); Ponderosa pine dominated with small (<1% - 10% canopy cover) provided by Douglas fir and lodgepole pine; dominant shrub species variable including snowberry, Oregon grape and young conifers; dominant herbaceous species variable including Idaho fescue, pine grass, Geyer's sedge
TOTAL	54.43		

In general, the overall project area is dominated by dry coniferous forest, mainly Ponderosa pine. Most of the mapped acreage is associated with the proposed transmission line route. The powerhouse area consists mainly of bare disturbed ground. A narrow riparian zone on the banks of the Powder River begins at the downstream end of the Mason Dam stilling basin (Figure 14).

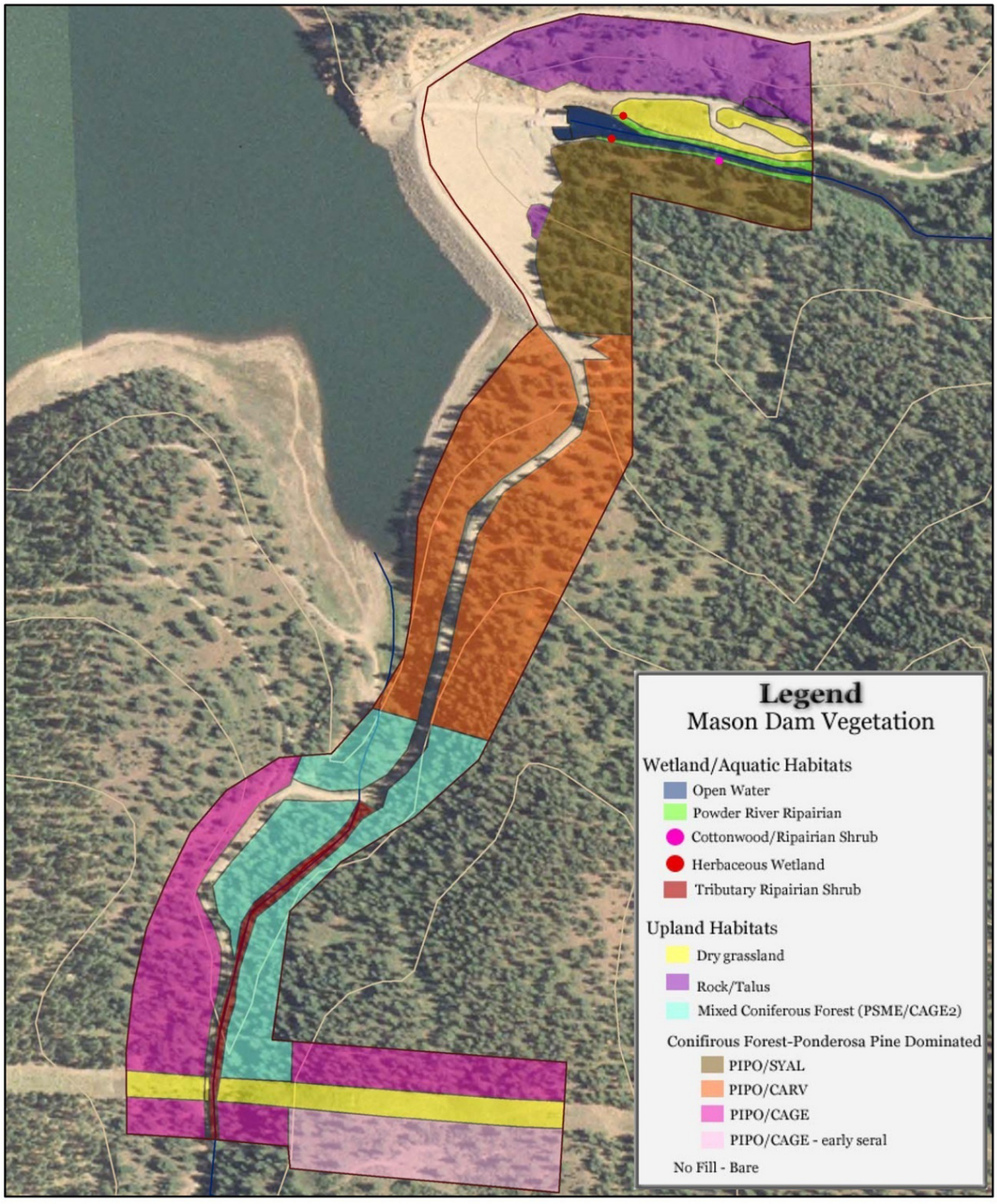
3.3.2 WETLANDS

Wetland mapping was performed as part of the comprehensive vegetation surveys conducted by Baker County in 2007 and 2008 (EcoWest Consulting, 2009b). Herbaceous wetlands occur in three small patches (totaling 0.07 acres) within the Powder River riparian zone (Figure 13). One herbaceous wetland patch occurs along the north bank of the Powder River at the beginning of the vegetated zone below the stilling basin. The wetland is dominated by creeping bentgrass (80% cover). Young black cottonwoods provide 20 percent cover in the shrub layer. Flow releases from Phillips Reservoir provide the current hydrologic support for the wetland. The Cowardin classification is PEMK: palustrine emergent marsh, hydrology artificially maintained.

