Weber Hydroelectric Project

FERC No. 1744

Pre-Application Document

May 2015

PACIFICORP

A BERKSHIRE HATHAWAY ENERGY COMPANY

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FERC No. 1744

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Prepared by:
PacifiCorp
Hydro Resources
1407 West North Temple, Room 110
Salt Lake City, UT 84116

May 29, 2015

LIST OF ACRONYMS AND ABBREVIATIONS

ALP	Alternative Licensing Process
APE	Area of Potential Effects
AU	Assessment Unit
BCT	Bonneville cutthroat trout
BOR	Bureau of Reclamation
cfs	Cubic feet per second
DO	Dissolved Oxygen
EPA	Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
GIS	Geographic Information System
GLO	General Land Office
kV	Kilovolt
kW	Kilowatt
Mg/L	milligrams per liter
MW	Megawatt
MWh	Megawatt-hour
NEPA	National Environmental Policy Act
NOI	Notice of Intent
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTU	Nephelometric Turbidity Units
PAD	Pre-Application Document
PEA	Potential Effects Area (defined by resource)
PLC	Programmable logic controller
ROW	Right of Way
rpm	Rotations per minute
S&DA	Safety and Design Assessment
SHPO	State Historic Preservation Office
SSURGO	Soil Survey Geographic Database
STATSGO	State Soil Geographic Soil Survey Database
SWReGAP	Southwest Regional Gap Analysis
TMDL	Total Maximum Daily Load
TNW	Traditional Navigable Water
TSS	Total Suspended Solids
UDEQ	Utah Department of Environmental Quality
UDOT	Utah Department of Transportation
UDSH	Utah Division of State History
UDWQ	Utah Division of Water Quality
UPR	Union Pacific Railroad
USDA	United States Department of Agriculture
USFS	United States Forest Service
USGS	United States Geological Survey

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1.0 INTRODUCTION

PacifiCorp, a subsidiary of Berkshire Hathaway Energy, plans to file a new application for relicense of a major project, the Weber Hydroelectric Project (Project), Federal Energy Regulatory Commission (FERC or Commission) Project No. 1744, on the Weber River in Weber, Morgan and Davis Counties in Utah. The current license will expire on ~~June 28~~May 31, 2020. The Project has a generation capacity of 3.85 megawatts (MW) and is located partially on federal lands managed by the Wasatch-Cache National Forest, and partially on lands owned by the Union Pacific Railroad Company.

1.1 Purpose

The purpose of this Pre-Application Document (PAD) is to provide the Commission and interested parties with existing information relevant to the issuance of a new license for the Project. The information presented in this document is intended to assist in the identification of issues and related information needs, development of study plans, and the license application process. This document follows the form and content requirements specified in 18 CFR 5.6 (c) and (d).

1.2 Process Plan and Schedule

PacifiCorp plans to use the Alternative Licensing Process (18 CFR Part 5) for relicensing the Project. The Alternative Licensing Process (ALP) is intended to streamline the Commission's licensing process by providing a predictable, efficient, and timely licensing process that continues to ensure adequate resource protections. Table 1.2-1 presents the draft schedule for pre-application filing activities under the Alternative Licensing Process~~es~~. The proposed location for scoping meeting(s) is the U.S. Forest Service (USFS) office at 507 E. 25th Street, in Ogden, Utah, when available. The building and additional location information for these meetings will be noticed separately 30 days prior to the meeting(s).

Table 1.2-1. Preliminary schedule and milestones for the Alternative Licensing Process for Weber.

Responsible Party	Pre-Filing Milestone	Date	FERC Regulation
PacifiCorp	Form Working Group of Stakeholders to include State and Federal Agencies, Citizen Groups, and Indian Tribes; Prepare Communications Protocol; Consensus on Process	Ongoing	4.34
PacifiCorp	File NOI/PAD , Request to use the ALP with FERC, Notice in the Local Newspaper(s)	5/29/15	4.34(i)(5),5.3 5.5, 5.6
FERC	FERC Approves Use of Alternative Process	8/1/15	4.34(i)(6)
PacifiCorp	Hold NEPA Scoping and Joint Agency Meeting	9/15/15	4.34(i)(4)
PacifiCorp	Every 6 months file with the Commission a report summarizing the progress made in the ALP~~alternative licensing process~~	Ongoing	4.34(i)(6)
PacifiCorp/All Stakeholders	Negotiate Study Plans	11/7/2015	4.34(i)(4)
PacifiCorp	Conduct Studies	2016	4.34
PacifiCorp	Analysis of Completed Studies	2/13/17	4.34(i)4
PacifiCorp	Prepare Phase II Study Plans & Conduct Additional Studies if Needed	Spring/ Summer 2017	4.34(i)4
PacifiCorp	Prepare Preliminary Draft Environmental Assessment and Draft License Application and Provide to Stakeholders	September 2017	4.34(i)4
All Stakeholders	Provide PacifiCorp with Comments on the Preliminary Draft Environmental Assessment and Draft License Application	December 2017	4.34(i)4
PacifiCorp	Prepare Final Application and Preliminary Draft Environmental Assessment	12/17-2/18	4.34
PacifiCorp	File Final Application and Preliminary Draft Environmental Assessment and Provide ~~-~~Copies of Final Application and NEPA Documents to Stakeholders.~~; and~~ Issue Public Notice of Filing	2/21/2018	5.17
	Current FERC License Expires	6/28/2020	

*Under FERC rules NOI/PAD may be filed anytime between 11/30/2014 and 5/31/2015.

2.0 PROJECT LOCATION, FACILITIES AND OPERATION

The Project location is as follows:

State:	Utah
Counties:	Weber, Morgan, Davis
Nearby Town:	Ogden
Body of Water:	Weber River

2.1 Name and Address

The Project liaison for all correspondence is:

Eve Davies
Licensing Project Manager, Hydro Resources
1407 West North Temple, Room 110
Salt Lake City, Utah 84116
801-220-2245

Secondary contact:

Miriam Hugentobler
Project Coordinator
2328 Dimple Dell Rd.
Sandy, Utah 84092
801-652-8983

2.2 Project Area, Vicinity, and Maps

For the purposes of this document, the FERC Project Boundary (or Project Boundary) is defined as all lands and waters within the existing FERC Project Boundary for the Weber Hydroelectric Project No. 1744, as denoted on the project's Exhibit G. The Project Area is the area which contains all project features (encompassing the FERC Project Boundary as defined above), and which extends out for the purposes of characterization and analysis from the furthest edge of the Project Boundary, and across the river to the far riverbank (including the river regardless of which side of the river the project features are found), as shown in Figure 2.2-1. Where appropriate, a Potential Effects Area (PEA) is defined by resource (e.g., Section 3.4 Botanical Resources) as the lands and waters within a given vicinity, often an additional one-mile buffer around, the Project Area (see individual sections for maps denoting the specific PEA by resource).

The location of the Project is shown in Figure 2.2-1. Detailed maps showing lands and waters within both the FERC Project Boundary and the Project Area, land ownership, and Project facilities are provided in Appendix A.

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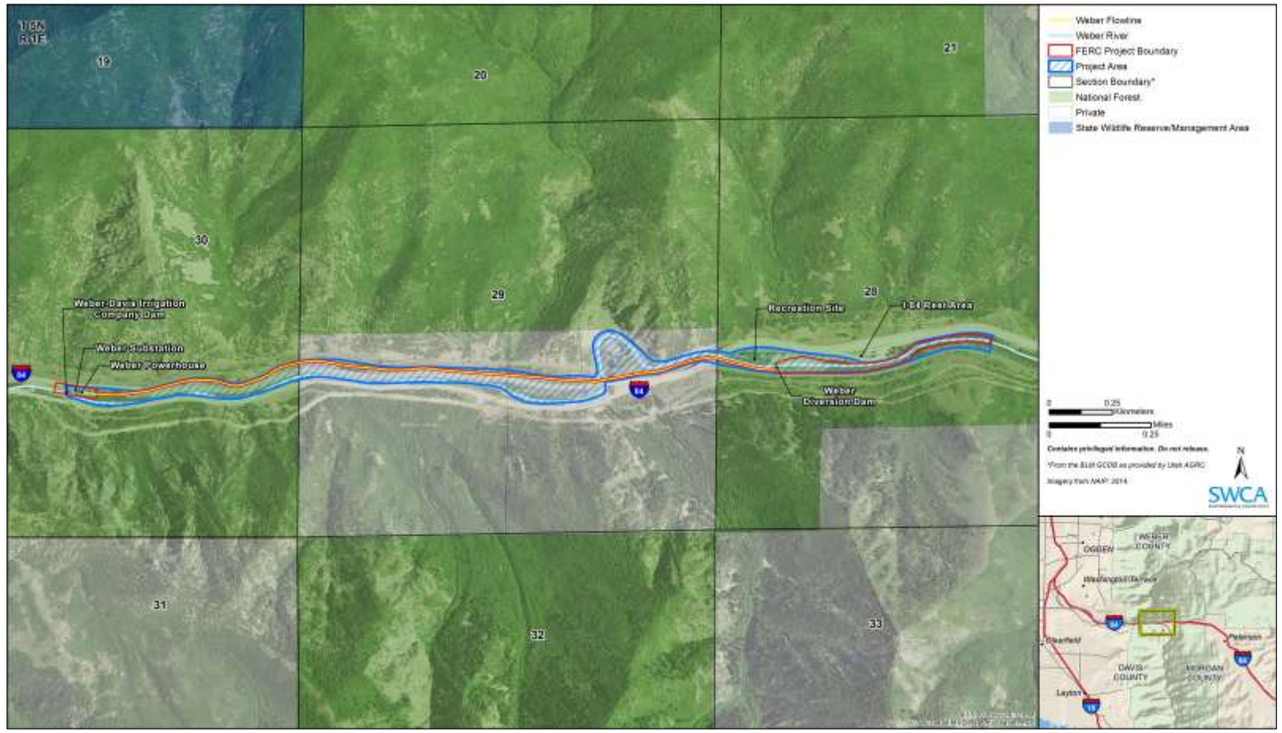

Figure 2.2-1. Project Location.

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2.3 Description of Existing and Proposed Project Facilities and Components

The Project was initially constructed in 1910 by Utah Light and Railway Company and later acquired by Utah Power & Light in 1944. The project has a generating capacity of 3.85 MW. The original license was made effective January 1, 1938 and expired June 30, 1970. Subsequently a FERC operating license was issued annually for a period from June 30, 1970 to June 28, 1990, due to a dispute with a nearby municipality that wanted to acquire the Weber Project. After a follow-up relicensing process with the FERC, the current license was issued on June 28, 1990. It expires on June 28, 2020.

The existing Project consists of:

(1) a 27-foot-high, 79-foot-long concrete diversion dam, having two radial gates approximately 29 feet wide, and a 35-foot-wide intake structure, for a total width of 114 feet, on the Weber River;

(2) a 9,107-foot-long, 5-foot to 6.3-foot diameter steel pipeline partially encased in concrete beginning at the intake and terminating at the powerhouse on the Weber River;

(3) a 3-foot by 18-foot non-operative fish passage structure (used however to pass the minimum flow through the calibrated slide gate opening);

(4) a powerhouse containing a generating unit with a rated capacity of 3,850 kilowatt (kW) operating under a head of 185 feet producing a 30-year average annual energy output of 16,932 megawatt-hours (MWh);

(5) a discharging pipe returning turbine flows into the Weber River at the powerhouse; and,

(6) a 77-foot-long, 46-kilovolt (kV) transmission line which connects to the Weber substation.

The normal maximum water surface area and normal maximum water surface elevation (mean sea level), and gross storage capacity of the Project impoundment (forebay) is:

Area – 8.4 acres maximum
Elevation – 4,797.8 feet (dam crest)
Storage – Approximately 42 acre-feet

The number, type, and minimum and maximum hydraulic capacity and installed (rated) capacity of the turbines or generators include:

Generator: One 5,000-horsepower horizontal ~~Doble~~double reaction turbine; a synchronous generator rated at 1.0 power factor, 360 rpm, three-phase, 60 cycles, and 2,300 volts.

Minimum Hydraulic Capacity: The turbine can be operated to 0 kW/0 cubic feet per second (cfs) with either standard (automated mode) or manual operation.

Transmission: A 77-foot-long, 46-kV transmission line connects the powerhouse to the Weber substation and is the only transmission line included in the Project. Figure 2.3-1 is a single-line diagram showing the transfer of electricity from the Project to the transmission grid.

The estimated dependable capacity is 1.420 MW (see section 3.2.1 for methodology detail). The average annual generation is 16,932 MWh. The average monthly generation is 1.411 MWh.

For jurisdictional purposes of the Clean Water Act, which relies on determination of Traditional Navigable Waters (TNW), the State of Utah has made a navigability determination for the Weber River and has rated the Weber River and its tributaries as *nonnavigable*, although they are all tributary to the Great Salt Lake, which is considered a TNW. Under a separate definition, in April of 2015, a federal court of the State of Utah made a navigability determination under the Commerce Clause of the US Constitution, which relies on a rating of navigable-in-fact, for the upper 25 miles of the Weber River, from the headwaters to Rockport Reservoir. This latter designation is strictly related to questions of recreational access versus private property rights and may be appealed.

During the current license term PacifiCorp made the following capital improvements to the Project dam structure and access:

- 1992 - Weber Recreation Site improvements (mandated by the current license)
- 1993 - North radial gate automated (south gate was previously automated)
- 1996 - Automatic leak detect system installed
- 2014-2015 - Tunnel penstock recoating and support structure improvement

The following routine (non-license related) Project improvements to ensure reliable and safe operation are anticipated in the next license period (all items and their dates are subject to modification and/or update):

- 2021 - Butterfly valve section penstock replacement
- 2021 - Turbine overhaul and bearings replacement
- 2022 - Penstock support structure upgrade
- 2022 - Pipeline river crossing recoat

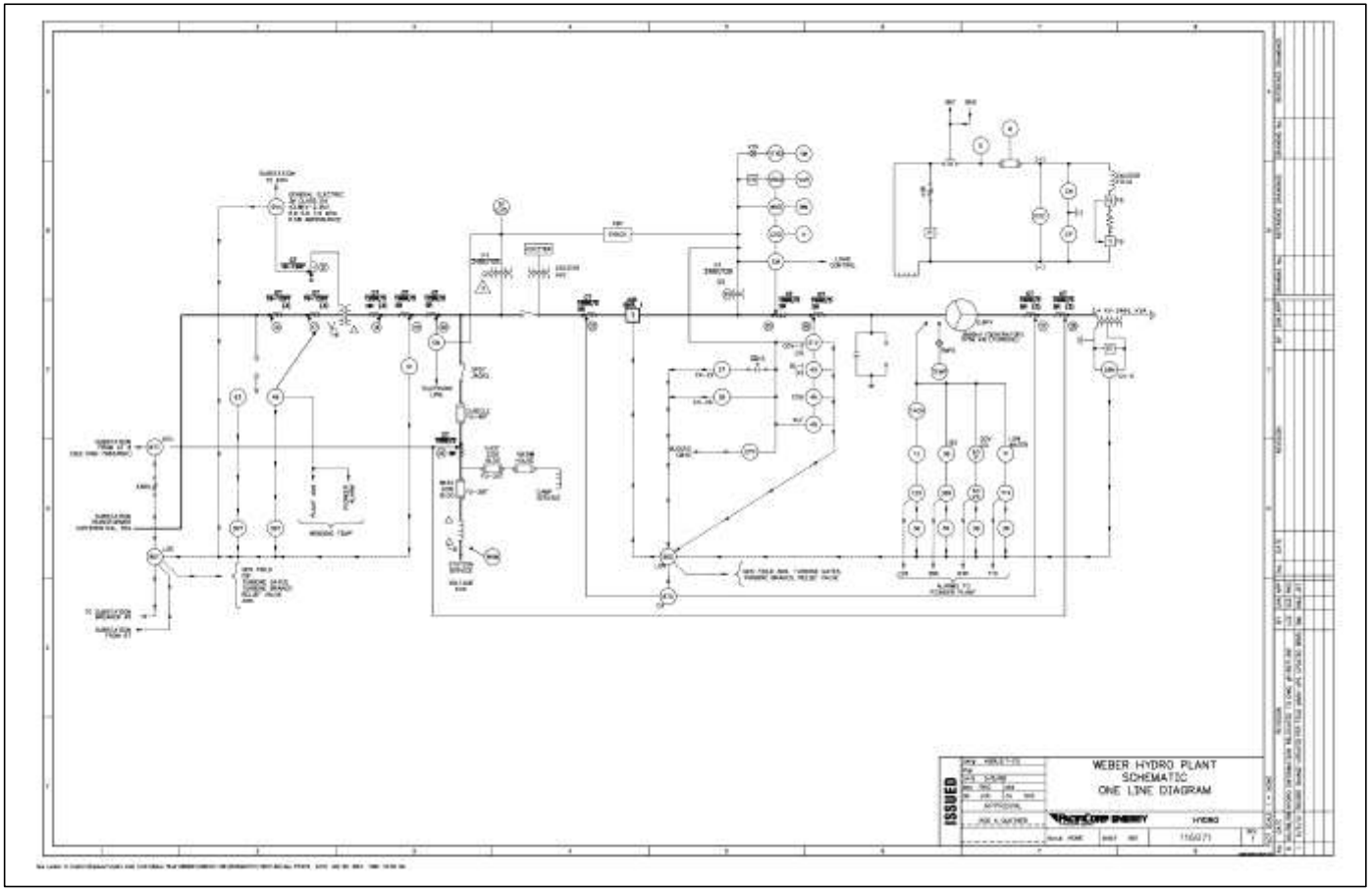

Figure 2.3-1. Weber Hydro Plant Schematic One Line Drawing.

2.4 Project Operations and Existing License

2.4.1 Current Operations

The current operating license was issued by the Commission in 1990 with a 30-year license term, expiring June 28, 2020. The Weber Hydroelectric Project is operated as a run-of- the river project. The current license does not specify any daily/seasonal ramping rates, flushing flows, reservoir operations, or flood control operations. Prior to 1993 the Project was manually operated locally. Following the installation of an automated control system in 1993 the Weber plant is now designed for unmanned semi-automatic operation and is controlled by a programmable logic controller (PLC). The normal mode of operation is for the plant to be unattended. Two local operators are located nearby in Ogden, Utah and visit the Project on a daily basis and as called out by PacifiCorp's Hydro Control Center located in Ariel, Washington. The Hydro Control Center monitors the Project operations remotely and notifies the local operator when an issue arises. In addition to standard local generator protection equipment and alarms, the penstock pressure, generator load, forebay level, and circuit breaker at the Weber plant and are monitored by a hydro control operator at the Hydro Control Center. The Weber flowline can divert up to approximately 365 cfs at the project dam; the bypassed reach is approximately 1.7 miles long.

Below the Weber diversion dam, tThe current license mandates a continuous minimum stream flow of 34 cfs or inflow, whichever is less, from October 1-March 31 annually; and, a continuous minimum flow of 34-50 cfs (range dependent on the annual runoff forecast), or inflow, whichever is less, from April 1- September 30 annually.

Annual maintenance is routinely conducted each year and involves vegetation management (including landscaping areas) on Project lands, recreation area maintenance and management (including seasonal portable restroom facilities), limited road maintenance activities, as-needed maintenance on the water conveyance system and generating unit, and non-routine forebay dredging as discussed in Section 2.4.3. The timing and scope of annual maintenance activities are coordinated with the Wasatch-Cache National Forest as provided in the Special-Use Permit issued for the Project by the ~~U.S. Department of Agriculture, Forest Service (~~USFS~~)~~.

2.4.2 Existing License

The FERC Order Issuing New License was conveyed to PacifiCorp (dba Utah Power & Light Co.) on June 28, 1990.