Riparian wetlands also occur along the extent of the small unnamed stream east of Black Mountain Road that enters Phillips Reservoir (Figure 14). The unnamed tributary is spring-fed, with a narrow channel ranging from 1 to 3 feet wide and 1 foot deep. The water depth in the channel ranged in depth from 0 to 6 inches at the time of the fall 2007 surveys, with portions of the channel dry. The channel contained flow throughout the growing season in 2008 in the upper segment, but dried during the fall in the lower, steeper segment. Besides spring support, the tributary stream flow is likely also supplemented by snowmelt and other runoff. The herbaceous layer is dominated by creeping bentgrass. Large-leaf Avens occurs throughout the riparian area. The Cowardin classification for the dominant wetland community types is PSSC: palustrine shrub-scrub, seasonally flooded. There are a total of 1.04 acres of riparian wetlands along the unnamed tributary, of which 0.48 acres of wetlands are located above the slope break (and within the potential construction area) and 0.56 acres below the slope break (and outside of the construction area).

The proposed transmission line would cross above the riparian wetland zone along the unnamed tributary. The location of this intersection corresponds to the area of ‘tributary riparian shrub’ that intersects the strip of ‘dry grassland’ in the southern portion of the map on Figure 14.

FIGURE 14: VEGETATION MAP OF MASON DAM PROJECT AREA



3.3.3 NOXIOUS WEEDS

Existing information on noxious weeds in and near the Project area is limited. No known dedicated noxious weed surveys had been conducted in Forest Service-owned portions of the

study area prior to the 2007 – 2008 vegetation mapping by EcoWest Consulting (EcoWest Consulting, 2009b). A total of 211 vascular plant species were observed and verified to species/subspecies during vegetation surveys. Of the above 211 plant species 13 are on the noxious/invasive weed lists provided by Baker County and Forest Service (Table 18). In December 2008, the locations of the previously noted weed populations were mapped and the number of individuals tallied. The data collected during the previous surveys for the related botanical resources allowed these weed concentrations to be readily relocated.

TABLE 18: NOXIOUS WEEDS OBSERVED IN THE PROJECT AREA

COMMON NAME	SCIENTIFIC NAME	BAKER COUNTY	FOREST SERVICE RANGER DISTRICT	REGIONAL FOREST SERVICE FOR PACIFIC NORTHWEST
Spotted knapweed	Centaurea macalusa	A	1	-
Diffuse knapweed	Centaurea diffusa	A	1	-
Scotch thistle	Onopordum acanthium	A	2	-
Canada/bull thistle	Cirsium valgare	B	4	-
Teasel	Dipsacus fullonum	B	2	-
Sulfur cinquefoil	Potentilla recta	B	2	-
Common mullein	Verbascum thapsis	C	-	-
Canada thistle	Cirsium arvense	-	2	-
Cheatgrass	Bromus tectorum	-	-	X
Orchardgrass	Dactylis glomerata	-	-	X
Prickly lettuce	Lactuca serriola	-	-	X
Yellow sweetclover	Melilotus officinale	-	-	X
Stinging nettle	Urtica dioica	-	-	X

KEY: A = mandatory control county wide; B = widespread and/or high concern; C = widespread and/or moderate concern; 1 = Goal is to eradicate new populations and/or control existing populations of these aggressive species; 2 = Goal is to contain existing populations of aggressive species; 4 = Goal is to contain existing populations of less aggressive species; X = not categorized

Mapping included all species listed on the Baker County 2008 Noxious Weed List (Baker County, 2008) and the species listed as invasive species in the Wallowa-Whitman National Forest Invasive Plant Program EIS (USDA Forest Service, 2009).

3.3.4 THREATENED AND ENDANGERED PLANTS

Table 19 shows the federal listed threatened, endangered or special status plant species that are potentially present in Baker County (Oregon Natural Heritage Information Center, 2007; US Fish and Wildlife Service, 2009). Only one of these species, Howell's spectacular thelypody, is a federally listed threatened/endangered/candidate species. All of the species in Table 19 as well as Forest Service special status species were evaluated for potential adverse project impacts during surveys conducted in 2007 and 2008 by EcoWest Consulting (EcoWest Consulting, 2009b). More than 200 vascular plant species were recorded during the vegetation surveys. No federally or state threatened, endangered or special status plant species were observed.

Non-vascular species were also evaluated using specifically targeted surveys. Although there were 11 lichens, and a number of moss species/genera identified in key microhabitats, none of these were sensitive species (EcoWest Consulting, 2009b).

TABLE 19: FEDERAL AND STATE LISTED PLANTS THAT COULD POTENTIALLY OCCUR IN BAKER COUNTY

COMMON NAME	SCIENTIFIC NAME	HERITAGE RANK	FEDERAL STATUS	STATE STATUS	ORNHIC LIST
Howell's spectacular thelypody	Theylpodium howelli spp. spectabilis	G2T1,S1	LT	LE	1
Upward-lobed moonwort	Botrychium ascendens	G2G3,S2	SOC	C	1
Crenulated grape-fern	Botrychium crenulatum	G3,S2	SOC	C	1
Twin-spike moonwort	Botrychium paradoxum	G2S1	SOC	C	1
Stalked moonwort	Botrychium pedunculosum	G2G3,S1	SOC	C	1
Clustered lady's-slipper	Cypripedium fasciculatum	G4,S3	SOC	C	2
Cronquist's stickseed	Hackelia cronquistii	G3,S3	SOC	LT	1
Red-fruited lomatium	Lomatium erythrocarpum	G1,S1	SOC	LE	1
Cusick's lupine	Lupinus Lepidus var. cusickii	G1T1,S1	SOC	LE	1
Snake River goldenweed	Pyrrocoma radiate	G3,S3	SOC	LE	1
Wallowa ricegrass	Achnatherum wallowaensis	G2G3,S2S3	SOC	-	1