The Director's order states:

(A) This license is issued to PacifiCorp dba Utah Power & Light Company for a period of 30 years, effective the first day of the month in which this order is issued, to continue to operate and maintain the Weber Hydroelectric Project. This license is subject to the terms and conditions of2 the Act, which is incorporated by reference as part of this license, and subject to the regulations the Commission issues under the provision of the Act.

(B) The project consists of:

(1) All lands, to the extent of the licensee's interests in those lands, enclosed by the project boundary shown in Exhibit G:

Exhibit G	**FERC No. 1744**	**Showing**
1	19	Project Layout
2	20	Recreation and Forebay Sites
3	21	Existing Weber Plant Site

(2) The existing project consists of: (a) a 27-foot-high, 114-foot-long diversion dam; (2) an 8.4-acre impoundment; (3) a 20-foot-wide by 27-foot-long intake chamber; (4) a 9,107-foot- long, 5-foot- to 6.3-foot-diameter penstock; (5) a powerhouse containing one generating unit rated at 3,850 kW; (6) a 46-kv, 77-foot-long transmission line; and (7) appurtenant facilities.

The project works generally described above are more specifically shown and described by those portions of Exhibits A and F recommended for approval in the Safety and Design Assessment (S&DA).

(3) All of the structures, fixtures, equipment or facilities used to operate or maintain the project and located within the project boundary, all portable property that may be employed in connection with the project and located within or outside the project boundary, and all riparian or other rights that are necessary or appropriate in the operation or maintenance of the project.

(C) The Exhibit G described above and those sections of Exhibits A and F recommended for approval in the S&DA are approved and made part of the license.

(D) This license is subject to the following articles submitted by the Forest Service under section 4(e) of the Act:[1]

[specific Weber license articles 101-104, 201-202, and 401-406 omitted for space]

(F)[sic] The licensee shall serve copies of any Commission filing required by this order on any entity specified in this order to be consulted on matters related to that filing. Proof of service on these entities must accompany the filing with the Commission.

(G) This order is issue~~d~~s under authority delegated to the Director and is final unless appealed to the Commission by any party within 30 days from the issuance date of this order. Filing an appeal does not stay the effective date of this order or any date specified in this

[1] The mandatory conditioning authority of 4(e) of the Act is applicable to relicensing proceedings. See City of Pasadena, issued January 5, 1989, 46 FERC 61,004 (1988)

order. The licensee's failure to appeal this order shall constitute acceptance of the license.

2.4.3 Daily and Seasonal Ramping Rates

The current license does not specify any daily/seasonal ramping rates, flushing flows, reservoir operations, or flood control operations. PacifiCorp does not flush the Project forebay to reduce sediment build-up, although limited dredging has occurred periodically on an as-needed basis. When dredging does occur, any dredged materials are removed and disposed of at an off-site location.

2.4.4 Project Generation

PacifiCorp began collecting electronic records of Project generation and water outflow in 1966. Therefore, approximately 49 years of data (1966-2014) were used to calculate the values in Table 2.4-1 below. The table provides the average monthly generation in megawatt-hours (MWh) and turbine discharge in cfs based on hourly data. The daily average generation and turbine discharge is highest in June (65.5 MWh/day, 1,965MWh/30 days, 303 cfs) and lowest in November (638 MWh, 98 cfs). As noted below in Section 3.2.2, winter flows and associated generation are affected by the seasonal diversion of water away from the lower Weber River resulting from the 1938 and 1965 Bureau of Reclamation contracts that can provide storage water to Deer Creek (and subsequently Jordanelle) and Echo Reservoirs during winter months.

Table 2.4-1. Average Monthly Generation Rate and Turbine Discharge[1].

Month	Generation (MWh)	Discharge (cfs)
January	873	130
February	918	150
March	1,464	219
April	1,766	273
May	1,979	296
June	1,965	303
July	1,979	296
August	1,955	292
September	1,759	271
October	1,121	167
November	638	98
December	721	108

Month	Generation (MWh)	Discharge (cfs)
[1]These averages include the approximate three-year period (1983-1985) that the Weber plant was offline due to a fire; the average annual generation with those years excluded is 800 MWh higher than shown in Table 2.4-1.		

2.4.5 Current Net Investment

As of 12-31-2014 the Company has incurred an Original Cost Investment of $4,412,005, Accumulated Depreciation of $2,825,645, and a Net Book Value of $1,586,360 for the Project.

2.4.6 Compliance History

The Project was constructed in 1910 and the original major license (Project No. 1744) was issued to the Utah Light and Railway Company, made effective January 1, 1938 and expired June 30, 1970. The Federal Power Commission approved the transfer of the license to Utah Power & Light in 1944.

2.4.7 Description of New Generation Facilities

No new facilities or capital upgrades to generation are planned for the Project. The Project will continue to operate as a run-of-river generating facility with a regular routine annual maintenance cycle to ensure reliable and safe operation. The project as presently constructed and as PacifiCorp proposes to operate it, fully develops the economical hydropower potential of the site.

3.0 EXISTING ENVIRONMENT AND RESOURCE IMPACTS

3.0.1 Weber River Basin Description

The Weber River Basin drains an area of 2,476 square miles in Summit, Morgan, Weber, and Davis Counties, Utah, and part of Uinta County, Wyoming (Figure 3.0-1). The primary drainage of the basin, the Weber River, begins its journey near Reids Peak (11,708 feet) in the Uinta Mountains, flows west to Oakley, Utah, and then flows in a northwesterly direction to its terminus at Great Salt Lake. The Weber River is approximately 125 miles long, and within its drainage there are approximately 968 miles of perennial streams and 1,254 miles of intermittent streams (Utah Water Atlas 2015). Flows in the Weber River Basin are regulated by seven major reservoirs. Echo and Rockport Reservoirs are located on the mainstem of the Weber River, whereas Pineview, Causey, East Canyon, Lost Creek, and Smith and Morehouse Reservoirs are located on tributaries.

Mean annual precipitation for the basin is 26 inches (3.4 million acre-feet). It is estimated that about 70% of the total precipitation in the watershed on average is consumed by vegetation and humans, leaving approximately 9 inches (1.2 million acre-feet) that is yielded to the basin's rivers, streams, and aquifers. Of the annual water yield, approximately 3% is exported out of the basin through canals (Utah Division of Water Resources 2009).

Weber Canyon in the project vicinity is a narrow, steep-walled canyon with highly-altered (filled and channelized) riverine and canyon floor environments, due primarily to the construction of I-84 and its associated bridges and infrastructure, but also from the various pipelines, cable and fiber utility lines, railroad tracks, the former highway, the Weber Hydroelectric Project diversion dam and flowline, and other river diversion structures. Some areas of fill, up to 30 feet deep and placed primarily to facilitate freeway construction, have altered the hydrogeomorphology of the canyon since the 1960s.

3.1 Geology and Soils

Geology and soils provide important information into the environmental history and setting of the project area. BA brief overviews of both are presented below. Geology data were obtained from the Utah Geological Survey's Geologic Map of Utah (2000), and soils data were obtained from the Natural Resources Conservation Service (NRCS) State Soil Geographic (STATSGO) soil survey database.

3.1.1 Geological Formations

The main geologic unit identified in the Project Area is the Farmington Canyon Complex (Lowe et al. 2003). The Farmington Canyon Complex, which formed the Wasatch Range, consists of early Proterozoic high-grade metamorphic and igneous rocks (Bryant 1984, as cited in Lowe et al. 2003). Most of the Project Area is underlain by Precambrian metamorphic rocks such as migmatite and gneiss (Figure 3.1-1). The eastern end of the Project Area is underlain by surficial alluvium and colluvium deposits, which primarily consist of silts, sands, and pebbles and gravel. There are two major northwest-southeast-trending fault lines through the central portion of the Project Area, and an additional two just east of the Project Area.

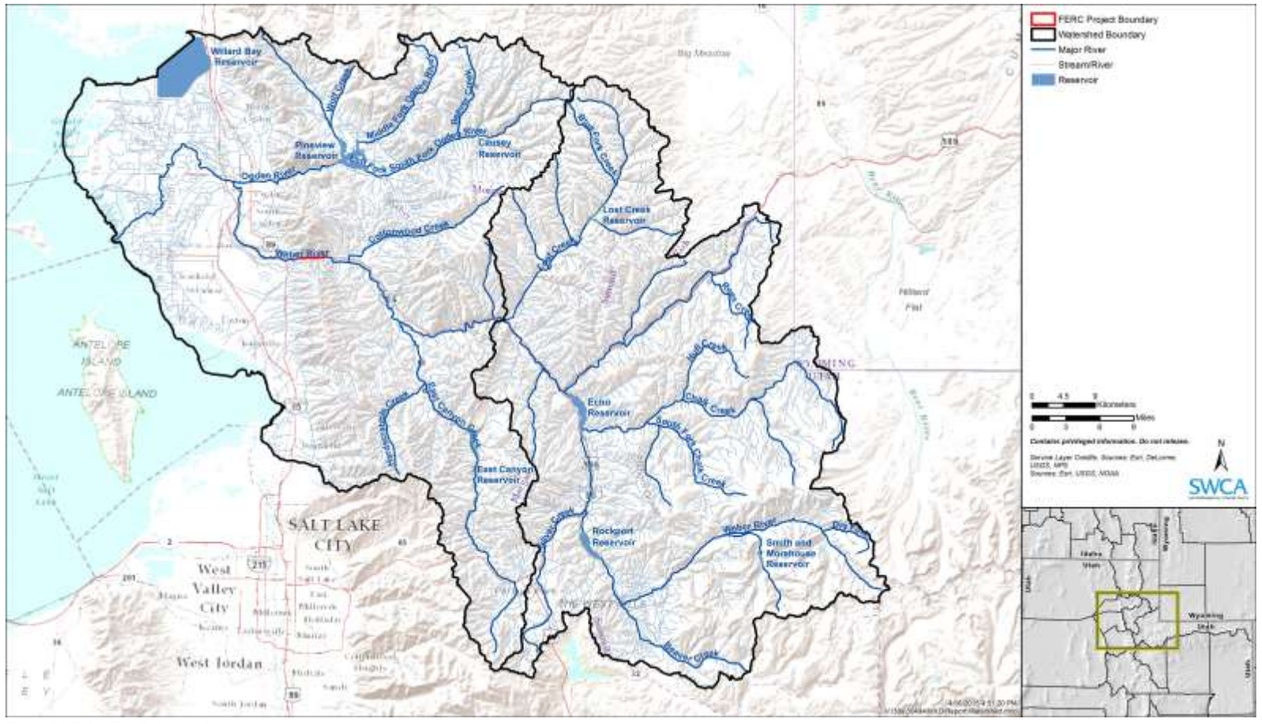

Figure 3.0-1. Weber River Basin watershed.

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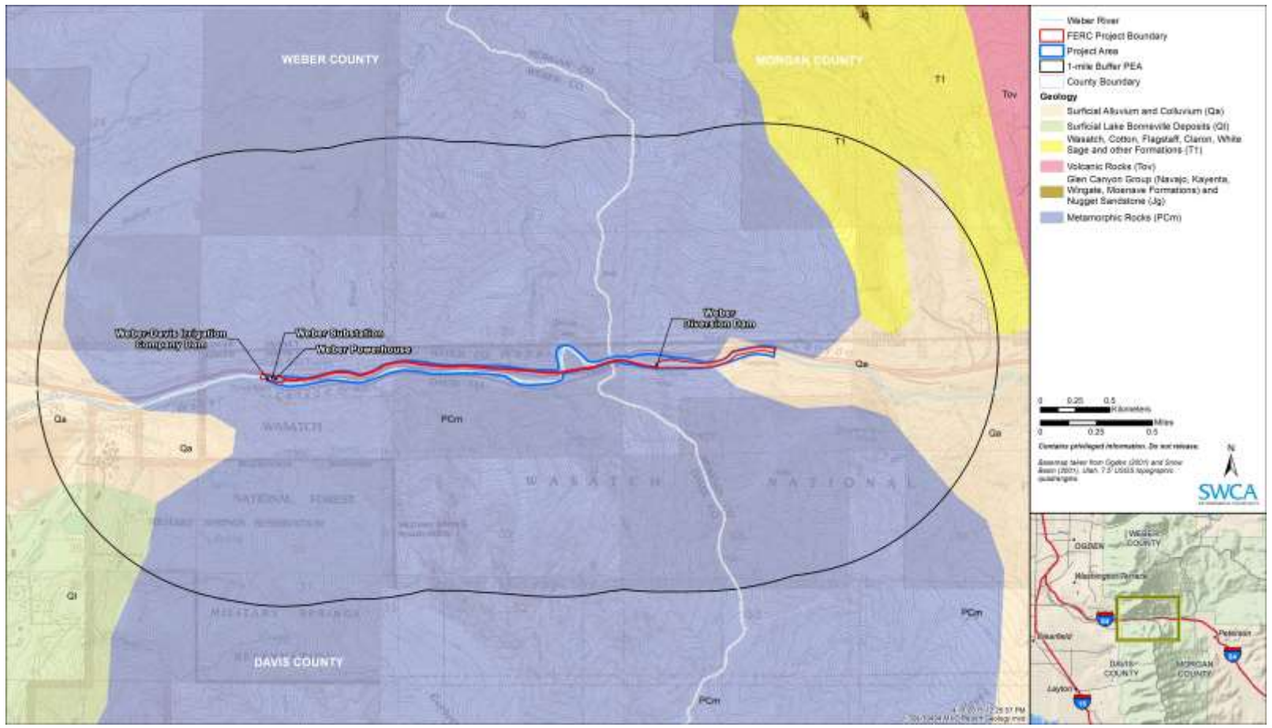

Figure 3.1-1. Project Area geology.

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3.1.2 Soils

There are two reported soil types for the Project Area, both of which are primarily rocky outcrop-type soils (Rock outcrop-Patio-Nagisty-Broad Canyon and Rock outcrop-Ridd-Barton; Figure 3.1-2). The primary difference between these two soil types is that the soil complex (Rock outcrop-Ridd-Barton) encompassing the western part of the Project Area has a slightly higher percentage of clay, sand, and organic content by mass, and has a greater soil k-factor (i.e., is slightly more erodible) than the soil complex (Rock outcrop-Patio-Nagisty-Broad Canyon) encompassing the eastern part of the Pproject Aarea. Most of the soils in the Project Area and surrounding landscape are recent surficial deposits that were formed by lakebed deposits, river deposits, mountainside erosion, and glacial processes (Lowe et al. *ibid*). Due to the low resolution of STATSGO soil survey data (versus Soil Survey Geographic Database [SSURGO] survey data), other soil properties are too variable or vague to be generalized for the Project Area. However, higher resolution data are not necessary for an accurate soil characterization for the Project Area in this document.

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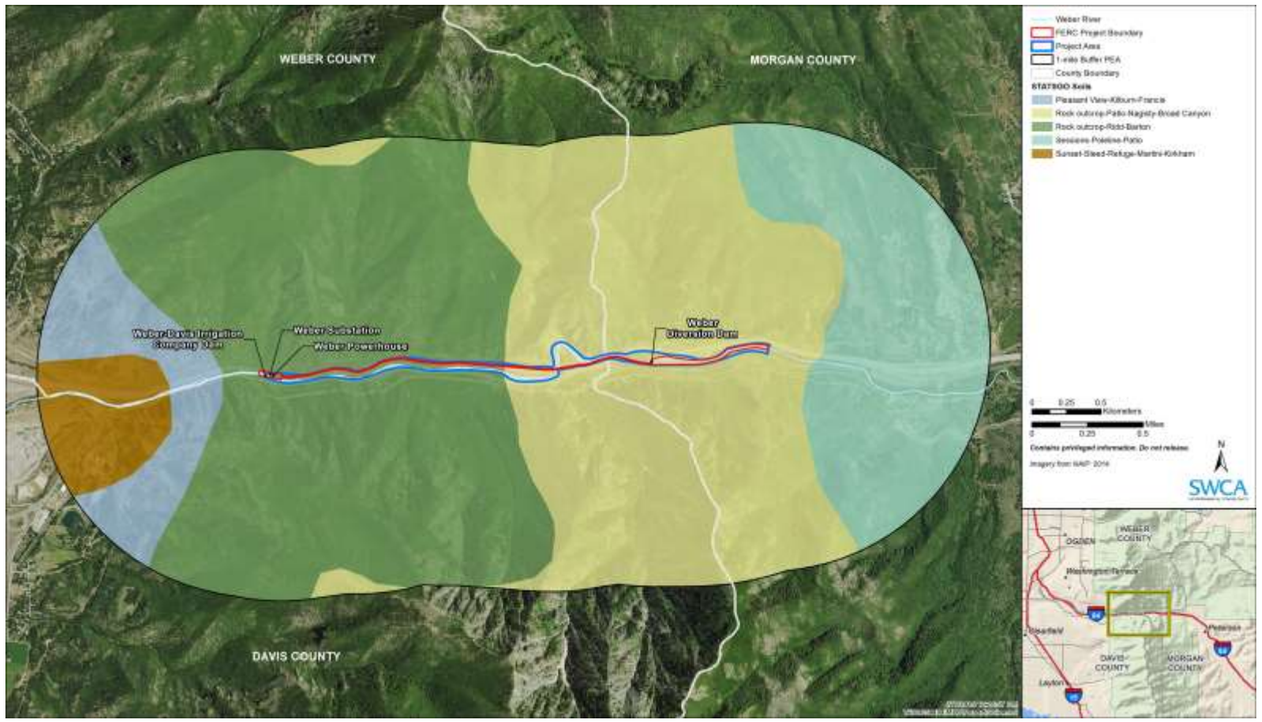

Figure 3.1-2. Project Area soil types.

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3.2 Water Resources

3.2.1 Hydrology

Streamflow:

- Low flow: 192 cfs; Flow parameter: Monthly mean flow (November).
- High flow: 1450 cfs; Flow parameter: Monthly mean flow (May).
- Average flow: 536 cfs Flow parameter: Average yearly flow.

The entire U.S. Geological Survey (USGS) period of record was used to calculate data in the following table. Average monthly minimum flows ranged from 140 cfs in December to 868 cfs in May while average monthly maximum flows ranged from 271 in November to 2,134 cfs in May. Average mean monthly flows ranged from 192 cfs to 1,450 cfs (November and May). Table 3.2-1 lists all average monthly minimum, mean and maximum flow data for Station USGS gage No. 10136500

Table 3.2-1. Average monthly flow data for USGS gaging station (No. 10136500 for the 94.3 year period of record 7/1/1919 to 9/30/2014 (missing 335 days: 9/1/1919 to 7/31/1920).

Month	Average of Monthly Minimum Flow across all years (cfs)	Average of Monthly Mean Flow across all years (cfs)	Average of Monthly Maximum Flow across all years (cfs)
January	147	219	392
February	182	270	472
March	262	484	900
April	538	958	1549
May	868	1450	2134
June	604	1100	1735
July	412	527	732
August	360	439	529
September	254	353	477
October	156	232	354
November	149	192	271
December	140	205	349

Figure 3.2-1 provides a flow duration curve for the total contribution of the Weber River as described above. Flows for Gage Site 10136500 met or exceed 87 cfs 90% of the time, 339 cfs 50% of the time and 1,260 cfs 10% of the time.

A Dependable Capacity of 1,420 kW was estimated using the critical month method. The critical month method uses the lowest monthly average flow for the period of record (192 cfs) from the USGS gage 10136500 and considered this to be the approximate minimum inflow one can expect at the Project diversion. The minimum in-stream flow for the bypass reach of 34 cfs was subtracted from the lowest monthly average flow as this would not be available for generation. A simple h/k factor conversion (9 kW/cfs) for the power plant was then used to convert 158 cfs to 1,420 kW.

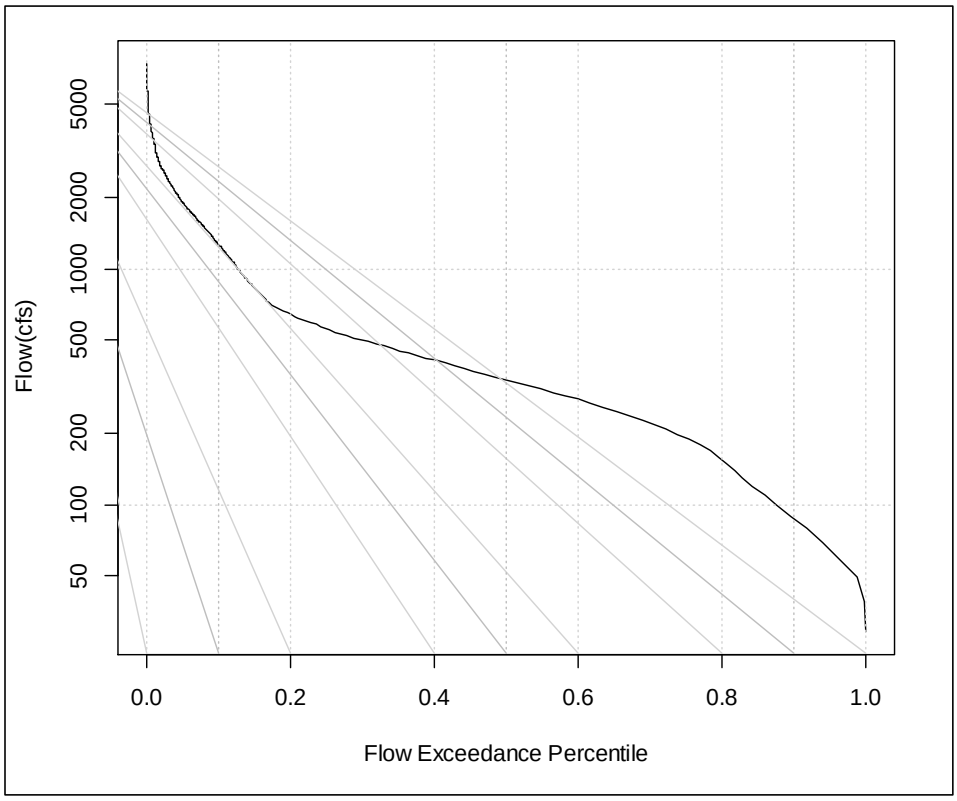


Figure 3.2-1. Flow duration curve of daily mean flows for Weber River at Gateway, UT (USGS gage No. 10136500).

3.2.2 Water Rights

PacifiCorp holds three water rights certificated by the State of Utah, Division of Water Rights, for the purposes of power generation at the Project. Up to 365 cfs may be diverted from the Weber River under water right no. 35-8061. The storage of 100 acre-feet in the forebay is permitted under water right no. 35-8062. "Project waters" consist of waters within the Project Area that have been diverted from the Weber River pursuant to this right. Following the original development of the Project, two agreements (covered in more detail below) allow for additional water storage and diversion away from the Weber Project to benefit other water storage facilities. A subsequent water right related to the 1965 agreement, water right no. 35-8741, allows for the storage of 28,040 acre-feet in Echo Reservoir.

Other than for the Weber-Davis Irrigation Company immediately downstream of the powerhouse (and as memorialized in the 1938 BOR contract), PacifiCorp is not aware of any existing or proposed uses of Project waters for irrigation, domestic water supply, industrial or other purposes that would impose additional upstream or downstream constraints to Project operations.

Other than the Project itself, there are no known in-stream flow uses, existing water rights or pending water rights in the Project vicinity upstream of the Weber project that would be affected by continued operation of the Project. It should be noted that no changes to existing water rights are proposed or envisioned as a result of this license process.

The Division of Water Rights, Weber River Commissioner, administers the water on the Weber River in priority. In 1938, a predecessor company to PacifiCorp, Utah Power & Light Company, entered into an agreement—the 1938 Power Water Agreement—that allowed for the storage of water out of priority above Echo dam including diversion into the Provo River basin for storage in Deer Creek, which may occur from October 15 through April 15 each year, and which interferes with generation at the Weber project when it is in force. A 1965 agreement allowed further interference with winter flows through the Weber plant, similarly to store water in Echo Reservoir. The two contracts mandate the compensation due to PacifiCorp through the exercise of these two contracts.

In a letter dated January 21, 2014, the Division of Water Rights State Engineer issued instructions to the Weber River Commissioner as to the storage period, trade period, and spill period of the 1938 Power Water Agreement. A copy of the instructions is attached as Appendix C.

3.2.3 Water Quality

The Weber River watershed comprises approximately 1.5 million acres of land throughout four counties in northern Utah. It is a large watershed with complex and varying physical, topographical, ecological, and land use characteristics, all of which affect water quality. Several stakeholder groups are deeply vested in this water source for a variety of reasons including agriculture, municipal water supply, recreation, and fishing. The State of Utah has designated beneficial uses for water bodies throughout the watershed, the most common being Class 1C (domestic/drinking water), Class 2B (infrequent primary contact recreation [e.g., fishing and

wading]), Class 3A (coldwater fishery/aquatic life), and Class 4 (agricultural uses [crop irrigation and stock watering]).

Generally speaking, water quality in the Weber River watershed is moderately degraded with approximately 56% of assessed water bodies meeting beneficial uses as defined and classified in Utah Administrative Code R317-2-6 and R317-2-13 (Weber River Partnership 2014). As of the 2010 Integrated Report, 19 water bodies in the Weber River watershed did not meet their beneficial uses, and were listed as impaired (UDWQ 2010). Common causes for impairments include low dissolved oxygen, high temperatures, high nutrient levels, sedimentation, and habitat degradation.

For the purposes of the following water quality analysis as it relates to the Weber Dam and its operation, water quality data from the Weber River-3 Assessment Unit (AU) (UT16020102-002) were used. AU's are delineated by the Utah Division of Water Quality (UDWQ) based on similarity in physical, chemical, and biological conditions of a waterbody (UDEQ 2014). ~~Cottonwood Creek-Weber River watershed (HUC10: 1602010204) were used. This watershed covers approximately 173,498 acres and is a part of the Lower Weber water~~0~~shed (HUC8: 16020102). It includes the main stem of the Weber River from the confluence with the Ogden River east and south to the confluence with Lost Creek. Major tributaries in the watershed include Cottonwood Creek and Peterson Creek.~~ The Weber River-3 AU extends from the confluence with the Ogden River upstream to the confluence with Cottonwood Creek. It is approximately 19.5 miles in length and encompasses the entirety of the Weber Project Area. Beneficial uses for this portion of the river are identified as 2B, 3A, and 4. ~~The main stem of the Weber River within the HUC 10 watershed is assessed by UDEQ as three separate water bodies: 1) Weber River-3 from the confluence with the Ogden River to the confluence with Cottonwood Creek (including the Weber Project Area), 2) Weber River-4 from the confluence with Cottonwood Creek to Stoddard Diversion, and 3) Weber River-6 from the confluence with East Canyon Creek to the confluence with Lost Creek. T~~~~As of t~~he ~~2010~~ 2014 Integrated Report lists~~,~~ the ~~,~~ Weber River-3 AU ~~and Weber River-6 were listed~~ as "not supporting" for not meeting beneficial use 3A due to a biological impairment. While this AU is listed as impaired and ~~in need~~will require ~~of~~ a Total Maximum Daily Load (TMDL), the current TMDL priority is low (UDEQ 2014), and has not been scheduled. ~~, whereas Weber River-4 was designated as "supporting." It should be noted that a draft version of the 2014 Integrated Report is now available (UDEQ 2014), and it identifies all three waterbodies of the main stem in the HUC 10 watershed as "supporting."~~

3.2.3.1 Data Summary for the ~~Cottonwood Creek-Weber River Watershed~~Weber River-3 Assessment Unit

Water quality data were obtained from the U.S. Environmental Protection Agency (EPA) STORET database and consist primarily of information collected by Utah Department of Environmental Quality (UDEQ). Data were available from 1976 through ~~2008~~2006; however, data used in the following analysis are from ~~2000~~ 1995 through ~~2008~~2006, the goal being to conduct an assessment that is most representative of current conditions. The year ~~2000~~ 1995 was chosen as a benchmark because it was the point at which enough data were included to allow for

a robust analysis. Database queries covered ~~11~~ two~~2~~ stations, one of which was located ~~both~~ approximately 1 river mile upstream of the Project Area (Station ID 4921000), and one that was located approximately 12.6 miles downstream of the ~~dam~~ Project Area (Station ID 4922990) ~~so that a dataset large enough to observe water quality trends could be compiled~~(Figure 3.2-2). ~~.~~ Specific parameters analyzed include pH, specific conductance, turbidity, dissolved oxygen (DO), temperature, alkalinity, ~~ammonia,~~ phosphate, hardness, and total suspended solids (TSS). Pathogen data (total coliform, fecal coliform) were available from 1976 to 1993 but were excluded from the analysis because they are not considered representative of current conditions. Water quality parameters are summarized on an annual and monthly basis in Tables 3.2-2, 3.2-3, and 3.2-4. ~~Annual trends for 2008 are not presented due to lack of data (see Table 3.2-4).~~

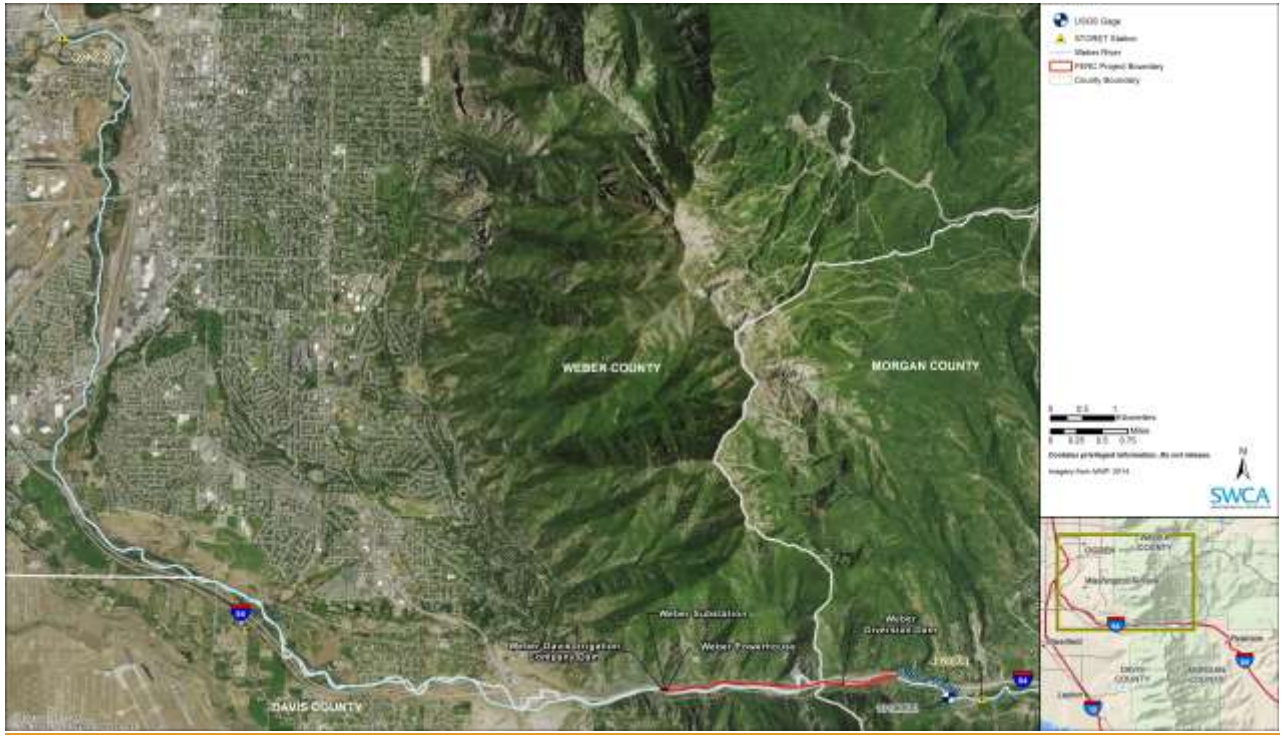


Figure 3.2-2. Map of existing water quality data locations

Table 3.2-2. Monthly Summary of Water Quality Data for Field Parameters for the Weber River-3 Assessment Unit ~~(HUC 1602010204)~~ from ~~2000~~ 1995 through ~~2008~~2006~~8~~2008

	January	February	March	April	May	June	July	August	September	October	November	December	Mean
pH													
Average	~~8.3~~8.2	8.2	~~7.7~~8.1	~~7.9~~8.0	~~8.3~~8.2	~~8.3~~8.2	~~8.5~~8.4	8.3	8.4	~~8.3~~8.2	~~8.2~~8.3	~~6.7~~8.3	~~8.3~~8.2
Maximum	~~8.6~~8.5	~~8.7~~8.6	~~8.3~~8.9	8.4	9.2	~~8.6~~9.3	~~8.8~~8.7	~~8.5~~9.0	~~8.6~~8.7	~~8.6~~8.8	~~8.8~~8.7	~~8.6~~8.5	~~8.6~~8.8
Minimum	~~7.9~~8.0	7.4	7.0	~~7.1~~7.2	7.1	~~7.7~~6.7	~~8.2~~8.1	~~8.1~~8.0	~~8.2~~8.1	7.5	~~7.6~~8.0	8.0	~~7.0~~7.6
Specific conductance (umho/cm)													
Average	~~668~~571	~~684~~609	~~429~~470	~~408~~365	~~431~~359	~~530~~419	~~600~~529	~~590~~579	~~523~~553	~~517~~551	~~680~~649	~~686~~585	~~565~~520
Maximum	909	~~800~~766	~~660~~679	~~542~~472	~~826~~611	~~636~~569	~~851~~843	~~729~~669	~~623~~623	~~613~~634	~~846~~846	~~761~~732	~~909~~696
Minimum	~~488~~235	~~538~~538	291	238	140	~~381~~263	~~441~~293	~~435~~482	294	348	~~397~~537	~~596~~512	~~140~~348
Turbidity (NTU)													
Average	~~3.6~~12.7	4.~~2~~5	~~23.9~~29.3	~~8.2~~26.6	~~5.8~~15.6	~~5.0~~6.4	~~5.5~~2.3	~~4.6~~3.2	~~7.1~~5.8	~~3.1~~3.0	~~2.9~~2.8	~~2.2~~2.7	~~5.9~~9.6
Maximum	~~11.5~~62.3	13.1	~~37.3~~99.3	~~22.5~~110.0	~~13.7~~44.4	~~12.1~~18.4	~~16.7~~6.5	~~10.7~~7.9	~~17.3~~14.1	~~6.6~~6.8	5.9	~~2.9~~3.6	~~37.3~~32.7
Minimum	1.5	1.3	~~13.2~~2.9	3.5	1.8	1.7	1.0	0.8	1.2	0.8	0.9	1.4	~~0.8~~1.6
DO (mg/L)													
Average	~~11.9~~10.8	~~11.3~~10.9	9.~~5~~4	9.~~6~~8	~~10.6~~9.9	~~10.2~~9.4	~~10.8~~10.2	~~10.5~~10.4	~~10.4~~10.3	~~10.2~~9.9	~~12.3~~11.8	~~11.9~~12.1	10.~~4~~9
Maximum	~~14.8~~13.5	12.9	~~9.8~~11.5	10.6	~~14.0~~13.0	12.2	13.4	13.2	14.1	~~12.6~~12.7	~~14.9~~13.4	~~12.2~~13.7	~~14.9~~12.9
Minimum	8.3	~~9.6~~9.7	~~9.1~~8.0	8.8	~~8.3~~8.2	8.4	~~9.2~~7.6	~~7.9~~7.5	~~6.0~~7.4	6.3	~~9.8~~9.9	~~11.6~~11.1	~~6.0~~8.4

Table 3.2-2. Monthly Summary of Water Quality Data for Field Parameters for the Weber River-3 Assessment Unit ~~(HUC 1602010204)~~ from ~~2000~~ 1995 through ~~2008~~2006~~8~~2008

	January	February	March	April	May	June	July	August	September	October	November	December	Mean
Temperature, water (ºC)													
Average	~~2.4~~2.8	4.~~4~~2	~~7.4~~6.2	~~8.8~~8.6	12.4	~~15.2~~14.7	~~16.9~~19.7	~~17.3~~17.2	~~14.5~~14.6	~~11.2~~8.7	~~8.0~~7.6	~~3.6~~2.3	~~10.1~~9.9
Maximum	~~4.2~~3.7	~~7.4~~7.2	9.2	12.5	17.2	17.7	22.2	~~19.5~~20.1	~~16.0~~18.0	~~12.4~~10.4	~~11.4~~10.6	~~5.0~~4.2	~~22.2~~12.7
Minimum	~~0.0~~0.1	~~1.2~~1.8	~~4.6~~3.4	~~6.8~~5.1	6.1	~~11.6~~10.5	~~13.5~~15.9	~~14.6~~14.4	12.4	~~9.1~~6.9	~~4.5~~5.4	~~2.3~~0.7	~~0.0~~6.9

Notes: umho/cm = micromhos per centimeter; NTU = nephelometric turbidity units; mg/L = milligrams per liter; ºC = degrees Celsius

Table 3.2-3. Summary of Monthly Water Quality Data for Nutrient, Sediment, and Hardness Parameters for the Weber River-3 Assessment Unit ~~(HUC 1602010204)~~ from ~~2000~~ 1995 through ~~2008~~2006~~8~~2008

	January	February	March	April	May	June	July	August	September	October	November	December	Mean
Alkalinity, carbonate as CaCO3 (mg/L)													
Average	~~232~~213	~~220~~213	~~116~~167	~~140~~124	~~130~~125	~~181~~157	~~195~~187	~~209~~213	~~201~~211	~~212~~219	~~220~~217	~~230~~215	188
Maximum	256	235	~~135~~241	~~246~~159	~~195~~192	~~203~~202	~~203~~202	~~221~~231	~~216~~233	241	~~235~~226	239	~~256~~221
Minimum	~~208~~163	184	93	97	81	~~144~~100	~~187~~162	190	~~190~~193	~~192~~203	~~203~~194	~~210~~197	~~81~~155
~~**Ammonia-nitrogen as N (mg/L)**~~													
~~Average~~	~~0.133~~	~~*ND*~~	~~0.070~~	~~0.070~~	~~0.068~~	~~0.075~~	~~*ND*~~	~~0.070~~	~~*ND*~~	~~0.105~~	~~0.070~~	~~*ND*~~	~~0.081~~
~~Maximum~~	~~0.140~~	~~*ND*~~	~~0.080~~	~~0.080~~	~~0.100~~	~~0.090~~	~~*ND*~~	~~0.090~~	~~*ND*~~	~~0.160~~	~~0.090~~	~~*ND*~~	~~0.160~~
~~Minimum~~	~~0.120~~	~~*ND*~~	~~0.060~~	~~0.060~~	~~0.050~~	~~0.060~~	~~*ND*~~	~~0.050~~	~~*ND*~~	~~0.050~~	~~0.060~~	~~*ND*~~	~~0.050~~