COMMON NAME	SCIENTIFIC NAME	HERITAGE RANK	FEDERAL STATUS	STATE STATUS	ORNHIC LIST
Biennial stanlaya	Stanleya confertiflora	G1,S1	SOC	-	1
Oregon semaphore grass	*Pleuropogon oregonus*	G1,S1	SOC	LT	1

KEY: LE = Listed Endangered; LT – Listed Threatened; SOC = Species of Concern; C = Candidate; ORNHIC 1 = threatened with extinction throughout entire range; ORNHIC 2 = threatened with extirpation from the State of Oregon

HOWELL'S SPECTACULAR THELYPODY

Howell's spectacular thelypody is listed as endangered by the State of Oregon and as threatened by FWS. It is known only from 11 sites (five populations) in Baker and Union Counties, Oregon. All of the known sites are located within a 15-mile radius of Haines in Baker County, within the Baker-Powder River valley. Occupied habitats include alkaline wet to mesic meadows within valley bottoms between elevations of 3,000 to 3,500 feet. Common associates include great basin wild rye (*Leymus cinereus*), with greasewood (*Sarcobatus vermiculatus*) typically occurring along the habitat fringes. The FWS considers that all moist, alkaline meadows dominated by greasewood, great basin wild rye or saltgrass between 3,000 to 3,500 feet in elevation within Baker, Union and Malheur Counties represent potential suitable habitat for the species (US Fish and Wildlife Service, 1999).

3.3.5 PROJECT EFFECTS ON VEGETATION RESOURCES

3.3.5.1 EXISTING VEGETATION RESOURCES

Construction of the powerhouse and tailrace at the base of Mason Dam would not cause any permanent loss of existing vegetated habitat. Construction of these facilities would occur in previously disturbed areas barren of vegetation. The existing recreation parking area located just downstream of Mason Dam on the north side of the river would be used for construction staging, thus eliminating the need for any additional disturbance to existing habitat.

Construction of the 0.8 mile long overhead transmission line would result in the loss of a small amount of forest habitat. The 12.47 kV line would require a 40 – 50 ft wide cleared corridor. The route will follow Black Mountain Road and interconnect with an existing Idaho Power 138 kV transmission line (Figure 2). The route will consist of five segments with the following tree clearance requirements:

Segment 1: 150 ft across open space at the base of the dam. This segment would require no tree clearance.

Segment 2: 500 ft through sparse trees to Black Mountain Road. This segment would require a 40-ft x 500-ft corridor clearance through sparse trees.

Segment 3: 1900 ft along Black Mountain Road to the unnamed tributary, crossing the road as necessary to minimize tree clearance. This segment would require clearance of few trees.

Segment 4: 1300 feet on the west side of Black Mountain Road to the Idaho Power Corridor. This segment would require clearance of a few trees on the northern end of the segment and a 20-ft x 900-ft corridor on the southern end of a segment.

Segment 5: 550 ft along the Idaho Power corridor to a new substation and interconnect. This segment would require no tree clearance.

The interconnect with Idaho Power would require construction of a small substation within the Idaho Power corridor, which would cause permanent loss of less than 0.2 acres of dry grassland.

Routine project operation and maintenance would utilize existing Reclamation, Forest Service and Idaho Power roads and parking areas and would have no effect on existing habitat.

3.3.5.2 WETLANDS

No direct loss or disturbance to the Powder River riparian zone is expected to occur since the riparian zone begins at the downstream end of the stilling basin and construction would occur at the upstream end of the pool (see Figure 15).

FIGURE 15: PHOTOGRAPH OF SOUTH BANK OF MASON DAM TAILRACE POOL SHOWING LIMIT OF POWDER RIVER RIPARIAN ZONE

The potential adverse effect to the Power River riparian zone from sedimentation caused by construction would be minimized by use of industry standard erosion control practices. The

details of the erosion control practices to be employed during construction and operation of the proposed project are included in the Erosion Control Plan in Appendix D.

The transmission line would be located on the side of Black Mountain Road opposite from the unnamed tributary riparian zone. Incidental travel outside of approved construction areas would be prohibited. All disturbed areas would be re-vegetated with beneficial plant species per the Re-vegetation/Noxious Weed Management Plan which is included in Appendix E.

3.3.5.3 Noxious Weeds

The species of greatest concern in the study area due to their highly invasive nature, proximity to special habitats, and proximity to construction or staging areas are diffuse knapweed, creeping and bull thistles, teasel and sulfur cinquefoil (EcoWest Consulting, 2009b). Several measures would be taken to eliminate noxious weeds and deter their growth in the project area. These are described in the Re-vegetation/Noxious Weed Management Plan, included in Appendix E.

3.3.5.4 Threatened and/or Endangered Species

The project is expected to have no effect on spectacular thelypody or any other special status plant species since none of these plant species were observed in the project area. With regard to Howell's spectacular thelypody, neither the plant nor the habitat and plant associations favored by the plant were observed in the project area.

3.3.6 Proposed PM&E Measures for Vegetation Resources

Due to the lack of impact from construction and operation activities, no mitigation measures other than the Re-Vegetation/Noxious Weed Management Plan (Appendix E) are proposed for vegetation resources. Costs for the Re-Vegetation/Noxious Weed Managment Plan are incorporated into the project construction costs.