Hardness, Ca + Mg (mg/L)													
Average	321267	288267	147197	144152	165153	246198	252224	242247	242250	251249	269260	287246	240226
Maximum	382	310306	175277	163183	267239	293252	271265	268272	260267	283	285	296281	382274
Minimum	266200	244235	111	125	93	193110	222186	210223	215236	218223	235229	278174	93179
Phosphate-phosphorus as P (mg/L)													
Average	0.040 0.061	0.042 0.044	0.066 0.062	0.040 0.067	0.033 0.065	0.033 0.032	0.026 0.030	0.049 0.052	0.036 0.044	0.039 0.036	0.029 0.024	0.028 0.055	0.039 0.048
Maximum	0.059 0.140	0.074 0.074	0.129 0.176	0.089 0.213	0.045 0.224	0.045 0.064	0.036 0.050	0.082 0.094	0.054 0.094	0.039 0.055	0.034	0.044 0.231	0.129 0.121
Minimum	0.022	0.020	0.020 021002	0.021	0.021	0.022 021202	0.020	0.029 021902	0.021 010210	0.039 026390	0.023 020302	0.009 020090	0.009 0.020
Solids, total suspended (mg/L)													
Average	9.726.0	15.512.1	93.380.8	52.68	17.352.1	13.513.3	4.023.4	8.113.3	13.514.8	9.64.4	8.26.4	5.25.9	26.825.4
Maximum	23.686.7	21.2	273.0	106166.0	45.6135.5	32.037.6	4.097.0	12.835.2	30.044.0	9.612.8	17.6	5.212.0	273.078.2
Minimum	0.0	9.20.0	5.6	4.0	4.04	4.0	4.0	0.0	0.0	9.60.0	0.0	5.20.0	0.01.8

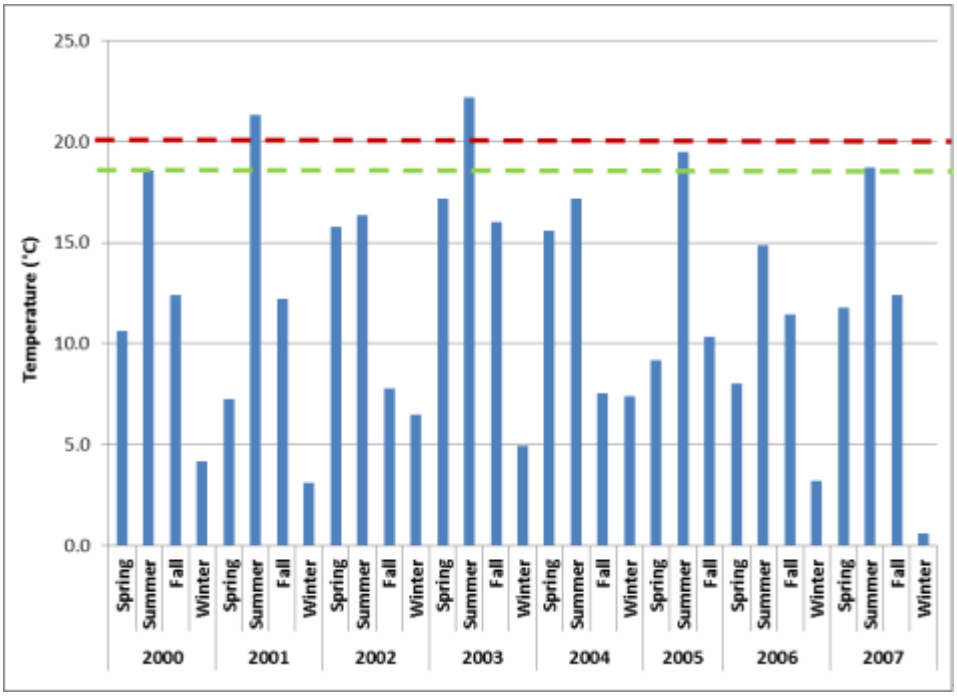
Notes: ND =Non-detectable value based on analytical limits.

Table 3.2-4. Summary of Average Annual Water Quality for the Weber River-3 Assessment Unit ~~(HUC 1602010204)~~ from 1995~~2000~~ through 2006~~2007~~

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	~~2007~~
pH	8.3	8.5~~3~~	8.2~~4~~	8.3~~4~~	8.2~~0~~	8.3	8.2	8.4	8.4	8.0	8.0	8.0	
Specific conductance (umho/cm)	479~~529~~	494~~522~~	510~~567~~	528~~640~~	434~~545~~	511~~555~~	499~~546~~	544~~553~~	644	488	512	554	
Turbidity (NTU)	9.9	5.7	21.0	5.9	24.1	3.7~~5~~	2.7	1.7	3.1~~5.4~~	8.8~~0~~	–~~4.2~~	–	–
DO (mg/L)	9.8	10.6~~5~~	9.3~~11.0~~	9.8	9.7	10.8	11.2~~8~~	11.5~~3~~	12.0	10.2	10.4~~3~~	10.8~~11.0~~	~~12.1~~
~~Average Annual~~ Temperature, water (°C)	9.9~~5~~	9.5	9.7	10.9~~4~~	8.3	10~~11~~.5	10.3	10.5~~7~~	12.3~~8.2~~	10.4~~5~~	11.0	–	
~~Maximum Temperature, water (°C)~~	~~18.6~~	~~21.3~~	~~16.4~~	~~22.2~~	~~17.2~~	~~19.5~~	~~14.9~~	~~18.7~~					
Alkalinity, carbonate as CaCO3 (mg/L)	187~~195~~	189	189	203	157	193	197	198	215~~209~~	157~~170~~	–~~197~~	–	–
~~Ammonia-nitrogen as N (mg/L)~~	~~ND~~	~~ND~~	~~ND~~	~~ND~~	~~0.015~~	~~0.059~~	~~0.054~~	~~ND~~					
Hardness, Ca + Mg (mg/L)	219~~243~~	214	210	238	195	240	229	235	259~~257~~	209~~230~~	–~~235~~	–	–
Phosphate-phosphorus as P (mg/L)	0.061	0.073	0.084	0.040	0.061	0.049	0.027	0.036	0.029~~03~~5	0.041~~04~~2	–~~0.039~~	–	–
Solids, total suspended (mg/L)	36.1	15.8	46.5	13.8	42.6	5.4~~3~~	2.7	0.0	10.0~~13.~~5	16.3~~21.~~7	–~~69.9~~	–~~44.0~~	–

Notes: ND = Non-detectable value based on analytical limits. – data not available

~~Seasonal water temperatures from 2000 to 2007 range from lows of 0°C–3°C during the winter time period (December through February), whereas the warmest temperatures occur in the summer months of June, July, and August (12°C–17°C). Variation in average annual temperature is relatively small with the greatest differences occurring from 2005 to 2006 (see Table 3.2-4). From 2000 to 2007, there were only two exceedances of the cold-water fishery standard of 20°C during the summer months at stations both upstream and downstream of the dam (Figure 3.2-2).~~



~~Figure 3.2-2. Maximum temperature values by season from 2000 to 2007~~

Seasonal water temperatures from 1995 to 2006 range from lows of 0°C–2oC during the winter time period (December through February), to highs of 14°C–19oC during the summer months (June, July, August). Variation in average annual temperature is relatively small with the greatest difference occurring from 1998 to 1999 (see Table 3.2-4). From 1995 to 2005, maximum temperatures occurred during the summer months with the highest temperature recorded during

the summer of 2003 at 22.2 ºC (Figure 3.2-3). The UDEQ cold-water fishery temperature standard states that greater than 10% of samples must exceed 20°C in order for the waterbody to be listed as impaired. It should be noted that while this dataset does include temperatures that surpass 20°C, ~~more~~fewer than 10% of the samples ~~did not~~ exceeded 20°C. In addition to denoting the 20°C standard, the average maximum temperature from 1995 to 2005 is also provided in Figure 3.2-3 to further identify temperature conditions in the Weber River-3 AU and ~~conclude~~illustrates that as it relates to fisheries, temperature is not a water quality issue for the time period covered by this data set.

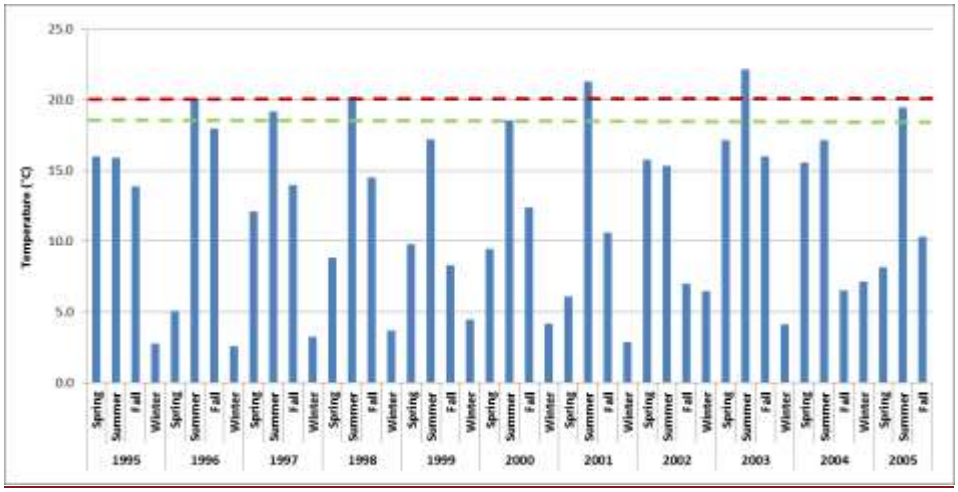
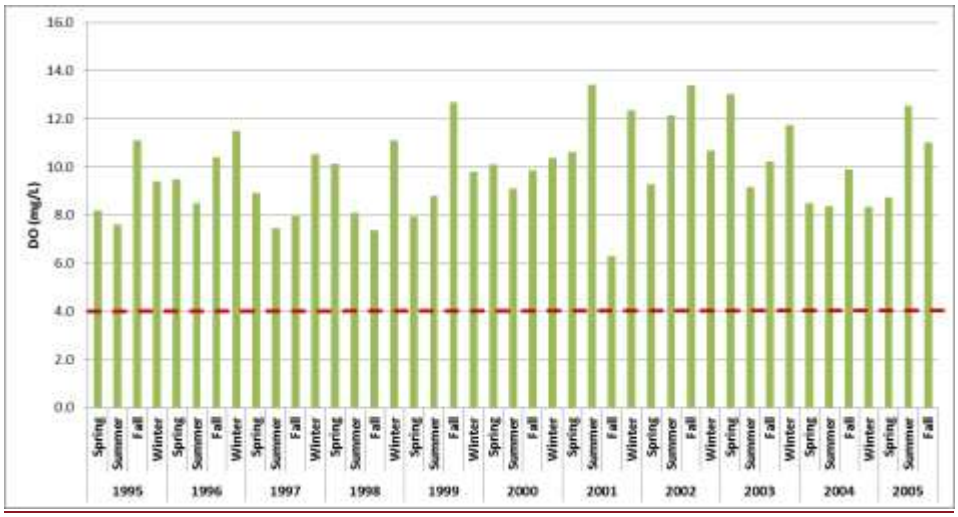


Figure 3.2-3. Maximum temperature values by season from ~~2000~~ 1995 to ~~2007~~ 2005 compared to the UDEQ temperature standard of 20°C (red dashed line) for Class 3A waters. The average maximum value from ~~2000~~1995-~~2007~~ 2005 is also shown (green dashed line) for reference purposes.

Average ~~A~~alkalinity~~Alkalinity~~ (ability of the water to neutralize a strong acid) ranged from ~~81~~ 124 mg/L to ~~256~~ 219 mg/L over the analyzed period with lower values occurring in late spring and higher values occurring in winter. Similarly, total hardness (Ca++ and Mg++) ranged from ~~93~~ 152 mg/L to ~~382~~ 267 mg/L with lower values occurring in late spring and higher values occurring in winter. Data indicate that water in the Weber River-3 AU is on the high end with regard to hardness and alkalinity; however, for this area of Utah, values are reasonable. On a seasonal basis, the highest concentrations are found during low-flow periods driven by groundwater recharge, with low concentrations occurring during snowmelt and spring runoff. The pH along this portion of the Weber River ~~also fluctuates seasonally in a similar pattern as alkalinity; a single exceedance of the Utah water quality standard for pH (6.5-9) was observed in spring of 2003.~~remains relatively stable with average monthly values ranging from 8.0 in April to 8.4 in July. ~~.~~

High concentrations of DO (6.0–8.0 mg/L or greater) are important for the health and viability of fish and other aquatic life in the Weber River. Low DO concentrations (less than 4.0 mg/L) can

cause an increase in stress to fish species and lower resistance to environmental stress and disease, and can ultimately result in mortality (at levels less than 2.0 mg/L). Low DO in water bodies can be related to a number of factors that include decomposition of algae and other organic matter and subsequent depletion of DO. From ~~2000~~ 1995 to ~~2007~~2006, DO ranged from 6.~~0~~ 3 mg/L to ~~14.9~~14.1 mg/L in the Weber River-3 AU with an overall average of 10.~~0~~ 4 mg/L. The minimum DO water quality standard of 4.0 mg/L as a 1-day minimum was not exceeded during this time period (Figure 3.2-4). It should be noted that several other DO state water quality criteria apply to the designated uses assigned to Weber River-3 AU, however the existing dataset utilized for this analysis precluded us from applying these standards.



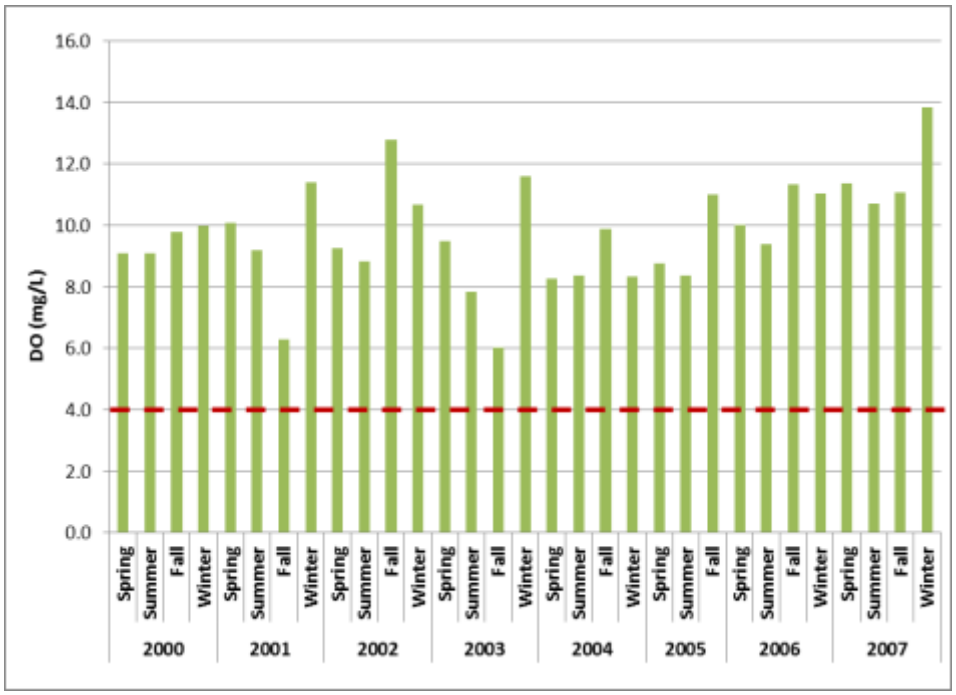
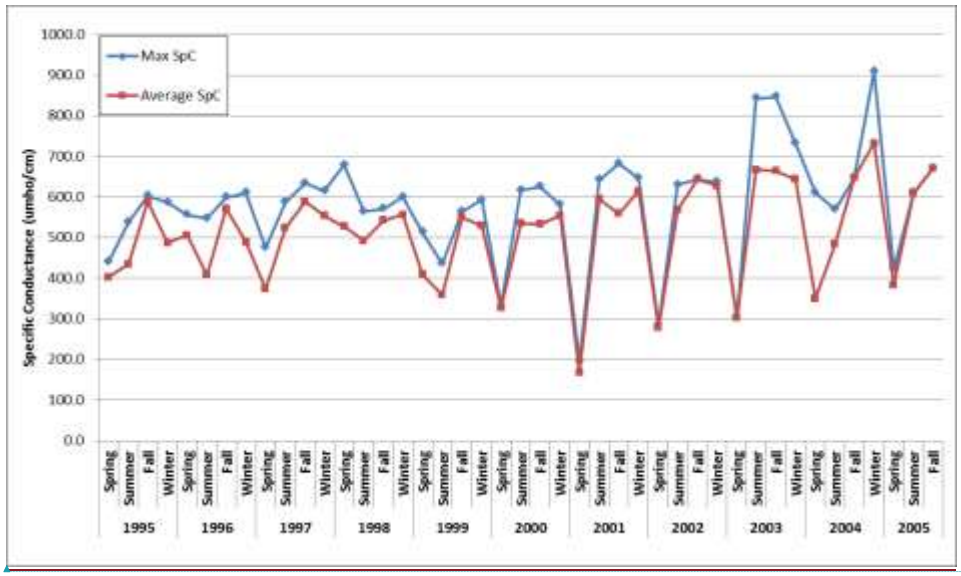


Figure 3.2-4. Minimum DO values by season from ~~2000~~ 1995 to ~~2007~~ 2005 compared to the UDEQ DO standard of 4°C as a 1-day minimum (red dashed line) for Class 3A waters.

Seasonal average ~~S~~specific~~Specific~~ conductivity ranged from ~~140~~ 168 mg/L to ~~909~~ 733 mg/L with an average value of ~~569~~ 517 mg/L from ~~2000~~ 1995 to ~~2007~~2005. Seasonally, higher values were observed during the low flows of the winter months (Figure 3.2-5), possibly due to groundwater sourcing of flow, or surface runoff containing dissolved solids associated with deicing roads.



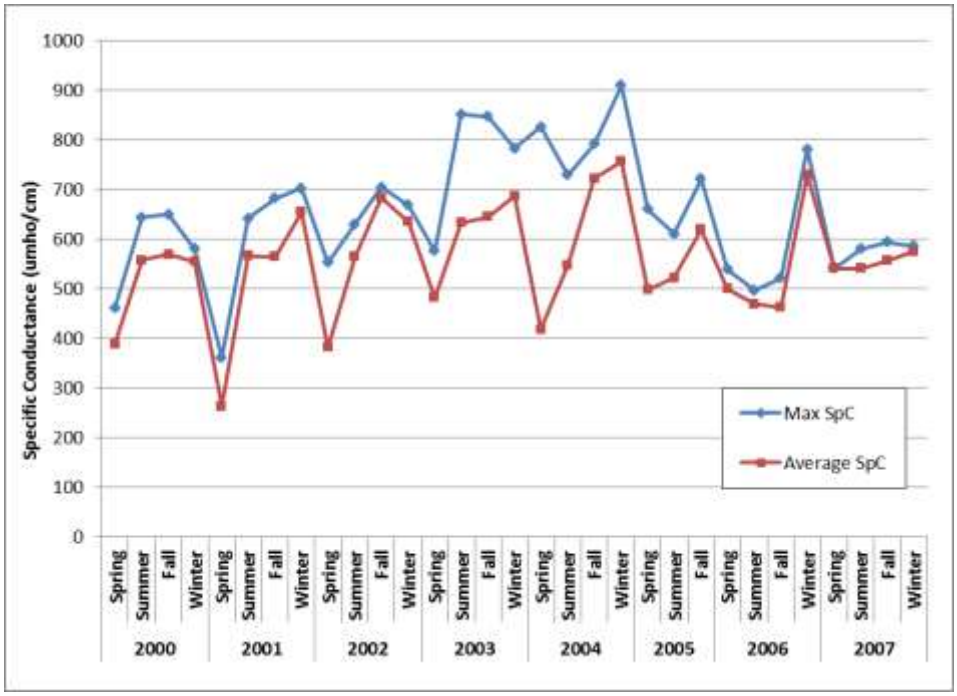


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Figure 3.2-5. Maximum and average specific conductance by season from ~~2000~~ 1995 to ~~2007~~2005.