4 Report on Historical and Archaeological Resources

4.1 Existing Historical and Archaeological Resources

An Area of Potential Effect (APE) was established for cultural resource impact evaluation. The selected APE corresponds with the limits of the vegetation survey shown in Figure 13. The APE includes areas directly impacted through clearing, construction, and maintenance as well as 100 foot buffers around the powerhouse and tailrace facilities and substation, and 50 feet on either side of the transmission line route.

Two studies were conducted to gather information on the existing cultural and historic resources in the project area. Both studies were conducted by registered archaeologists who performed library research, examination of previous studies, and physical examination of the proposed project site. The first study focused on Traditional Cultural Properties (TCPs) and was conducted by the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) (Karson, 2009). The

second study focused on Archaeological and Historic-era Properties and was conducted by Kathryn M. Boula, MA, RPA archaeologist (Boula, 2009). The archeology study included background/archival research and a cultural resources inventory of the APE. Both reports are on file with FERC, and contain further details about cultural properties in the project vicinity, including maps of the terrain surveyed by the studies.

4.1.1 Traditional Cultural Properties

Phillips Reservoir falls well within the usual and accustomed areas used by the CTUIR. The upper Powder and Burnt River Basins, while far from the reservation where people reside today, is an area for which many people still hold memories and knowledge and continue to pass this knowledge and information on to the next generation.

The Elkhorn Mountain Range and upper and lower segments of the Powder River Basin have been historically used by members of the CTUIR. Tribal oral history details travel routes and seasonal activity; indigenous place names reveal natural and cultural resource information connected to the landscape and these sites are identified as TCPs. The Powder River basin is a location where people traveled to for part of their subsistence, cultural endurance, and spiritual survival. Because the earth offered so much in the way of natural resources, this is a place the people promised to protect, and to obey *tamánwit* (the law).

The Powder River is a traditional fishery of the CTUIR, meaning that the CTUIR have used the river historically for fishing purposes. Mason Dam and other dams have altered the free flowing Powder River and prevent an important traditional resource, salmon, from being harvested on the tribe's ceded lands.

This area was and continues to be of importance to the CTUIR. Descendants of those who used to travel to the region for subsistence purposes on a seasonal basis still return to accessible areas to pursue hunting, fishing, and gathering activities in the region. The core activities associated with the Phillips Reservoir region include fishing, hunting, habitation, gathering of obsidian resources, burial areas and physical and spiritual vision questing.

4.1.2 Archeological and Historic-era Properties

No archeological or historic-era resources of any kind were found during the inventory survey, including previously recorded isolates. Based on the field survey and literature review, no further archeological review is deemed necessary in the area surveyed.

4.1.3 Oregon SHPO Review

Dennis Griffin Ph.D., RPA reviewed both reports. For the archeological and historic-era properties report, Mr. Griffin said the following in a letter dated January 13th, 2009:

> *"…agree that the project will have no affect on any known cultural resources. No further archaeological research is needed with this project. …if during development activities*

you or your staff encounters any cultural material (i.e., historic or prehistoric), all activities should cease immediately and an archaeologist should be contacted to evaluate the discovery."

Dennis Griffin also reviewed the Traditional Cultural Properties report but had no comment due to the fact that the report provided to him did not contain enough information due to its sensitivity.

4.2 Project Effects on Historical and Archaeological Resources

The TCP study of the project area found that no important historic properties of religious and cultural significance to the CTUIR are present within the proposed project impact area. The study concluded that there would be no direct effects, either positive or negative, on any known cultural resources. Indirect effects, such as changes in landscape, would be minimal because the proposed project does not affect the existing dam or reservoir. These conclusions were submitted to the state, which responded by concurring that there would be no negative impacts on cultural resource properties.

The importance of cultural resources in the Powder River Basin to CTUIR cannot be overstated. The significance of these places continues today through the continued use, traditions, and stories that have been passed down through the generations. These locations are a physical link with the CTUIR and its history and religion. At various times, Indians have been excluded from participating in traditional cultural and spiritual practices, but these places are rooted in the Tribes' history and are important elements for perpetuating the CTUIR's ongoing cultural identity. CTUIR culture and the natural environment cannot be separated.

Past developments on the Powder River have had an adverse effect on the Powder River and CTUIR traditional use areas, including some that are now under Philips Lake. However, the impacts to the Powder River in the project area have already occurred. The construction and retrofit of the hydropower facility at Mason Dam should not further adversely affect these sites.

Since no archeological or historic-era properties were found during field inventory, the project would have no effect on any known properties.

4.3 Proposed PM&E Measures for Historical and Archaeological Resources

Changes in facility locations could make additional surveys necessary. In the event that archaeological resources or human remains are inadvertently discovered during the course of project construction, all ground disturbing activities must cease and the Wallowa-Whitman Forest Archaeologist, Oregon SHPO and CTUIR would be contacted immediately for further instruction.

5 Report on Socio-Economic Resources

5.1 Existing Socio-Economic Resources

Baker County, which was established in 1862 encompasses an area of 3,068 square miles. With a population of 15,983, the population density is 5.5 people per square mile. Fifty-seven percent of the population lives in the eight incorporated cities: Baker City, Greenhorn, Haines, Halfway, Huntington, Richland, Sumpter, and Unity. General population and socioeconomic statistics for Baker County are presented in Table 20.

TABLE 20: KEY SOCIO-ECONOMIC STATISTICS FOR BAKER COUNTY AND STATE OF OREGON

SOCIO-ECONOMIC PARAMETER	**BAKER COUNTY**	**OREGON**
POPULATION		
Total, April 1, 2000	16,741	3,421,437
Total, Estimated 2008	15,983	3,790,060
Persons under 5 years old, percent 2008	4.90%	6.40%
Persons under 18 years old, percent 2008	19.50%	22.90%
Persons 65 years old and over, percent 2008	21.40%	13.30%
EDUCATION		
Population 25 years and over		
High school graduates, 2000	80.30%	85.10%
Bachelor's degree or higher, 2000	16.40%	25.10%
Housing		
Housing units, 2007	8,743	1,609,595
Households, 2000	6,883	1,333,723
Homeownership rate, 2000	70.10%	64.30%
INCOME		
Median household income, 2007	$36,942	$48,735
Mean earnings, 1999	$35,103	NA

Primary industries providing employment in Baker County include education, health and social services (16.1%); agriculture, forestry, fishing, hunting, and mining (14.4%); and retail trade (10.9%) (Table 21) (U.S. Census Bureau, 2009b). The estimated median household income is $36,942, nearly $12,000 below the state average. Residences with income below the poverty level in Baker County are estimated at 17.7%, compared to a state average of 13%.

TABLE 21: KEY EMPLOYMENT STATISTICS FOR BAKER COUNTY AND STATE OF OREGON

EMPLOYMENT STATISTICS, BAKER COUNTY	NUMBER	PERCENT
Population 16 years and over, 2000	13,197	100
In labor force	7,333	56
Civilian labor force	7,324	55.5
Employed	6,717	50.9
Unemployed	607	4.6
Armed Forces	9	0.1
Not in labor force	5,864	44.4
OCCUPATION		
Employed civilian population 16 years and over	6,717	100
Management, professional and related	2,048	30.5
Service	1,227	18.3
Sales and office	1,504	22.4
Farming, fishing, and forestry	231	3.4
Construction, extraction, and maintenance	628	9.3
Production, transportation, and material moving	1,079	16.1
INDUSTRY		
Agriculture, forestry, fishing and hunting, and mining	965	14.4
Construction	478	7.1
Manufacturing	635	9.5
Wholesale trade	112	1.7
Retail trade	731	10.9
Transportation and warehousing, and utilities	434	6.5
Information	103	1.5
Finance, insurance, real estate, and rental and leasing	365	5.4
Professional, scientific, management, administrative and waste management services	258	3.8
Educational, health and social services	1,083	16.1
Arts, entertainment, recreation, accommodation and food services	651	9.7
Other services (except public administration)	474	7.1
Public administration	428	6.4

5.2 Project effects on Socio-Economic Resources

The Mason Dam Hydroelectric project is estimated to spend $3,100,000 on major construction works, 30% of which is estimated to be spent on Baker County goods and services. The project is also estimated to bring in $50,000 annually. This additional revenue source will be added to the general fund of Baker County to be used to secure current employment numbers as well as

support the services Baker County offers. This will have a net positive benefit on Baker County services and finances.

5.3 Proposed PM&E Measures for Socio-Economic Resources

No protection, mitigation, or enhancement measures are proposed with respect to socio-economic resources.

6 Report on Geological and Soil Resources

6.1 Existing Resources

Mason Dam is at the southeastern end of Sumpter Valley. The dam was completed in 1968 under Specifications No. DC-6355 (BOR, 2004). Mason Dam contains approximately 895,000 cubic yards of embankment. The crest, at elevation 4082 feet, is 35 feet wide and 895 feet long. The dam is a zoned, earthfill embankment having a relatively impervious core – Zone 1 flanked by a Zone 2 of sand, gravel, and cobble dredge tailings. A Zone 3 [rockfill] is placed at the upstream and downstream toes of the dam. Riprap protects the upstream slope. Zone 4 (a cobble and boulder blanket) protects the downstream face with a 3-foot selected rock blanket below elevation 3962 feet.

Overburden in the canyon floor and left abutment is quite shallow, ranging from 0 to 25 feet. In the right abutment, there is an alluvium-filled channel that bypasses the damsite. The overburden in this area reaches a maximum depth of 154 feet and extends 15 feet below the present river channel. This fill consists of a tight mixture of clay, sand, gravel, cobbles, and boulders. Available evidence indicates that the bulk of this material is moderately to very tight, and the designers believed that leakage through this alluvial channel would be negligible. Seepage at Mason Dam historically has not been a large amount (BOR, 2004).

Bedrock in the left abutment, canyon floor, and the lower 90 feet of the right abutment consists of a greenish-gray fine-grained, very hard, fresh instrusive andesite that has been metamorphosed. The rock, although cut by numerous joints, is generally fresh except for watering stains along the joint surfaces.

6.2 Project Effects on Geological and Soil Resources

The Mason Dam Hydroelectric project is anticipated to create minimal erosion to the 3-foot selected rock blanket on the downstream face of the dam during construction-related activities, and have no impact to geological and soil resources during operation. See Appendix D for Baker County's Erosion and Sediment Control Plan.