Turbidity ranged from 1 NTU to ~~37~~ 110 NTU with an average value of ~~6~~ 10 NTU, and TSS ranged from 0 mg/L to 273 mg/L with an average value of ~~30~~ 22 mg/L. These two parameters (turbidity and TSS) are particularly important for understanding macroinvertebrate habitat because an increase in these parameters can indicate that pores of the streambed are becoming clogged with sediments, causing a reduction of habitat diversity and surface area available for microbial and macroinvertebrate growth, and subsequently for habitat availability and surface protection for eggs and juvenile fish to become limited.

3.2.3.2 Water Quality Upstream and Downstream of the Dam

Paired data points from 2003 and 2004 were identified from the two water quality monitoring stations and compared to gain insight into differences in water quality upstream and downstream of the Project Area. ~~The availability of water quality data for sampling stations upstream and downstream of the dam was explored to identify sampling locations with paired sampling parameters and dates. A water quality monitoring station below the dam near the confluence with the Ogden River (Station ID 4922990), approximately 12.6 river miles below the Project Area, and a station just above the dam (Station ID 4921000), approximately 1 river mile above the Project Area, were identified where paired data points were available in 2003 and 2004.~~ Table 3.2-5 summarizes the number of data pairs available and the average difference and percentage change from upstream to downstream in water quality for all paired water quality samples for these stations. Trends were graphically explored for specific conductance and turbidity due to the magnitude of difference in matched pairs. Both specific conductance and turbidity are higher at the downstream sampling station versus the upstream sampling station (Figures 3.2-6 and 3.2-7). These differences are likely due to the fact that the upstream and downstream sampling stations are far enough apart (13.6 miles total and the downstream site is likely affected by the urban corridor it traverses) that other factors may be influencing these parameters. Additional data will be acquired so that the degree to which the dam is affecting water quality can be identified. While historical data are useful for characterizing the evolution of water quality in the watershed, the addition of more recently collected data in closer proximity to the Project Area will be helpful for determining current trends and identifying additional studies and courses of action during the relicensing process.

Table 3.2-5. Paired Water Quality Parameters and Average Percentage of Difference for Upstream and Downstream Sampling Locations

Parameter	Number of Data Pairs	Average Upstream	Average Downstream	Average Difference	Percentage ~~of Difference~~Change
pH	25	8.1	8.2	~~-0.1~~+0.1	~~-1.0~~+1.2%
Specific conductance (umho/cm)	24	~~511.0~~500.0	~~602.0~~601.0	~~-91.0~~+101.2	~~-21.0~~+20.2%
Turbidity (NTU)	13	5.0	8.2	~~-3.2~~+3.2	~~-79.4~~+64%

DO (mg/L)	13	10.9	10.7	-0.3	~~-0.3~~-1.8%
Temperature, water (ºC)	13	11.6	11.1	-0.5	~~8.4~~-4.3%
Alkalinity, carbonate as CaCO3 (mg/L)	13	173.0	186.0	~~-13.0~~+12.7	~~-10.0~~+7.5%
Hardness, Ca + Mg (mg/L)	13	220.7	235.8	~~-15.0~~+15.0	~~-0.1~~+6.8%

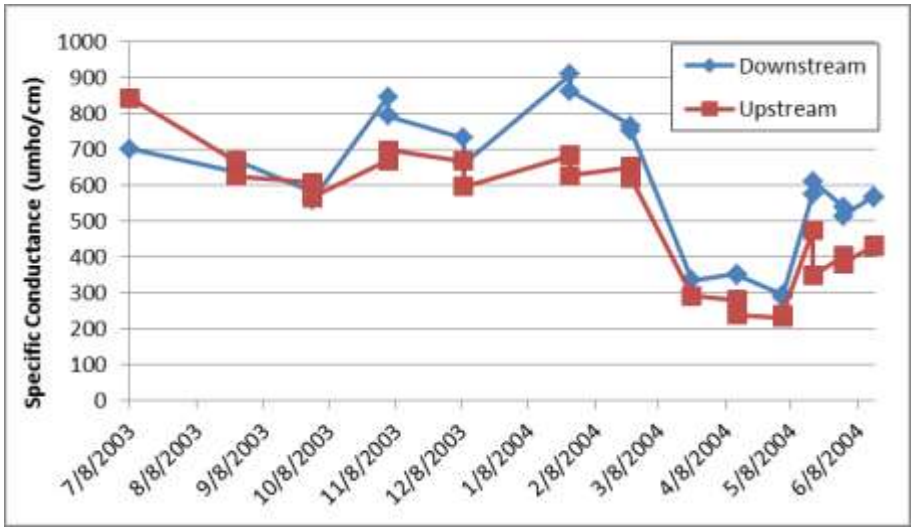

Figure 3.2-6. Matched pair values for specific conductance upstream and downstream of the dam from 2003 to 2004.

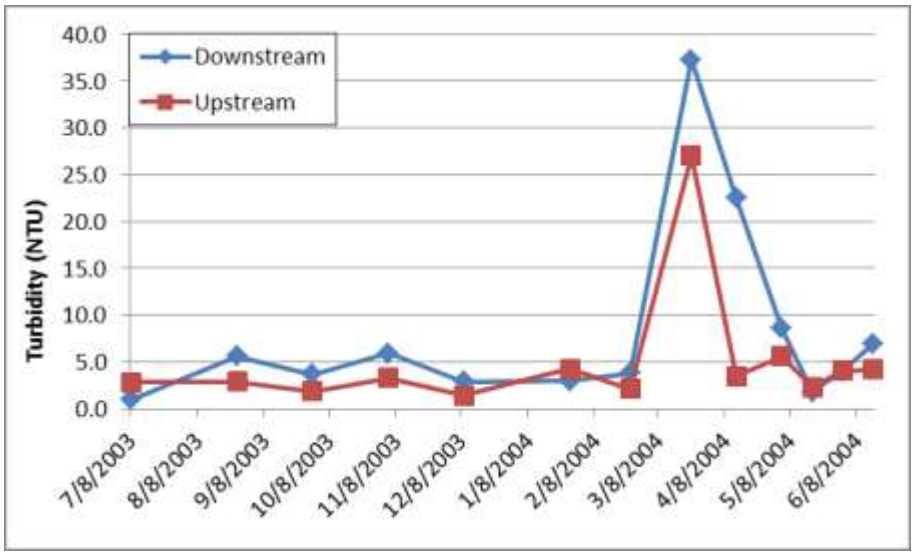

Figure 3.2-7. Matched pair values for turbidity upstream and downstream of the dam from 2003 to 2004.

3.3 Fisheries and Aquatic Resources

3.3.1 Habitat

The aquatic habitat in the Project Area has been severely altered from historical conditions. The physical characteristics of the river have been altered with construction of U.S. Interstate Highway 84 in 1968. Much of the river was channelized and a large portion of the lower velocity/backwater environment was eliminated (Webber, et al. 2012). The substrate is typical of high gradient mountain streams in the Wasatch-Cache National Forest, consisting primarily of small boulders, small to medium cobble, gravel and sand.

3.3.2 Fish Community

Fisheries:

Anadromous:	X	Absent.		Present.
Resident:		Absent.	X	Present.

Fish identified previously in the Project bypass reach or the Project Area are rainbow trout (*Oncorhynchus mykiss*), cutthroat trout (*O. clarki*), and brown trout (*Salmo trutta*); mountain whitefish (*Prosopium williamsoni)*, mottled sculpin (*Cottus bairdii*), bluehead sucker (*Catostomus discobolus*), and mountain sucker (*C. platyrhynchus*~~).~~), Utah sucker (*C. ardens*),

speckled dace (*Rhinichthys osculus*), longnose dace (*R. cataractae*), redside shiner (*Richardsonius balteatus*), and common carp (*Cyprinus carpio*).. Cutthroat trout, ~~and~~ mountain whitefish, and brown trout make up more than 9~~0~~5% of the total biomass of game species in the bypass reach. The Utah Division of Wildlife Resources (UDWR) rates the project reach of the Weber River as Class ~~III, a quality fishery~~IIIB, a quality fishery with species of special concern (Bonneville cutthroat trout and bluehead sucker). ~~.~~ Bonneville cutthroat is also listed as a sensitive species by the USFS~~DA Forest Service~~.

UWDR does not stock fish in the vicinity of the Weber Project Area and relies, primarily, on natural production (Paul Thompson – pers. comm. 2015). The state used to stock 3-inch brown trout but that was discontinued several years prior to 2015. UDWR now manages the area for native Bonneville cutthroat trout. There are some catchable sterile rainbow trout stocked in Echo, East Canyon, and Lost Creek reservoirs and~~upstream of Oakley; however,~~ it is possible some of these fish can make it downstream ~~through Echo Canyon Reservoir~~ to the Project Area. Historical stocking of fertile rainbow trout may have resulted in a few fertile rainbow trout or cutthroat x rainbow trout hybrids occurring within the Project Area, although these fish are removed when discovered during annual fisheries surveys and other work.

The following is a description of the aquatic species present in the Project reach beginning with native species and followed by introduced species.

3.3.2.1 Bonneville Cutthroat Trout

The Bonneville cutthroat trout (BCT) is the only ~~a~~ subspecies of cutthroat native to the historic Lake Bonneville basin of Utah, Wyoming, Idaho, and Nevada. Pure-strain BCT~~onneville cutthroat~~ are rare throughout their historic range but several Utah populations exist in Bear Lake and Strawberry Reservoir. BCT~~onneville cutthroat trout~~ have been petitioned twice for federal listing under the Endangered Species Act in 1992 and 1998. In both cases the U.S. Fish and Wildlife Service found the species not warranted for federal protection. Major threats to BCT~~onneville cutthroat~~ include habitat loss or alteration, predation by and competition with nonnative fishes, and hybridization with nonnative fishes including rainbow trout. Because of this BCT~~onneville cutthroat trout~~ have a State of Utah (1997) and Range-wide (2000) Conservation Agreement and Strategy developed to further cooperation toward protection of the species. Recent genetic studies conducted by UDWR indicate that BCT in the Project Area have a very low level of hybridization. Because of these numerous threats this cutthroat subspecies is included on the *Utah Sensitive Species List* (UDWR 2014). Bonneville cutthroat trout is also the Utah state fish.

BCT~~onneville cutthroat trout~~ primarily eat insects, but large individuals have been known to also eat other fish. Like most cutthroat trout, this subspecies spawns in streams over gravel substrate in the spring. ~~The~~ BCT~~onneville cutthroat~~ can be found in a variety of habitat types ranging from high elevation mountain streams and lakes to low elevation grassland streams but can also be found in natural lakes, such as Bear Lake, or in reservoirs. Within each different habitat type, BCT~~onneville cutthroat~~ require a functional stream riparian zone which provides structure, cover, shade, and bank stability plus crucial spawning habitat. During a study in 2011 and 2012, UDWR marked several BCT downstream of Weber dam (Matt McKell – pers. comm. 2015).

The UDWR has also placed PIT tag antennas at eight of the tributaries upstream of Weber dam to detect movement into and out of those tributaries.

In 2013, seven individual BCT were detected upstream of the dam in tributaries and, in 2014, 20~~twenty~~ of those marked fish exhibited a similar upstream migration pattern indicating the first documented presence of a fluvial strain of BCT in the lower Weber River. Fluvial-type BCT reside in a major river much of the year, but annually migrate to smaller tributaries to spawn. Current information among regional biologists is that there is only one other known fluvial population of BCT, found in the Bear River system in southeastern Idaho. ~~BasedBasedBased~~Through tagging and monitoring, 28~~twenty-eight~~ BCT have been shown to navigate upstream past Weber dam; based on the timing of the documented movements, there is some thought that the migrating fish are travelling ~~possibly~~ through the low-~~-~~flow sluice gate~~ but~~. However, there is no evidence available to ~~prove or disprove that hypothesis~~show the precise path taken by these fish moving upstream past the dam.

3.3.2.2 Bluehead Suckers

Bluehead suckers are native to parts of Utah, Idaho, Arizona, New Mexico and Wyoming. The species occurs in the upper Colorado River system, the Snake River system, and the Lake Bonneville basin, although recent work suggests the Snake and Lake Bonneville populations (including the Weber River fish) are a genetically distinct group from those occurring in the Colorado River system (Hopken, et. al., 2013). In Utah, bluehead suckers have been reduced in numbers and distribution due to flow alteration, habitat loss or alteration an`d the introduction of nonnative fishes. Consequently the bluehead sucker is included on the *Utah Sensitive Species List* (UDWR 2014); the recent genetics work may make the Weber River fish additionally vulnerable to status updates of the species. Bluehead suckers have a Range-wide (2004) and State of Utah (2006) Conservation Agreement and Strategy developed to further cooperation toward the protection of this species.

The bluehead sucker is a benthic species with a mouth modified to scrape algae from the surface of rocks. Algae is the primary food of the species. Bluehead suckers spawn in streams during the spring and early summer. Fast flowing water in high gradient reaches of mountain streams is the most important habitat for this species.

It has recently been determined that the bluehead sucker exists in the area of the Weber River occupied by the hydroelectric project but also extending upstream and downstream of the project (Webber, et al. 2012). ~~According to Webber et al.According to Webber et al.According to Webber et al.~~Bluehead sucker populations occur in the Weber River from the confluence of the Ogden River upstream to above Echo Reservoir. The populations in the lower river (Weber Project Area and downstream) appear to be the most robust (~~According to~~ Webber et al. 2012). ~~(ibid), of the two reaches on the Weber River where bluehead suckers are known to exist, the population in the reach between Weber dam and the Weber-Davis Canal Company dam (the Project Area) is the most robust.~~

3.3.2.3 Mountain Suckers

Mountain suckers occur in most of the western United States and parts of western Canada. A native species in Utah, the mountain sucker is found in the Lake Bonneville basin and the Colorado River system. This species prefers clear, cold water of streams with gravel substrate. Mountain suckers are benthic oriented and feed on algae, higher plants, and sometimes invertebrates. The species spawns during the spring and early summer in gravel riffles. Because mountain suckers are small (about six to eight inches) and are often found in trout waters, this species is an important food item for trout.

3.3.2.4 Mountain Whitefish

This species is native to the western United States and western Canada. Mountain whitefish prefer cold mountain lakes and are~~is~~ common in many areas of Utah. Food habits include insect larvae, insects, fish eggs, and small fish. They feed most actively at night and during the winter. Mountain whitefish spawn in the late fall to early winter, usually in stream riffle habitat with gravel substrate.

3.3.2.5 Mottled Sculpin

The mottled sculpin is native to both eastern and western North America. The species is common in Utah and can be found in many of Utah's coldwater streams. Mottled sculpin are benthic organisms and are important forage for steam dwelling trout. These sculpin feed on aquatic insects, small fishes, crayfishes, fish eggs and plant matter. Mottled sculpin spawn in the late winter through early spring

3.3.2.6 Utah Sucker

Utah suckers are still found within their native range in southeastern Idaho and western Wyoming in the Bear River drainage and along the western front range of the Wasatch Mountains in Utah along with parts of Nevada and the Snake River above Shoshone Falls; all of which is part of the ancient Lake Bonneville (Sigler and Sigler 1987 and 1996). The Utah sucker spawns in the spring over shallow gravel or sand in small streams or lakeshores.

3.3.2.7. Speckled Dace

Speckled dace are a widely distributed native species in western North America and found in a variety of habitats. They are primarily invertivores feeding on insects, plankton, freshwater shrimp and plant material. These fish typically spawn in mid-summer in stream riffles.

3.3.2.8 Longnose Dace

The longnose dace, another native species, has a much more extensive range than the speckled dace ranging from northern Mexico to the Northwest Territories in Canada and southward in the Appalachians to Georgia. They are adapted to benthic life in fast-flowing streams and feed on drift organisms or immature aquatic insects. Longnose dace typically spawn in late spring or early summer over gravelly riffle areas.

3.3.2.9 Redside Shiner

Redside shiners, another small native species, are found in North America generally west of the Rocky Mountains. These fish are a schooling species found in lakes, ponds, and slower moving rivers and streams. Redside shiners feed primarily on invertebrates, zooplankton and algae but may also consume mollusks, fish eggs and smaller fishes. Redside shiners spawn in the late spring or early summer in shallow gravelly areas.

3.3.2.10 Brown Trout

Brown trout, a nonnative species, have become established in many of the cool and cold water streams in Utah. Their diet consists of primarily fishes, but they are opportunistic and are known to consume amphibians, rodents, and invertebrates including insects, snails and crayfish. Because of their piscivorous nature, brown trout often have a detrimental effect on populations of native and nonnative sport fishes. The brown trout spawn in the fall in the gravel substrate of streams. While brown trout do not appear to be the majority species in the Weber project reach, they are sought after by anglers because of their size.

3.3.2.11 Rainbow Trout

The rainbow trout is native to western North America but it is not native to Utah. It has been introduced to cool waters throughout the state. Because it is a popular sport fish and because most of the stocks used by UDWR are now considered sterile, millions of fish are stocked in Utah state waters.

Rainbow trout prefer to eat invertebrates including insects, worms, zooplankton, and insect larvae. Larger rainbows can become piscivorous. The species spawns in streams over gravel substrate during the spring. In areas where rainbow trout and cutthroat trout co-exist rainbow-cutthroat hybrids can occur. Loss of genetic purity of cutthroat trout is considered one of the major threats to Utah's native cutthroat trout, especially the Bonneville strain.

3.3.2.12 Common Carp

The common carp is not native to North America but is found in every mainland state in the Union. Carp feed primarily on zooplankton but their diet may also include detritus and benthic organisms. They typically spawn in large groups over silt or vegetation in the shallow, warmer areas of lakes or rivers. Spawning and feeding activities can create a lot of turbidity which can inhibit feeding behavior of other species in the vicinity.

3.3.3 Rare, Threatened and Endangered Aquatic Species

There are no known federally listed threatened, endangered, or candidate species in the Weber River. However, USFS~~DA Forest Service~~ does list the Bonneville c~~C~~utthroat as a sensitive species on the Wasatch National Forest.

3.4 Botanical Resources

The Project Area sits at approximately 4,600 feet elevation and is dominated by development with minimal native vegetation. Botanical resources were evaluated in the Project Area and in the larger potential effects area (PEA), which consists of a 1-mile buffer around the Project Area. The PEA comprises mostly USFS-administered lands from approximately 4,600 to 6,600 feet elevation and contains a wide range of vegetation communities and land cover types.

3.4.1 Botanical Habitat

3.4.1.1 Land Cover Types

Geographic Information System (GIS)-based analyses of Southwest Regional Gap Analysis Project (SWReGAP) land cover data (Lowry et al. 2007) were performed which identified 18 SWReGAP vegetation communities and land cover types in the PEA (Figure 3.4-1). The PEA is dominated by Rocky Mountain Gambel Oak-Mixed Montane Shrubland (57.0%), with significant cover of Rocky Mountain Bigtooth Maple Ravine Woodland (15.4%) and Rocky Mountain Montane Mesic Mixed Conifer Forest and Woodland (8.6%). The remaining 19% of the PEA consists of small patches of native vegetation communities, agriculture, and developed land cover types. Land cover in and adjacent to the Project Area is predominantly Developed, Medium – High Intensity land cover (62.4%), with smaller areas of Rocky Mountain Gambel Oak-Mixed Montane Shrubland (31.5%), Rocky Mountain Bigtooth Maple Ravine Woodland (3.1%), Rocky Mountain Cliff and Canyon (1.6%), Invasive Perennial Grassland (1.3%), and Inter-Mountain Basins Big Sagebrush Shrubland (0.2%).

Figure 3.4-1 demonstrates that sheltered, north-facing slopes in the PEA comprise Rocky Mountain Montane Mesic and Dry-Mesic Mixed Conifer Forest and Woodlands interspersed with Bigtooth Maple Ravine Woodland and Gambel Oak-Mixed Montane Shrubland, with more xeric vegetation types dominating south-facing slopes north of the Weber River. SWReGAP land cover types in the PEA are described below.

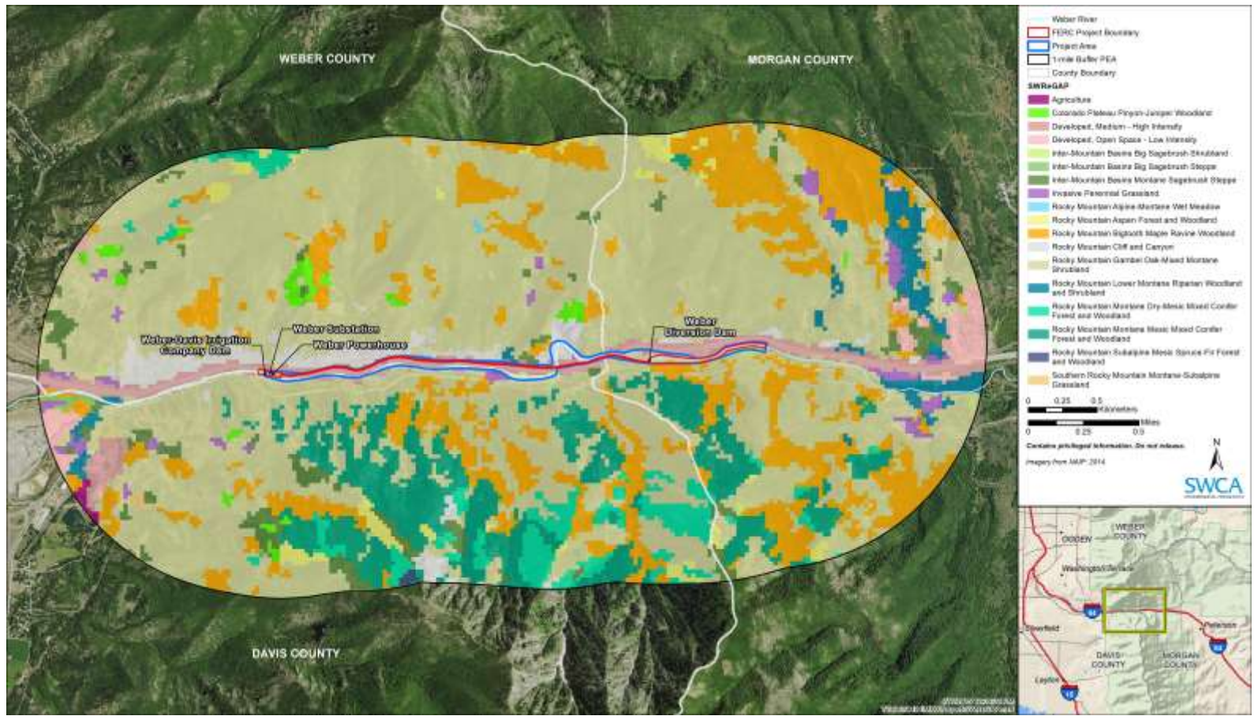

Figure 3.4-1. SWReGAP land cover types identified within the PEA.

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3.4.2 Botanical Community

3.4.2.1 Colorado Plateau Pinyon-Juniper Woodland

Colorado Plateau Pinyon-Juniper Woodland occurs from 4,900 to 7,874 feet and is dominated by Utah juniper (*Juniperus osteosperma*) with scattered pinyon (*Pinus edulis*) trees. At higher elevations and on north-facing slopes, Rocky Mountain juniper (*Juniperus scopulorum*) replaces Utah juniper as the dominant tree species.

3.4.2.2 Developed, Open Space-Low Intensity

The Developed, Open Space-Low Intensity cover type is typically dominated by a mixture of infrastructure, construction materials and vegetation in the form of lawn grasses.

3.4.2.3 Developed, Open Space-Medium High Intensity

The Developed, Open Space-Medium High Intensity cover type is typically dominated by infrastructure (e.g., freeway, bridges, diversion dams), disturbed ground (e.g., road edges), construction materials and limited vegetation with the majority of surface covered by impervious materials. **This is the dominant land cover type in the Project Area, covering approximately 62.4% of the area.**

3.4.2.4 Inter-Mountain Basins Big Sagebrush Shrubland

The Inter-Mountain Basins Big Sagebrush Shrubland cover type occurs from 4,900 to 7,545 feet and is dominated by basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) and/or Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*), with Utah juniper and pinyon pine as subdominants. Co-dominant species include saltbush (*Atriplex* spp.), greasewood (*Sarcobatus vermiculatus*), rubber rabbitbrush (*Ericameria nauseosa*), and snowberry (*Symphoricarpos oreophilus*).

3.4.2.5 Inter-Mountain Basins Big Sagebrush Steppe

The Inter-Mountain Basins Big Sagebrush Steppe cover type occurs at lower elevations and is typically dominated by basin big sagebrush and/or Wyoming big sagebrush along with antelope bitterbrush (*Purshia tridentata*). This cover type differs from Inter-Mountain Basins Big Sagebrush Shrubland in that grass is a dominant community component. Associated native grass species include Indian ricegrass (*Achnatherum hymenoides*), slender wheatgrass (*Elymus lanceolatus*), Idaho fescue (*Festuca idahoensis*), Sandberg bluegrass (*Poa secunda*), and bluebunch wheatgrass (*Pseudoroegneria spicata*).

3.4.2.6 Inter-Mountain Basins Montane Sagebrush Steppe

The Inter-Mountain Basins Montane Sagebrush Steppe cover type occurs between 5,000 and 9,800 feet and is dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and antelope bitterbrush. Common shrubs include snowberry, Utah serviceberry (*Amelanchier*

utahensis), rubber rabbitbrush, and sticky rabbitbrush (*Chrysothamnus viscidiflorus*). Dominant grass species are similar to the Inter-Mountain Basins Big Sagebrush Steppe land cover type.

3.4.2.7 Invasive Perennial Grassland

Invasive Perennial Grasslands are generally highly disturbed lands and have been either planted with or invaded by non-native/invasive perennial and annual grass species including crested wheatgrass (*Agropyron cristatum*), brome (*Bromus* spp.), and Kentucky bluegrass (*Poa pratensis*).

3.4.2.8 Rocky Mountain Alpine-Montane Wet Meadow

The Rocky Mountain Alpine-Montane Wet Meadow cover type occurs from 3,280 to 11,800 feet around ponds, lakes, and streams, and is dominated by grass, sedge, and dwarf shrub species.

3.4.2.9 Rocky Mountain Aspen Forest and Woodland

Rocky Mountain Aspen Forest and Woodland occurs from 5,000 to 10,000 feet and is typically dominated by quaking aspen (*Populus tremuloides*). Dominant understory species include graminoid and/or shrub species, including Utah serviceberry, snowberry, bearberry (*Arctostaphylos uva-ursi*), and thimbleberry (*Rubus parviflorus*).

3.4.2.10 Rocky Mountain Bigtooth Maple Ravine Woodland

Rocky Mountain Bigtooth Maple Ravine Woodland is typically found on slopes and in ravines, and is dominated by bigtooth maple (*Acer grandidentatum*) and/or Gambel oak (*Quercus gambelii*). Other tree species include boxelder (*Acer negundo*) and quaking aspen. This cover type is typically found adjacent to Rocky Mountain Gambel Oak-Mixed Montane Shrubland.

3.4.2.11 Rocky Mountain Cliff and Canyon

Rocky Mountain Cliff and Canyon consists of sparsely vegetated cliff faces and rock canyon walls and occurs at most elevations. Dominant plant species are influenced by adjacent plant communities and can include white fir (*Abies concolor*), subalpine fir (*Abies lasiocarpa*), juniper (*Juniperus* spp.), lodgepole pine (*Pinus contorta*), limber pine (*Pinus flexilis*), Douglas-fir (*Pseudotsuga menziesii*), and/or quaking aspen.

3.4.2.12 Rocky Mountain Gambel Oak-Mixed Montane Shrubland

Rocky Mountain Gambel Oak-Mixed Montane Shrubland occurs from 6,500 to 9,500 feet and is dominated by Gambel oak. Co-dominants include Utah serviceberry, mountain-mahogany (*Cercocarpus montanus*), chokecherry (*Prunus virginiana*), bitterbrush (*Purshia* spp.), and snowberry. **This is the dominant land cover type in the PEA, covering approximately 57.0% of the area.**

3.4.2.13 Rocky Mountain Lower Montane Riparian Woodland and Shrubland

Rocky Mountain Lower Montane Riparian Woodland and Shrubland occurs from 2,900 to 9,200 feet along rivers and streams. Dependent on periodic flooding, the dominant plant species include boxelder, Rocky Mountain maple (*Acer glabrum*), mountain alder (*Alnus incana*), water birch (*Betula occidentalis*), redoiser dogwood (*Cornus sericea*), narrowleaf cottonwood (*P. angustifolia*), Fremont cottonwood (*P. fremontii*), Douglas-fir, spruce (*Picea* spp.), and willow (*Salix* spp.). State of Utah noxious weed species Russian-olive (*Elaeagnus angustifolia*) and saltcedar (*Tamarix chinensis*) may also dominate this land cover type in some landscapes.

3.4.2.14 Rocky Mountain Montane Dry-Mesic Mixed Conifer Forest and Woodland

Rocky Mountain Montane Dry-Mesic Mixed Conifer Forest and Woodland occurs from 4,100 to 11,000 feet elevation and is dominated by Engelmann spruce (*Picea engelmannii*) and subalpine fir. Co-dominant tree species may include blue spruce (*Picea pungens*), lodgepole pine, quaking aspen, and Douglas-fir.

3.4.2.15 Rocky Mountain Montane Mesic Mixed Conifer Forest and Woodland

Rocky Mountain Montane Mesic Mixed Conifer Forest and Woodland occurs from 3,900 to 10,800 feet and is dominated by white fir and Douglas-fir. Co-dominant tree species include Engelmann spruce, blue spruce, quaking aspen, Rocky Mountain maple, bigtooth maple, mountain alder, and water birch. This land cover type differs from Rocky Mountain Montane Dry-Mesic Mixed Conifer Forest and Woodland in typically cooler, wetter site conditions.

3.4.2.16 Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland

The Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland cover type is typically found at high elevations and north-facing slopes. Dominant species include Engelmann spruce and subalpine fir.

3.4.2.17 Southern Rocky Mountain Montane Subalpine Grassland

Southern Rocky Mountain Montane Subalpine Grassland occurs from 7,200 to 10,800 feet and is dominated by graminoid plant species including Idaho fescue and bluebunch wheatgrass. This open vegetation community is typically intermixed with spruce-fir stands.

3.4.3 Rare, Threatened, and Endangered Plant Species

The potential distributions of special-status plant species in the PEA was also evaluated. There is one federally threatened plant species (Ute ladies'-tresses orchid [*Spiranthes diluvialis*]) and one USFS R4 sensitive plant species (Burke's draba [*Draba burkei*]) that may have the potential to occur in the vegetation communities and elevational ranges found in the PEA. In 1990, when the original FERC licensing document (Utah Power & Light Company 1990) was prepared, no special-status plant species were documented. On-site surveys will be required to determine if any potential special-status plant species currently occur in the Project Area.

3.5 Terrestrial Wildlife Resources

The Project Area sits at approximately 4,600 feet elevation and is dominated by development with minimal native vegetation. Terrestrial wildlife resources were evaluated in the Project Area and in a potential effects area (PEA), which consists of a 1-mile buffer around the Project Area. The PEA comprises mostly USFS-administered lands from approximately 4,600 to 6,600 feet elevation and contains a wide range of habitats.

Terrestrial wildlife distributions in the Project Area and PEA are limited by existing development and transportation corridors in Weber Canyon. Big game winter ranges typically occur below 7,000 feet along the entire western boundary of the Wasatch portion of the Uinta-Wasatch-Cache National Forest, but are reduced due to human activities at the wildland-urban interface (USDA Forest Service 2003).

3.5.1 Terrestrial Wildlife Habitats

Terrestrial wildlife habitats within the PEA include sagebrush steppe shrublands, grasslands, oak-maple woodlands, pinyon-juniper woodlands, riparian woodlands, mixed coniferous forests, wet meadows, subalpine forests, and developed areas, particularly in the riverine canyon floor habitats. Detailed descriptions of the land cover types in the PEA are provided in section 3.4, Botanical Resources.

Vegetation communities in the PEA are used by a variety of game and non-game terrestrial wildlife species. The PEA is dominated by oak shrublands interspersed with maple and mixed conifer woodlands. The remaining land cover in the PEA consists of small patches of other habitat types, agricultural lands, and developed areas. The land cover in and adjacent to the Project Area is mostly developed, with some native vegetation and invasive grasslands that are of limited or no value to wildlife. Sheltered, north-facing slopes along the canyon provide thermal cover for game species, while south-facing slopes are known to provide winter range for mule deer. Usable terrestrial wildlife habitats within the Project Area are extremely limited due to the previous construction of Interstate 84 and other development infrastructure, as well as the inherent safety risks of terrestrial wildlife in areas with extremely high speed hazards (freeway and railroad), as well as physical obstructions, to wildlife movement.

3.5.2 Terrestrial Wildlife Community

Terrestrial wildlife in the PEA comprises a diverse assemblage of large and small mammals and numerous migratory and year-round avian species. An approximate list of terrestrial mammals with potential to use habitats within the PEA for all or part of the year is provided in Table 3.5-1.

Table 3.5-1. Terrestrial Mammals with Potential to Occur in the PEA

Common Name	Species or Family Name
Moose	*Alces alces*
Coyote	*Canis latrans*
Beaver	*Castor ~~canadensis~~Canadensis*
Elk	*Cervus ~~canadensis~~Canadensis*
Porcupine	*Erithizon dorsatum*
Small rodents (voles and mice)	Family Cricetidae and Family Muridae
Weasel	Family Mustelidae
Bat species	Family Vespertilionidae
Cougar	*Felis concolor*
Bobcat	*Lynx rufus*
Yellow-bellied marmot	*Marmota flaviventris*
Skunk	*Mephitis mephitis*
Mink	*Mustela vison*
Chipmunk	*Neotamias* spp.
Mule deer	*Odocoileus hemionus*
Rock squirrel	*Otospermophilus variegatus*
Raccoon	*Procyon lotor*
Golden-mantled ground squirrel	*Spermophilus lateralis*
Mountain cottontail	*Sylvilagus nuttallii*
Red squirrel	*Tamiasciurus hudsonicus*
Badger	*Taxidea taxus*

Common bird species that likely use habitats in the PEA include song sparrow, robin, dark-eyed junco, orange-crowned warbler, and black-billed magpie. Numerous raptor species, such as sharp-shinned hawk, Cooper's hawk, American kestrel, and bald and golden eagles, are known to use the river corridor (Utah Power & Light Company 1990). A partial list of avian species with potential to occur in the PEA is shown below ~~There are 22 migratory bird species with potential to occur in the PEA~~ (Table 3.5-2).

Table 3.5-2. Partial List of Avian Species with Potential to Occur in the PEA

Common Name	Species or Family Name	Season of Use
Cooper's hawk	*Accipiter cooperii*	Breeding
Sharp-shinned hawk	*Accipiter striatus*	Breeding
American wigeon	*Anas ~~americana~~Americana*	Breeding
Cinnamon teal	*Anas cyanoptera*	Breeding
Mallard	*Anas platyrhynchos*	Breeding
Golden eagle	*Aquila chrysaetos*	Year-round
Black-chinned hummingbird	*Archilochus alexandri*	Breeding
Short-eared owl	*Asio flammeus*	Year-round
Burrowing owl	*Athene cunicularia*	Breeding
Juniper titmouse	*Baeolophus ridgwayi*	Year-round
Common goldeneye	*Bucephala clangula*	Wintering
Ferruginous hawk	*Buteo regalis*	Year-round
Swainson's hawk	*Buteo swainsoni*	Breeding
Cassin's finch	*Carpodacus cassinii*	Year-round
American dipper	*Cinclus mexicanus*	Breeding
Olive-sided flycatcher	*Contopus cooperi*	Breeding
Yellow-rumped warbler	*Dendroica ~~coronata~~coronate*	Breeding
Yellow warbler	*Dendroica ~~petechia~~petechial*	Breeding
Willow flycatcher	*Empidonax traillii*	Breeding
Prairie falcon	*Falco mexicanus*	Year-round
American kestrel	*Falco sparverius*	Breeding
Pinyon jay	*Gymnorhinus cyanocephalus*	Year-round
Bald eagle	*Haliaeetus leucocephalus*	Wintering

Table 3.5-2. Partial List of Avian Species with Potential to Occur in the PEA

Common Name	Species or Family Name	Season of Use
Barn swallow	*Hirundo rustica*	Breeding
Dark-eyed junco	*Junco hyemalis*	Year-round
Loggerhead shrike	*Lanius ludovicianus*	Year-round
Lewis's woodpecker	*Melanerpes lewis*	Breeding
Song sparrow	*Melospiza melodia*	Breeding
Long-billed curlew	*Numenius americanus*	Breeding, wintering
Sage thrasher	*Oreoscoptes montanus*	Breeding
Fox sparrow	*Passerella liaca*	Breeding
Black-billed magpie	*Pica hudsonia*	Year-round
Eared grebe	*Podiceps nigricollis*	Breeding
Broad-tailed hummingbird	*Selasphorus platycercus*	Breeding
Williamson's sapsucker	*Sphyrapicus thyroideus*	Breeding
Brewer's sparrow	*Spizella breweri*	Breeding
Northern rough-winged swallow	*Stelgidopteryx serripennis*	Breeding
Calliope hummingbird	*Stellula calliope*	Breeding
Western meadowlark	*Sturnella neglecta*	Breeding
Tree swallow	*Tachycineta bicolor*	Breeding
American robin	*Turdus migratorius*	Year-round
Orange-crowned warbler	*Vermivora celata*	Breeding
Greater sage-grouse	*Centrocercus urophasianus*	Breeding
Yellow-billed cuckoo	*Coccyzus americanus*	Breeding

There are numerous amphibian and reptile species with potential to occur in the PEA (Table 3.5-3), but none of these have federally protected status and only one (smooth greensnake *[Opheodrys vernalis])* is a state sensitive species (although most are protected from being killed as nuisance species by state law). These species include rattlesnake (*Crotalus oreganus lutosus*), gopher snake (*Pituophis catenifer*), garter snake (*Thamnophis sirtalis*), rubber boa (*Charina bottae*), yellow-bellied racer, tiger salamander (Ambystoma tigrinum), and leopard frog (Rana pipiens).

Table 3.5-3. Amphibian and Reptile Species with Potential to Occur in the PEA

Common Name	Species or Family Name
Tiger salamander	*Ambystoma tigrinum*
Rubber boa	*Charina bottae*
Yellow-bellied racer	*Coluber constrictor ~~mormon~~Mormon*
Rattlesnake	*Crotalus oreganus lutosus*
Smooth greensnake*	*Opheodrys vernalis*
Gopher snake	*Pituophis catenifer*
Leopard frog	*Rana pipiens*
Garter snake	*Thamnophis sirtalis*

* Smooth greensnake is a state sensitive species

3.5.3 Rare, Threatened, and Endangered Terrestrial Wildlife Species

There are two federally listed (Endangered Species Act of 1973) terrestrial wildlife species with some potential to occur in the PEA: greater sage-grouse (federal candidate; *Centrocercus urophasianus*) and yellow-billed cuckoo (federal threatened; *Coccyzus americanus*~~).~~); both are also USFS R4 sensitive species.~~).~~ However, the Project Area is not within any sage grouse management areas as identified in the *Conservation Plan for Greater Sage-grouse in Utah* (Utah 2013).~~-~~These species are also USFS R4 sensitive species. There is one state sensitive species (smooth greensnake *[Opheodrys vernalis])* with the potential to occur in the PEA. On-site surveys will be required to determine if any potential special-status terrestrial wildlife species or their habitats currently occur in the Project Area.