6.3 Proposed PM&E Measures for Geological and Soil Resources

To protect the geological and soil resources Baker County developed an Erosion and Sediment Control Plan that can be found in Appendix D. These measures will be implemented to ensure erosion does not occur. The cost of this plan and implementation is included in the license and construction costs associated with the project.

7 Report on Recreational Resources

7.1 Existing Recreational Resources

Baker County performed a project specific recreation study to determine the potential project impacts on recreation in the Mason Dam area (EcoWest Consulting, 2008). This report is on file with FERC and may be referenced for a full description of existing recreational resources, as well as results of surveys conducted. A combination of offsite data review and onsite mapping and surveys were used to identify the existing recreation facilities and visitor use and attitudes. Data on existing facilities was gathered from Forest Service maps and web sites (e.g., http://www/fs/fed/us/r6/w-w/recreation) and supplemented by visual inspection.

Several recreational facilities exist in the project area, summarized in Figure 16. Sites managed by the Forest Service include a recreation area, a picnic site, and trails. In addition, several areas along Black Mountain Road are used for dispersed, undeveloped camping.

The survey results indicate that visitors to the Powder River Recreation Area come to pursue various outdoors activities. Most visitors to the Powder River Recreation Area come to fish, sightsee or picnic (Figure 17). Groups are generally small (78% in groups from 1 to 3 people in size) and stay for an average of 0.9 hours, ranging from 0.1 to 12 hours. Most of the visitors are from Baker or nearby areas of eastern Oregon (74%) and come only for the day, not using the nearby Phillips Reservoir or Sumpter campgrounds for overnight stays. The greatest amount of recreation use occurs in the spring and summer, with lesser amounts in the fall and winter (with very limited to no parking available in the winter).

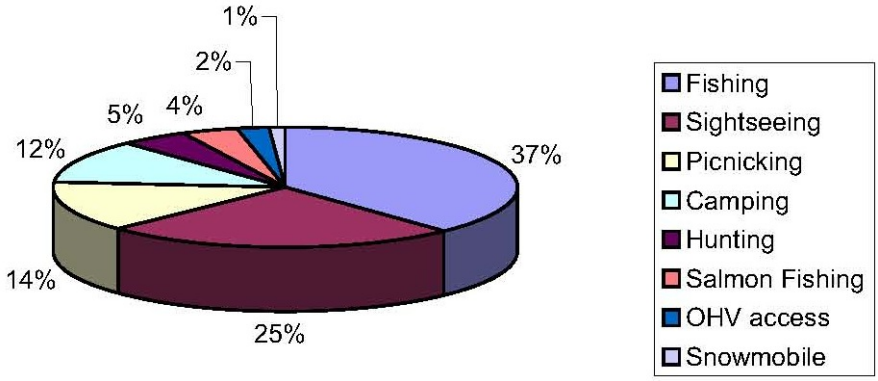
Based on a 95% confidence interval, between 9.5 and 14 groups use the Powder River Recreation Area during weekdays between May and September. On weekends, between 16.5 and 33.9 groups use the area. An average of 31 groups uses the area on holidays. Most groups consist of 3 or less people traveling in a single vehicle. Except for during unique events (such as a group baptism on 12-Aug), there were open parking spots on all survey dates.

Aspects of the area important to visitors were fairly evenly divided among restrooms, rustic nature, scenery, open pine forests, and the fishery. Features that visitors found to detract from the site experience were predominantly those that detracted from the scenery or ability to fish, such as trash, too many people to fish, or insufficient parking.

FIGURE 16: EXISTING RECREATIONAL FACILITIES

Facility Name	Distance from Mason Dam Facilities	Parking Spots	Other facilities	FS Management
Powder River Recreation Area				
Fishing Trails (FS map site 4)	1.25 mile	6 regular, 2 handicapped additional RV parking area	• Interpretative signs • 1 paved trail, 1 gravel trail • Bridge crossing river • Sitting benches	No restrooms or trash bins, inspected one a week; not plowed in winter
Recreation Area and Trailhead #630 (FS map sites 2 and 3; survey site 1)	1 mile	6 regular, 2 handicapped 2 spots for RV/trailer parking	• 2-Vault restroom • 2 picnic sites • Bridge crossing river • 1 paved trail, 1 gravel trail; connects to above site	Restrooms cleaned 3 times/week;no trash collection. Not plowed in winter
Picnic Site (FS map site 4; survey site 2)	0.1 mile	30 cars or 10 RVs	• 3 fire rings with picnic tables • Bridge crossing river • 2-Vault restroom	Restrooms cleaned 3 times/week; rated as a low use site by the FS; not plowed in winter
Black Mountain Road				
South Shore Trail #1610	Adjacent to the powerline corridor	None developed	Trail head	None
Dispersed Camping		3 areas commonly used; 2 at the site of a former developed area and 1 just above the end of the powerline corridor	None	None

FIGURE 17: PERCENTAGE OF USE BY TYPE



Plans to change the area by removing some of the developed facilities were not favored, although a number of visitors indicated no concerns as long as fishing access was maintained. A majority of visitors stated that the addition of a powerplant at the base of Mason Dam would not affect their recreational visits to the area, but some conditioned their responses on the assumptions that there would be no additional taxes or fees, or that there would be no effects on either the fishery or site access after construction.