3.6 Cultural and Tribal Resources

3.6.1 Cultural

A search of project, site, and preservation files at the Utah Division of State History (UDSH) was conducted on February 23, 2015. In all, 19 archaeological projects have been conducted within 1 mile of the Project Area (Table 3.6-1). Of the 19 projects, three have been conducted within the Project Area (Table 3.6-2). In the course of the 19 projects, 12 sites were documented, and two of these sites (42MO000059 and 42WB000328) are located within the Project Area. Site 42MO000059 is the Union Pacific Railroad (UPR). Site 42WB000328 is the Devil's Gate Weber Hydroelectric Power Plant Historic District. The Devil's Gate Plant was formally changed to the name Weber Plant in 1917. However, the National Register of Historic Places (NRHP) registration form retains both names. While several historic canal sites were identified within one mile of the Project Area during the file search, none of the canals cross the Project Area. One historic architectural locality (UPR Gateway Bridge) was identified in the UDSH historic files, but it is not located within the Project Area.

In addition, General Land Office (GLO) plat maps and several GIS layers were examined for potential cultural resources. These layers, available from state and federal agencies, include the NRHP properties, Utah historic trails, Utah historic districts, historic topographic maps, and other historic aerial imagery. Two NRHP properties were identified: Devil's Gate Weber Hydroelectric Power Plant Historic District (42WB000328) and Farmington Main Street Historic District. The Devil's Gate Weber Hydroelectric Power Plant Historic District is located within the Project Area, but the Farmington Main Street Historic District is not located within the Project Area. The Power Plant District's boundary encompasses an approximately 0.19-mile-long portion of the west end of the Project Area. The historic district's Weber Plant, substation, and dam are located entirely in the current FERC Project Boundary, but the rock wall and the two cottages are located only partially within the FERC Project Boundary, although the Project Area covers these and all known historic structures. The district was added to the NRHP in 1989. In 1991, PacifiCorp prepared and implemented a cultural resource management plan as part of their FERC license to address potential impacts to the district. Several potential historic resources were identified on three GLO maps: three unnamed roads, two unnamed buildings, two unnamed bridges, a flag station, a section house, a field, and the UPR. Only two of these resources are located in the Project Area: the UPR and one of the unnamed roads. This portion of the UPR identified on the GLO maps has not been previously documented, but is part of the historic portion of the UPR. One of the pipelines associated with the Weber hydroelectric plant crosses the railroad near the eastern end of the Project Area. Based on aerial imagery from Google Earth, the pipe appears to have been bored under the active UPR line; PacifiCorp records also indicate this. In addition, the flag station, the section house, and one of the unnamed bridges are related to the UPR, but they do not fall within the Project Area.

The unnamed road originally followed along the river (located on the south side of the river near the canyon mouth, it historically crossed to the north side of the river very near the Weber powerhouse and went immediately in front of the cottages in the historic district) and was later used as part of the old state highway which traversed the canyon prior to the construction of

Interstate 84. Portions of the road are still visible and cross the Project Area. The road is in disrepair because the paved areas have severely deteriorated. The road has also been affected by the construction and subsequent updates to the UPR and the construction of Interstate 84. The portion of the road within the Project Area is partially located within the historic district, and partially within the UDOT right of way, where it has been disturbed by road construction activities as well as the installation of a buried pipeline through the area.

The previous cultural inventory projects conducted within one mile of the Project Area have covered only a small portion of the Project Area. However, it is unlikely that additional survey projects within the Project Area would identify new cultural resources due to the heavy disturbances from the Interstate 84 and various UPR and pipeline ROWs, as well as the construction of the hydroelectric project. It is unlikely that any subsurface deposits would remain intact and be able to convey important information about the prehistory or history of the region.

Table 3.6-1. Previous Projects Conducted within a 1-Mile File Search Area

Project Number	Project Title	Consultant
U84SJ0416	2 Grvl Prospts/Weber Cyn nr Mt Green Cemetery/UDOT	Sagebrush Archaeological Consultants (Sagebrush)
U84SJ0425	Historical Assessment/W Gateway Hydroelectric Proj	Sagebrush
U87CN0615	AT&T Fiber Optics Cable Cheyenne-Sacramento	Centennial Archaeology
U88NP0463	El Monte-Weber 46 KV Relocation	A.K. Nielson and Associates
U89BC0057*	–	–
U89BC0578	Stoddard Diversion Dam and Gateway Canal	BYU - Office Of Public Archaeology (BYU-OPA)
U90FS0228	Weber Power Plant Picnic Area	USFS
U96JB0167	3 Pipeline Segments for Ogden Valley Project	JBR
U04UQ0416	Uintah U	Utah Division of Wildlife Resources (DWR)
U06ST1822	Rocky Mountain Pipeline- Legacy to SLC 16" Exploration	SWCA
U08LI1172	Questar Pipeline Replacement	Logan Simpson Design Inc. (LSD)
U08ST0600	Addendum To CRI Of The RMPS SLC 16" Pipeline	SWCA
U09ST0590	D Well Canal Improvements	SWCA
U09UQ0582	Lower Weber River Diversion Dam Modernization	UDWR
U11BC1133	DOGM Foothill Mine Inventory	BYU - OPA
U11LI0050	A Class II Cultural Resources Reconnaissance Of The Questar Pipeline's ML3 Peterson And Henefer Segments Replacement Project In Morgan And Summit Counties Utah	LSD

Table 3.6-1. Previous Projects Conducted within a 1-Mile File Search Area

Project Number	Project Title	Consultant
U12LI0642	A Class III Cultural Resources Inventory Of Questar Pipeline's ML3 Weber Canyon Segment Replacement Project In Davis And Morgan Counties Utah	LSD
U12XN0453	Cultural Resources Inventory For The 2012 Davis County Emergency Watershed Protection (EWP) Project Davis County Utah	Native-X Inc
U13TD0314	Additional Work For Questar's Mainline 3 In Weber County	Tetra Tech

*Copies of this report are not available from UDSH.

Note: The project titles listed in this table are taken directly from Preservation Pro, and have not been edited.

Table 3.6-2. Previously Documented Cultural Resources within the 1-Mile File Search Area

Site Number	Site Class	Site Type	NRHP Eligibility
42DV000120	Historic	Canal (Davis-Weber Canal)	Eligible
42DV000121	Historic	Retaining walls	Not Eligible
42DV000131	Historic	Canal (Davis-Weber Canal)	Eligible
42DV000143	Historic	Canal (South Weber Irrigation Canal)	Eligible
42MO000005	Prehistoric	Open campsite	Undetermined
42MO000007	Prehistoric	Lithic scatter	Undetermined
42MO000016*	–	–	–
42MO000059	Historic	Railroad (Union Pacific Railroad)	Eligible
42MO000068	Historic	Historic hard rock mine (Strawberry Mine)	Not Eligible
42WB000142	Prehistoric	Open campsite	Undetermined
42WB000328	Historic	Devil's Gate/Weber Hydroelectric Power Plant Historic District	NRHP-listed
42WB000465	Historic	Canal (Uintah Central Canal)	Eligible

Note: Copies of these site forms are not available from UDSH.

3.6.2 Tribal Resources

Historically, one Native American group, the Weber 'Utes' (likely a misnomer) or Weber Band of the Northwestern Shoshone, lived near the Project Area on the Weber River at the time of European contact (Alexander 2003:129; Hittman 2013:358; Idaho State Historical Society 1970). Multiple references identify The Weber Band as a band of the Northwestern Shoshone that spoke the Shoshone language and may have intermarried with Ute tribes. Depending on the text or

ethnography that is consulted, they are considered one of the Northwestern Bands of the Shoshone or by one author as Utes "who frequently intermarried with the Shoshone" or (Hittman 2013:358; Idaho State Historical Society 1970; Thomas et al. 1986:262). Mounting pressure from white settlers led to tensions, and the Weber Band were eventually forced to surrender their weapons and live in Ogden, distributed amongst the white settlers during the winter of 1854 (Roberts and Sadler 1997:77–79). Although information is limited, by mid-1863, some of the Weber Band scattered and/or joined with other Shoshone Bands, although at least some members of Little Soldier's (leader of the Weber Band) people concluded a "verbal treaty of peace or 'satisfactory understanding'" (Madsen 1985), that appears to have led to at least Little Soldier's assimilation with the local Mormon culture (Community Trees 2015).

There are no tribal lands or tribal claims within or immediately adjacent to the Project Area. The following Native American Indian Tribes are associated with the larger region where the Project is located:

- Northwestern Band of Shoshone Nation
- Shoshone-Bannock Tribes
- Ute Indian Tribe
- Skull Valley Band of Goshute
- Confederated Tribe of Goshute
- Paiute Tribes of Utah

3.7 Recreation

The Project Area is located within Weber Canyon and is surrounded by the Uinta-Wasatch-Cache National Forest and UPR lands. The Uinta-Wasatch-Cache National Forest is adjacent to the highly populated and urbanized Wasatch Front, which stretches from Nephi to Brigham City and includes the state capital of Salt Lake City. The western mouth of Weber Canyon is approximately 8 miles from the Ogden city center and 30 miles north of Salt Lake City. The western edge of the Project Area is approximately 9 miles from the Ogden city center. Recreation is the dominant land use in the national forest and includes activities such as camping, hiking, fishing, picnicking, biking, snowmobiling, and cross-country and downhill skiing.

Weber Canyon offers opportunities for fishing along the Weber River and limited (due to the lack of safe and legal access) hiking along the canyon slopes. Approximately 1,500 feet east of the Weber hydroelectric project's diversion dam, on Interstate 84, the Utah Department of Transportation (UDOT) maintains a rest stop. The rest stop has restrooms, water, picnic tables, river access for handicapped persons, viewpoints, and irrigated landscaping. UDOT maintains another rest stop approximately 2 miles east of the Project Area. There is also an existing recreation site located on USFS lands and operated by PacifiCorp in the Project Area immediately northwest of the Weber diversion dam that includes a small parking area, five picnic tables, a grassy area, fishing access to the river below the dam, fishing access to the forebay with a platform for disabled persons, and a portable toilet that is open on a seasonal basis. Using raw vehicle count data and the National Park Service's vehicle occupancy multiplier (2.4 during off-season and 2.7 during peak season) on a counter located for a year at the entrance

road to the Weber diversion dam and associated recreation site, PacifiCorp estimates that approximately 19,454 people visited the recreation site in the Project Area during 2014, with 13,687 visitors during the off season and 5,767 visitors during the peak season (the Friday before Memorial Day through Labor Day). No information exists regarding specific uses of the area by the visitors noted above during 2014, although some may have just been curious as to where the entrance road led.

Extensive angling use occurs in the bypass reach downstream of the recreation site located at the Weber project dam. UDWR completed a creel survey in the Weber River from the mouth of Weber Canyon upstream to the confluence with Lost Creek. An estimated 66,606 angler trips were made during 2013 to this reach of the Weber River (Nadolski and Penne, 2013, in draft). While the creel survey did not quantify the number of anglers specifically using the bypass reach, it would be safe to assume that many of the estimated 19,454 visitors to the recreation site in 2014 were anglers.

While not designated as a scenic highway, Interstate 84 is popular for scenic driving, and multiple recreational loop drives cross the Project Area. One of these recreational loop drives is popular for Ogden residents and involves taking Interstate 84 through Weber Canyon, past the Project Area at its east end, continuing north on Trappers Loop Road for 8 miles to Pineview Reservoir, and then returning to Ogden through Ogden Canyon via State Highway 39 along the Ogden River.

Although the Weber River overall offers some of the closest paddling to Wasatch Front communities, currently t~~T~~here are limited whitewater boating opportunities within the Project Area. In fact, the existing Class III-IV boatable section is relatively short ~~less than 0.5 mile long~~ and has ~~no~~ limited safe ~~or~~ and legal access due to the constraints on the Project Area of Interstate 84 and an unrelated diversion dam below the powerhouse. When water is available (generally when there is at least 650-700 cfs in the river above the diversion dam, assuming 320-365~~0~~ cfs is being diverted into the project flowline), boaters can easily access to put-in on the boatable reach immediately downstream of the existing Weber recreation site. However, after boating the 'Horseshoe', aka., 'Scrambled Eggs' section of the bypassed reach, boaters must either carry their boats back upstream along the old highway and back to the put-in, or continue downstream and portage a non-Project diversion located immediately below the powerhouse. This diversion is owned by the Weber-Davis Irrigation Company, and it commonly takes most or all of the flow in the Weber River at that point, limiting options to continue downstream. This reach of the river is further constrained by being in between the two lanes of I-84, and the only access route to this area is the road to the Weber-Davis irrigation diversion dam, which is gated and locked downstream of the potential portage area. Thus, although there is a short desirable boatable reach in the Project Area, accessing this section safely is problematic, and in fact the only other access to the only boatable reach (via the old highway) has been gated and locked by UDOT to prevent recreationists from using a freeway pullout that is considered unsafe due to the lack of acceleration and deceleration lanes. Further, due to geomorphology constraints, there is no room for acceleration or deceleration lanes in the Project Area. ~~Access~~As noted above, ~~A~~ put-in access to this boating reach ~~could~~ can be safely accomplished at the Weber Recreation Site ~~adjacent~~ downstream of~~to~~ the diversion dam, but again, due to the existence of the Weber-Davis Irrigation

Company diversion immediately below the Weber powerhouse and the freeway alignment (built on both sides of the river in most of the Project Area reach), other than walking back up to the put-in, there arei~~s~~ ~~no~~limited safe or legal egress ~~opportunity~~ routes ~~to create egress~~ for anyone putting in on the river at the recreation site.

Other than those opportunities described above, recreation opportunities are limited in the Project Area due to the existence of Interstate 84, the Union Pacific Railroad, two pipelines, a fiber optic line, steep terrain, and limited safe and legal access. The potential for trails is limited due both to safe access limitations and because they would have to traverse either the channelized river (and cross under the existing I-84 bridge) or steep canyon walls on either national forest or private UPR lands.

3.8 Land Use

Weber Canyon is used primarily as a transportation and utility corridor that is part of the route linking the greater Salt Lake City metropolitan area with Denver, Colorado. The canyon contains the double-track mainline of the Union Pacific Railroad (UPR) and Interstate 84, which is a four-lane divided freeway. Besides the mainline of the UPR and Interstate 84, the Gateway Irrigation Canal also travels through the canyon in a tunnel on the south side of the Weber River (Figure 2.2-1 and Appendix A1-4).

Most of the land in Weber Canyon is under the management of either the USFS or UPR. UPR private lands in contiguous blocks are located near the western mouth of the canyon and a large section in the middle of the canyon, leftover from the checkerboard land grants made to the railroads during the late 1800s as an incentive to complete the first transcontinental railroad. Table 3.8-1 includes the acres of private land and USFS land in the Project Area. Figure 3.8-1 shows landownership boundaries within Weber Canyon.

Table 3.8-1. Project Area Landownership

Owner	Acreage	Percentage
Private	3.1	21.4%
USFS	11.4	78.6%
Total	14.5	100%

The powerhouse, associated cottages, and diversion dam structures occupy land managed by the USFS. Approximately 1 mile of the pipeline is located on land owned by UPR and under an Agreement between the railroad and a PacifiCorp predecessor company. Interstate 84 is constructed on land owned by the USFS~~.S. Forest Service~~ and UPR.

Weber Canyon is located near a highly populated area of the Wasatch Front, and the western edge of the Project Area is approximately 9 miles from the Ogden city center. The combined

population of Davis and Weber Counties was approximately 560,613 in 2013 and is anticipated to exceed 690,000 in 2030 (UDWS 2013; UGOMB 2012). Because it is near highly populated and fast-growing counties, Weber Canyon experiences some pressure from residential development near the head and mouth of the canyon, which are both approximately 1 mile from each end of the Project Area.

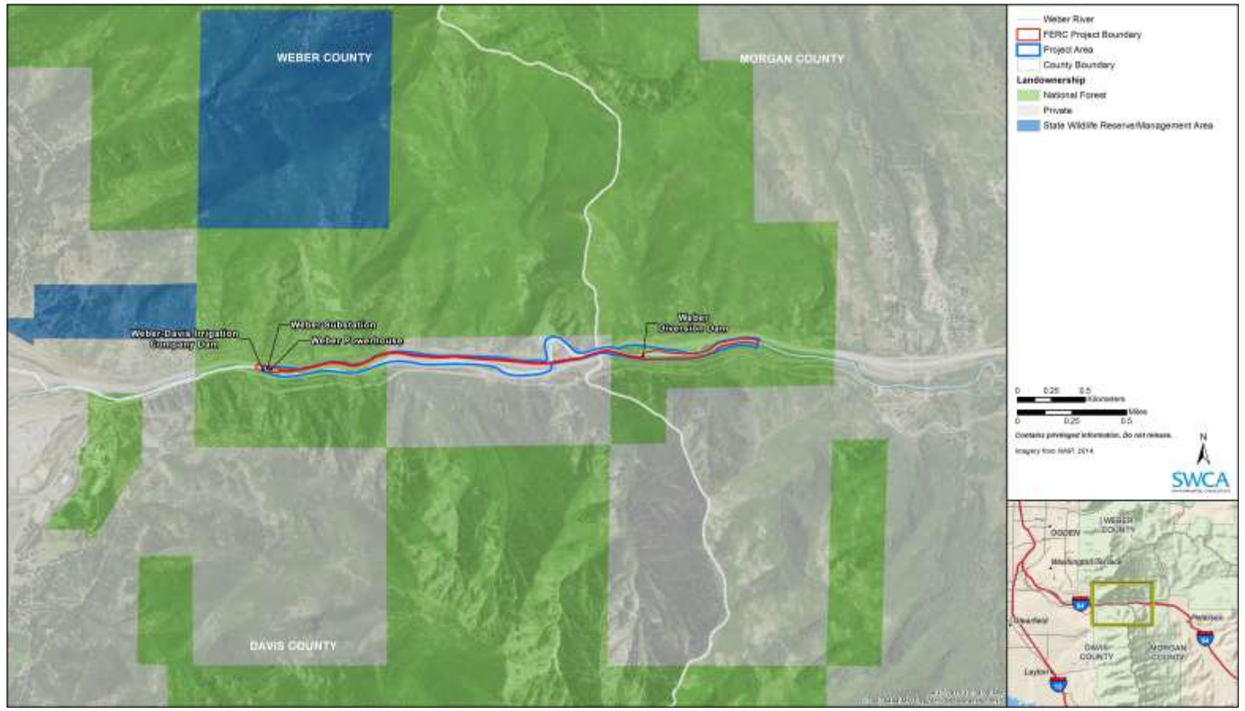

Figure 3.8-1. Landownership in Weber Canyon. (Source: Utah Automated Geographic Reference Center 2014.)

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3.9 Aesthetic Resources

This section describes the existing visual resources in the Project Area in terms of the characteristic visual landscape of the surrounding area and the visual access points. The most prominent features of the Project Area include the powerhouse and substation, the freeway, railroad lines, diversion dam, pipeline, and transmission line. The freeway, powerhouse and substation are the largest and most visible components of the Project Area (Figure 3.9-1). The powerhouse is approximately 73 feet by 56 feet, and 29.2 feet in height to the top of the concrete parapet wall (does not include the height of the stepped roof detail). Because of its location above the river and next to Interstate 84, it is more visible than the diversion dam and other developed components of the Project Area. The diversion dam is constructed of concrete and is 27 feet high and 114 feet long (Figure 3.9.2). The pipeline is approximately 9,138 feet long and constructed of concrete and steel (Figure 3.9-3). The 46-kV transmission line is approximately 77 feet long (Figure 3.9-4).