7.2 Project Effects on Recreational Resources

The project is not expected to cause any long-term adverse impacts to the existing recreation resources. Noise from the powerhouse turbine/generator unit would be less than the noise level currently produced by water discharge from the project high pressure slide gate valves. Project facilities would not eliminate any existing fishing access to the Powder River or Phillips Reservoir. The project is not expected to alter fish entrainment through Mason Dam, and is predicted to decrease mortality for entrained fish. Therefore, fishing quality on the Phillips Reservoir is not expected to change, while fishing quality below Mason Dam could potentially improve.

Public parking at the parking area just below the dam may be restricted during construction activities since this parking area is proposed as a construction staging area. Lane restrictions and some minor delays may occur for Black Mountain Road during the transmission line installation into the Black Mountain Road right-of-way. It may be necessary to restrict fishing access to the Mason Dam stilling basin during parts of powerhouse and tailrace construction.

7.3 Proposed Protection, Mitigation and Enhancement (PM&E) Measures for Recreational Resources

The Forest Service and Baker County would use recreation data to identify construction timelines that would have the least impact on recreation access and use. A significant amount of construction would likely occur during the winter, when recreation use is lowest. Baker County

would consult with the Forest Service on appropriate paint colors and materials to make the facilities blend in with the surrounding area and minimize visual impact.

Because most construction would occur during the winter, use of recreational parking space for construction activities would most likely not interfere with recreation. In addition, Baker County would consult with the Forest Service to ensure that there would be ample parking space for recreation during all construction stages. The cost and implementation of the above are included in the construction costs associated with the project.

8 Report on Aesthetic Resources

8.1 Existing Aesthetic Resources

The project is mostly located in the Wallowa-Whitman National Forest within the Powder River Basin. Open, south-facing slopes dominated by drought-tolerant shrubs rise from the Powder River, transitioning through stands of western juniper and Ponderosa pine. Shady north-facing slopes support mixed conifer forests with well-developed understories. Subalpine mixed coniferous forests and true alpine conditions are found at the crest of Elkhorn Ridge. From Phillips Reservoir and Highway 7 the project is not visible. From the Black Mountain Road and from the parking lot of the Forest Service Recreation site closest to the dam you can see the project site (Figure 18).

Currently there are cement structures that make up the Mason Dam valve house, tail race, and spillway (Figure 19). A large concrete spill way extends from the top of the dam to the stilling basin. The Idaho Power power line has its own right-a-way that has been cleared of all trees and can be seen in aerial photos (Figure 18), but is not visible from any of the major roadways in the area. Phillips Reservoir is the dominant visual feature observable from Highway 7 west of the dam site.

FIGURE 18: AERIAL PHOTOGRAPH OF THE PROJECT AREA

FIGURE 19: PHOTOGRAPH OF EXISTING STRUCTURES AT BASE OF MASON DAM

8.2 Project Effects on Aesthetic Resources

The powerhouse area would not be visible from Phillips Reservoir or from Highway 7, but would only be visible for about 1,500 ft along Black Mountain Road and the dam access road and from the top of the dam. The powerhouse facilities would be placed in areas that have previously been disturbed by human action. The most visible structure would be the new powerhouse located next to the valve house with a backdrop of Mason Dam, which is covered with large cobble. In general, the project is expected to blend in with its surroundings. The Forest Service would be consulted in color selection to have the least amount of visual impact.

The transmission line route would be largely screened by forest cover and topography. Nevertheless, the existence of the new overhead line, as well as the loss of some trees to clear room for the line, would represent long-term impacts to visual resources. No other visual impacts are expected. The substation constructed at the interconnect point would be visible only from a short segment of Black Mountain Road where it crosses the cleared corridor containing the 138 kV Idaho Power line.

Project operations would not affect reservoir water levels or the appearance of the reservoir.

8.3 Proposed PM&E Measures For Aesthetic Resources

Baker County would consult with the Forest Service on appropriate paint colors to make the facilities blend in with the surrounding area. The cost for these measures are included in the construction costs.

9 Land Management

9.1 Existing Land Management

Baker County, which was established in 1862 encompasses an area of 3,068 square miles. The USDA Forest Service and the Bureau of Land Management manage over 50% of the total area of Baker County. With a population of 15,983, the density is only 5.5 people per square mile. Fifty-seven percent of the population live in one of the eight incorporated cities in the County.

Gold mining was what brought the original settlers to Baker County. Subsequent generations of Baker County residents have worked in the forests and fields, relying on a traditional foundation of agriculture and timber to drive the local economy. Baker County seeks to continue to use its natural resources to create jobs, promote economic recovery, enhance energy efficiency and reliability, provide recreation opportunity and generally improve the quality of life in the everyday lives of its citizens.

The Forest Service manages the Wallowa-Whitman National Forest for multiple purposes, including grazing, timber harvest, public recreation and fish and wildlife habitat. The Forest Service has also granted special use authorizations for other uses such as the Idaho Power 138 kV transmission line. The small portion of the project located on Forest Service lands is used primarily for wildlife habitat and public recreation. The main function of the specific parcels that will be affected by the project is public access since the project effects will be confined to the Black Mountain Road corridor. During construction the project could potentially impact a recreation parking facility constructed by the Forest Service a short way below Mason Dam.

The lands used for Mason Dam and Phillips Reservoir were withdrawn from the Forest Service in order to develop the Baker Project. The Baker Project is one of the major Reclamation projects developed in the early part of the 20th century to promote agricultural development in the west. Mason Dam was added in the 1960s. Mason Dam and Phillips Reservoir provide significant socio-economic benefits to Baker County as follows:

Irrigation – Releases from Phillips Reservoir provide water to 19,000 acres of land. Principal crops such as alfalfa hay, grain, grass hay, pasture and some seed are produced from the irrigation waters.

Flood control – There are 38,000 acre-feet of storage assigned to flood control. Of this 38,000 acre-feet, 17,000 acre-feet are exclusively for flood control, which may not be retained for irrigation but must be released as soon as possible within specified discharge and stream flow constraints. The remaining 21,000 acre-feet are assigned jointly to irrigation and flood control.

Recreation – There are recreation facilities for camping, picnicking, swimming, hiking, biking, fishing, and boating on 5,038 acres in the Phillips Reservoir area and the almost 13 miles of shoreline.

Reclamation operates Mason Dam and Phillips Reservoir to continue supplying these benefits to the local population.

9.2 Project Effects on Land Management

The Mason Dam project could cause temporary impacts during construction to recreation traffic on Black Mountain Road and parking at the Forest Service recreation site downstream of the dam. Noise and construction traffic could adversely impact recreation in the immediate vicinity of the dam for a short period.

The project would not adversely impact the existing agricultural, flood control and recreation benefits provided by Mason Dam and Phillips Reservoir in the long term. The sale of electric power would provide revenue that the County may use to further promote proper land management of the area.

9.3 Proposed PM&E Measures for Land Management

Mitigation measures related to land management include all measures previously discussed that would assure uninterrupted water delivery, minimize impacts to fish, wildlife and plant habitat, and minimize impacts to public recreation. This would not incur any additional costs.

10 Alternative Locations, Designs, and Energy Sources

10.1 Alternative Sites Considered

This project was developed to utilize the existing Mason Dam structure and facilities, no other sites were considered.

10.2 Alternative Facility Designs, Processed or Operations

Baker County previously proposed to install fish screens at the Mason Dam intake in order to prevent fish entrainment. This proposal was approved by FERC, and Baker County was exempted from conducting fish entrainment and mortality studies. However, a subsequent analysis determined that installation of a fish screen would not be economically feasible due to the combination of high flow capacity (875 cfs) and deep screen submergence (95 ft) at the water intake structure in Phillips Reservoir.

To evaluate design options, investigation was done on existing submerged screen installations throughout the western US. Detailed information was found for five submerged fish screen projects, all in Pacific Northwest watersheds where ESA-listed salmon and steelhead are found. The closest project to Mason Dam in terms of water depth is Howard Prairie, with a water depth of 57 feet compared to 95 ft for Mason Dam. The Howard Prairie screen structure is much smaller than would be required at Mason Dam due to the maximum flow of 95 cfs compared to 875 cfs for Mason Dam. Additionally, the Howard Prairie installation capitalized on an advantageous intake configuration, which permitted deployment of the screen using rails on the embankment of the dam itself, i.e. no new tower structure was required. This design would not work at Mason Dam because the current intake is not located on the dam embankment; the Mason Dam intake is elevated above the reservoir bottom near the upstream toe of the dam.

The other four designs were located in shallow water. Except for East Unit, which is a pumping station rather than a dam outlet, the screen designs included new tower structures to provide access to the screens. A corollary tower structure at Mason Dam would be a much more significant structure due to the screen size (875 cfs) and water depth (95 ft).

An initial estimate of the cost for a tower and screen at Mason Dam is provided below (Table 22):

TABLE 22: COST ESTIMATE FOR MASON DAM FISH SCREEN

ITEM	DESCRIPTION	ESTIMATED COST	NOTE
1	Tower foundation	$400K - $600K	Submerged
2	Tower	$400K - $500K	Submerged
3	Access catwalk	$100K	From dam to tower
4	Screen	$200K	~1,750 sq ft total
5	Screen cleaning system	$300K	Rake system
6	Standby generator	$40K	Deploy screen during power outage
7	Reclamation review and inspection	$150K	
TOTAL		$1,590K - $1,890K	

At $1.6M – $1.9M, the screen would increase the project cost by 40 – 48%. This would equate to yearly loan payments of $300,000 - $315,000, resulting in a $180,00 - $210,000 loss in the first two years of operation, not being profitable until the seventh or eighth year, and making the project economically unfeasible. Because the fish screen was found to be unfeasible, Baker County conducted a paper study to fulfill the originally requested mortality and entrainment studies, the results of which are described previously. The conclusion of those studies was that the overall effect of the project would be to increase survival of entrained fish compared with existing conditions.

A buried line was initially considered as an alternative to an overhead line for interconnection of the generator with the utility company. However, a buried line along the same route would cause significantly more ground disturbance than an overhead line including unavoidable disturbance to wetlands along the unnamed tributary. Due to the size of the line necessary to carry the voltage and amperage underground, the overhead line would also be more cost effective to construct and was selected as the preferred alternative.

10.3 Alternative Energy Sources

In the event that this project is not completed, Idaho Power would purchase power from alternative sources in order to meet their growing demand. These sources would most likely be from added natural gas powered plants.

10.4 Overall Consequences if license is Denied

If the FERC license for the Mason Dam Hydroelectric Project is denied, there will be several consequences for Baker County.

Baker County will receive zero Return on Investment for its expenditures in developing this project. That will total a loss of $250,000 just in development costs not to mention the potential additional revenue stream the Mason Dam Hydroelectric project would supply, Baker County could be forced to cut services, eliminate positions, or find new revenue streams in order to compensate for loss of income from a declining tax base.

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