Figure 3.9-1. Powerhouse and substation.

Figure 3.9-2. Diversion dam.

Figure 3.9-3. Pipeline.

Figure 3.9-4. Transmission line.

3.9.1 Characteristic Landscape

The landscape of the Project Area is typical of many steep-sided canyons in the Wasatch Mountains. Weber Canyon, because of its dramatic topography and colorful, although limited, vegetation, is a relatively scenic area. Numerous small drainages create an undulating canyon wall with strong relief. The river and the vegetation along it play a strong role in the canyon's visual quality by providing a linear greenbelt that contrasts strongly with the earth tone colors of the canyon walls and the generally sparse vegetation.

Human activities have heavily affected the canyon floor, which functions as a regional transportation and utility corridor. The canyon bottom in the Project Area includes a four-lane interstate highway (Interstate 84), Union Pacific's railroad lines, several irrigation canal and power diversion structures, Questar and other pipelines, cable and fiber optic lines, and the Weber hydroelectric plant (see Figures 3.9-1–3.9-4.). The river has been channelized, and highway and railroad construction have modified it as portions of the river channel between the diversion dam and powerhouse were relocated to accommodate the highway and railroad. Extensive flooding has also eroded the north and south banks of the river within the Project Area. The river segment in the Project Area is bordered by riparian vegetation but is devoid of any vegetation in the most highly altered and rip-rapped reaches between the powerhouse and diversion dam.

Most of the canyon is either devoid of vegetation or contains scrub-brush types of plants. Vegetation on the south-facing slopes above the Project Area is characterized by a shrub zone at the lowest elevations. The higher elevations are characterized by mixed shrubland and woodland

types, which then give way to a mixed conifer forest at the highest elevations. At the lower elevations, vegetation on the north-facing slopes includes fewer drought-tolerant plants than are found on south-facing slopes. Mixed conifers are fairly common in sheltered areas at lower elevations. A variety of conifers occurs at higher elevations. More detailed discussion of the vegetation in the Project Area can be found in Section 3.4, the Botanical Resource section of this document.

The Uinta-Wasatch-Cache National Forest surrounds the Project Area. The national forest lands that can be viewed from the Project Area and from the adjacent Interstate 84 are designated in the *Revised Forest Plan: Wasatch-Cache National Forest* has having a "Natural Appearing" landscape character theme and a high scenic integrity objective (USFS 2003). The area designated as having the Natural Appearing landscape character theme is described as having been influenced by both direct and indirect human activities, but appearing natural to the majority of viewers. Natural elements such as native trees, shrubs, grasses, forbs, rock outcrops, and streams or lakes dominate the views. While there is evidence of human influence from historic use, railroads, pipelines, campgrounds, small organization camps, rustic structures and management activity, it is part of the valued built environment in the landscape to the majority of viewers. (USFS 2003)

A high scenic integrity objective applies to "[l]andscapes where the valued landscape character 'appears' intact. Deviations may be present but must repeat the form, line, color, texture, and pattern common to the landscape character so completely, and at such scale, that they are not evident" (USFS 2003). The Weber River is neither classified as wild and scenic nor located within a designated wilderness area. Interstate 84 has not been classified as a scenic highway.

3.9.2 Visual Access Points

The Project Area can be seen from on-site, off-site, and from the air. On-site views are infrequent and limited to employees and visitors, as well as recreational visitors to the recreation site northwest of the diversion dam. Off-site views are primarily from Interstate 84 through the canyon. The views of the Project Area are primarily foreground views from on- and off-site. Foreground is usually limited to areas within 1/4 mile to 1/2 mile of the viewer. Off-site views are primarily from Interstate 84, which runs through the canyon and adjacent to the Project Area. The powerhouse and substation, in particular, are clearly visible from the eastbound lanes of Interstate 84. Some of the facilities within the Project Area are partially obscured from view by trees and other vegetation between Interstate 84 and the facilities. The view of the Project Area from the air is experienced by relatively few people. The main visual features of the Project Area would not exhibit any stronger visual characteristics from the air than when seen from ground level.

3.10 Socioeconomics

The Project Area is located along the Weber River near the border of Davis, Weber, and Morgan counties (Figure 3.8-1). In 2013, Davis County's population totaled 322,094 (approximately 11% of Utah's total population); Weber County's population totaled 238,519 (approximately 8.2% of Utah's total population); and Morgan County's population totaled 10,173 (approximately 0.3% of Utah's total population) (UDWS 2013). Davis, Weber, and Morgan counties' populations

have increased 17.0%, 10.9%, and 22.8%, respectively, since 2005. Utah's statewide population has increased by 15.8% in the same period. In general, Utah has a very young population, with residents below the age of 18 totaling 30.9% statewide, 33.6% in Davis County, 29.3% in Weber County, and 34.8% in Morgan County. In 2012, the average number of persons per household statewide was three, which was also the case for Davis, Weber, and Morgan counties. The median household income was $57,067 statewide, $69,019 in Davis County, $54,169 in Weber County, and $75,348 in Morgan County (UDWS 2013).

Davis County maintains 8.6% of all of the state's nonfarm jobs. In 2013, Davis County maintained a labor force of 151,430. The largest three employers in Davis County are the U.S. Department of Defense (Hill Air Force Base), the Davis County School District, and Smith's Food and Drug/Marketplace.

Weber County maintains 7.3% of all of the state's nonfarm jobs. In 2013, Weber County maintained a labor force of 115,472. The largest three employers in Weber County are the Department of Treasury (Internal Revenue Service), the Weber County School District, and McKay-Dee Hospital Center (Intermountain Health Care).

Morgan County maintains 0.1% of all of the state's nonfarm jobs. In 2013, Morgan County maintained a labor force of 4,465. The largest three employers in Morgan County are the Morgan County School District, Holcim (US) Inc. (cement manufacturing), and Browning (sports and athletic equipment manufacturing).

Funds generated from the fishing community are a ~~significant~~ substantial source of revenue for the area. Krannich et al. (2012) estimated that anglers, on average, made $84 in direct expenditures (e.g., gas, food, and lodging) per trip. Assuming conservatively that only 50% of the above-referenced trips to the bypass reach were made by anglers, ~~which we think is conservative,~~ it would still mean that an estimated $846,249 in annual direct expenditures were made by anglers frequenting local businesses during their fishing trips. Additionally, for every dollar in direct expenditures made, $0.76 in indirect economic output (e.g., industry, labor income, and tax revenue) is created (Kim and Jakus 2012). The overall annual economic contribution of bypass reach angling to the Utah economy is, therefore, conservatively estimated at $1,489,398.

Through water right interference agreements, the winter water that would otherwise flow through the Weber Hydroelectric Project is stored in Echo Reservoir and is diverted across the Weber-Provo Canal to be stored in Deer Creek Reservoir. To date approximately $290 million (Reclamation project costs were taken from the "Statement of Project Construction Costs and Repayment" and recent safety of dams work. Costs include original construction costs, safety of dams work, hydropower, canals and water distribution systems) has been spent of Echo and Deer Creek Reservoirs and their related facilities. Over the last three years, 30,000-40,000 acre-feet/year of Weber Project water (Utah Division of Water Rights webpage, "Accounting for Deliveries to the Weber-Provo Canal") has been stored in Echo and Deer Creek reservoirs and used primarily for irrigation and municipal use. The storage of 30,000-40,000 acre-feet of water is sufficient to meet the indoor water needs of 80,000 homes of 10,000 acres of irrigation. As a result, the continued existence of the Weber Hydroelectric Project provides substantial benefits

to the storage water needs of several water conservancy districts which rely on the Project's winter water rights to allow water storage in several large reservoirs.

PacifiCorp, owner and operator of the Weber hydroelectric facilities in the Project Area, employs approximately 6,000 people throughout the West. The facilities are operated by two full-time employees that switch duties between this plant and another plant. Another five full-time maintenance staff employees also switch duties between this plant and other PacifiCorp Utah hydro plants.

4.0 PRELIMINARY ISSUES AND STUDIES LIST

4.1 Issues Pertaining to Identified Resources

4.1.1 Geology and Soils

No issues are expected to geologic and soil resources resulting from the continued operation of the Project as no new Project-related facilities are planned in undisturbed areas, so there would be no additional disturbance to geology, and only minor additional disturbance to soils. The only new Project facilities currently anticipated would be in relation to potential upstream fish passage facilities proposed at the edge of the existing Weber diversion dam in an area that is currently graded, unvegetated dirt. The footprint of these proposed facilities would not be anticipated to create significant additional disturbance to soils; Best Management Practices (BMPs) would be utilized to minimize and soil erosion or sediment delivery to the river.

4.1.2 Water Resources

4.1.2.1 Hydrology

Climate change and the resulting changes in rainfall or snow patterns/occurrences may affect flow rates in the Weber River. However, Project-related activities are not expected to negatively alter the hydrologic functioning of the Weber River as no changes to the existing operational regime of the Project or minimum stream flows are proposed.

4.1.2.2 Water Rights

As described in Section 3.2.2, PacifiCorp is not aware of any existing or proposed uses of Project waters for irrigation, domestic water supply, industrial or other purposes that would impose additional upstream or downstream constraints to existing Project operations. Other than the Project itself, there are no known instream flow uses, existing water rights or pending water rights in the Project vicinity up- or downstream of the Weber project that would be affected by continued operation of the Project.

PacifiCorp is not proposing altering, modifying, or otherwise interfering with existing water rights, with the terms of the 1938 or 1965 agreements, or the instructions to the commissioner found in the letter dated January 21, 2014, for purposes of relicensing the Project.

4.1.2.3 Water Quality

Because the Weber hydroelectric project is a run-of-the-river facility with a very small forebay (and associated short retention time) and all water is pass-through, water quality as related to designated beneficial uses is not likely to be negatively altered by continued operation of the Project.

If changes in runoff timing and amounts occur resulting from climate change, we can expect that water quality in the Weber River will be further altered, but unrelated to continued Project operation. Most likely effects of climate change include increases in ambient water temperature,

reduced dissolved oxygen levels, and slight changes in pH and total alkalinity related to increased algal production. Further, potential reductions in water flow will allow for greater concentration of minerals and soluble constituents. These are global factors that are beyond the scope or control of the Project, but that may further impair water quality of the Weber River.

4.1.3 Fisheries and Aquatic Resources

The primary issue with respect to fish and aquatic resources is ~~upstream and downstream~~ passage at the Weber diversion dam. ~~A~~An upstream fish passage structure currently exists at the dam but it is a jump-pool design and is not considered to be functional. It is possible that the low flow release structure functions as an occasional passage mechanism for BCT (the low-level gate was non-operational for decades until just a few years ago, and is only open under some operational conditions) but there is uncertainty about the ability of bluehead suckers and other species to pass upstream through this pathway.

Given the importance of fish passage to improve conditions for BCT, bluehead sucker, and potentially other native fish species, installation of fish passage facilities should be a key consideration of this license process. PacifiCorp proposes to participate in the planning, design, and construction of a fish ladder appropriate to allow the passage of BCT, bluehead sucker, and other fish species at the Weber hydroelectric project's diversion dam. Developing additional details regarding the planning, construction, and operation of the proposed fish passage facilities will be a major focus of the upcoming license process. See also Section 4.2.3 for additional information regarding proposed studies for this resource.

4.1.4 Botanical Resources

Section 3.4 describes the native botanical resources in the Project Area and larger PEA. The majority of the PEA is covered by the Rocky Mountain Gambel Oak-Mixed Montane Shrubland land cover type, as shown in Figure 3.4-1. The majority of the Project Area is covered by Developed, Open Space-Medium High Intensity cover type also shown in Figure 3.4-1. Given the existing development on the canyon floor and the Project's small size and limited geographic footprint, the Project and current or future operations are unlikely to have significant additional impacts on botanical resources, including special status species.

4.1.5 Terrestrial Wildlife Resources

As described in Section 3.5, terrestrial wildlife distributions in the Project Area are limited by the existing development of utility and transportation corridors in Weber Canyon. Construction of fish passage facilities could create minor and short-term impacts to wildlife such as breeding or nesting songbirds or small mammals in the near vicinity of the Weber diversion dam and recreation site. As described in Section 3.5.3, there are two federally listed terrestrial wildlife species with some potential to occur in the PEA: greater sage-grouse and yellow-billed cuckoo. However, there is no potential for greater sage-grouse to occur in the smaller Project Area. Limited habitat for yellow-billed cuckoo may exist in the Project Area; habitat for smooth green snake may exist in the Project Area. Given the existing development on the canyon floor and the Project's small size and limited geographic footprint, the Project and current or future operations

are unlikely to have significant additional impacts on wildlife resources, including for special status terrestrial wildlife species like yellow-billed cuckoo and smooth green snake.

4.1.6 Cultural and Tribal Resources

As described in Section 3.6.1, two cultural resource sites have been documented in the Project Area: the Union Pacific Railroad and the Devil's Gate Weber Hydroelectric Power Plant Historic District. Of the two sites, only the Historic District is a NRHP property. It is unlikely that additional cultural resource surveys within the Project Area would identify new cultural resources due to the heavy disturbances from the Interstate 84 and Union Pacific railroad, as well as the construction of the power plant. Because of all of the existing development along the canyon floor, it is also unlikely that any subsurface deposits would remain intact and be able to convey important information about the prehistory or history of the region. There are no tribal lands or tribal claims within or immediately adjacent to the Project Area.

With the exception of potential fish passage facilities, there are no proposed additional changes to the historic nature of existing Project facilities and infrastructure. PacifiCorp prepared and implemented a cultural resource management plan as part of their FERC license to address potential impacts to the district. PacifiCorp will follow the standards and procedures outlined in the plan in coordination with SHPO for any new proposed construction.

4.1.7 Recreation

The primary issues related to recreation resources in the Project Area include the adequacy of the existing recreation opportunities and their consistency with the goals and objectives of local, state, and federal agency plans. The adequacy of existing recreation opportunities in the Project Area relates to the type of opportunities safely and legally available, and facility capacity. As described in Section 3.7, recreation opportunities in the Project Area include fishing, a day-use/picnic area operated by PacifiCorp, limited walking in the vicinity of the existing day use recreation area, and scenic driving along Interstate 84. Hiking and boating opportunities in the Project Area are limited due to lack of safe and legal access resulting from the existence of Interstate 84 and the non-Project Weber-Davis diversion dam, the Union Pacific Railroad, two pipelines, a fiber optic line, and steep, constrained terrain.

As discussed in Section 3.7, the Weber River in the Project bypassed reach provides some whitewater boating opportunities. However, egress issues and Project operations may be limiting boating opportunities. Accessing the short boatable reach in the Project Area is particularly problematic due to ~~a lack~~the limitations of existing safe and legal opportunities to create egress for anyone putting in on the river at the recreation site. American Whitewater has expressed interest in gathering additional information regarding potential Project effects on whitewater boating opportunities in the bypassed reach of the Weber River, as well as identifying a site that could potentially be utilized as egress for paddlers; a proposal to study this possibility will be included in proposed recreation needs and opportunity study plans (see also 4.2.7).

4.1.8 Land Use

No changes in land use are envisioned to result from continued operation of the Project. Land use issues may arise from potential conflicts with applicable land use and resource management plans that have been drafted or revised since the Project was originally approved and licensed, as well as changing conditions in the Project Area resulting from human factors such as additional surrounding area development or such environmental factors as climate change.

4.1.9 Aesthetic Resources

The primary issue for aesthetic resources pertains to the consistency of the Project with existing management designations, plans, and objectives specifically with respect to scenery. As described in Section 3.9.1, Weber Canyon is a relatively scenic area, with dramatic topography and colorful, although limited, vegetation. However, human activities have heavily affected the canyon floor, including the four-lane interstate highway, a Union Pacific double railroad line, several irrigation canal and power diversion structures, and the Weber hydroelectric plant. On-site views of the Project are limited to employees and visitors. Off-site views of the Project are primarily from Interstate 84. Because the Project is adjacent to both a four-lane highway and a railroad, as well as other developments, noise and other aesthetic effects of continued operation of the Project do not present a contrast from the existing surrounding environment.

4.1.10 Socio-economic Resources

As described in Section 3.10, the Project facilities are operated by two full-time employees that switch duties between the Weber hydroelectric plant and another plant. Five full-time maintenance staff employees also switch duties between this plant and other Utah plants. However, continued operation of the Project would have a positive effect on socioeconomic conditions within the region by the continued generation of renewable power to help meet the local electrical load and keeping the economic benefits of this electrical production and the associated workers in the local area.

4.2 Potential Studies

4.2.1 Geology and Soils

No geology and soils studies are proposed because no issues are expected to arise from the continued operation of the Project regarding geology and soils.

4.2.2 Water Resources

4.2.2.1 Hydrology

There are no proposed changes to the hydrologic regime of the Weber River resulting from the continued operation of the Project; current minimum stream flows, in place for over the last 50 years, are believed to be sufficient to provide benefit to the aquatic resources in the bypassed reach due to the robust nature of Project Area populations of both species of concern (BCT and bluehead sucker). PacifiCorp will use the best available data from agencies and scientific

literature to describe the range of potential impacts that climate change may have on flow rates in the Weber River in the license application. Additionally, flow will be monitored through the use of USGS gage (10136500) located just upstream of the Project Area, and water in the bypass reach and downstream of ~~from~~ the powerhouse discharge will also be measured.

4.2.2.2 Water Rights

No water rights studies are proposed because no issues are expected to arise from the continued operation of the Project regarding water rights; futher as noted previously, no changes to existing water rights are proposed or envisioned as a result of this relicensing process.

4.2.2.3 Water Quality

PacifiCorp will evaluate the current water quality conditions in the Project Area to determine if Utah state water quality standards regarding designated beneficial uses are being met, and to determine the effects of the project on critical water quality parameters such as temperature, pH, dissolved oxygen, and turbidity~~, and dissolved oxygen~~. PacifiCorp will monitor water quality as it enters the project pool, and have two other monitoring stations just downstream of the dam in the bypass reach, and at the lower end of the bypass reach just upstream of the point where bypass water mixes with powerhouse discharge and enters the Weber-Davis canal.

For these three new monitoring locations (Figure 4.2-1~~ – pending~~), PacifiCorp proposes to measure the water quality parameters listed in Table 4.2-1.

Table 4.2-1. Monitored parameters and associated Utah State water quality standards.

Parameter	Utah State standard
~~Dissolved oxygen (7-day avg/minimum)~~	~~9.5/8.0 mg/l~~
Temperature (max/change)	20/2 °C
pH	6.5-9.0
Dissolved oxygen[1] (30-day average) (7-day average) (1-day minimum)	 6.5 mg/L 9.5/5.0 mg/L 8.0/4.0 mg/l
Turbidity (increase)	10 NTU
Total suspended solids	No water quality standard.
Specific conductivity	No water quality standard.

[1] First number in column details when early life stages are present; second number details when all other life stages are present.

In addition to monitoring the four parameters with state water quality standards, PacifiCcorp also proposes to potentially monitor total suspended solids and specific conductivity as these two parameters can lend additional insight into water quality issues.

Temperature will be monitored daily on an hourly time interval. Dissolved oxygen, pH, turbidity, total suspended solids, and specific and conductivity will be monitored on a monthly to weekly basis depending on the parameter, and parameters may also be monitored on an as-needed basis depending on project operations. once a month. Water quality monitoring is proposed towill occur for a 2 a one year period beginning June in early 2016. A detailed study proposal will be made available for review by interested parties by December 2015.

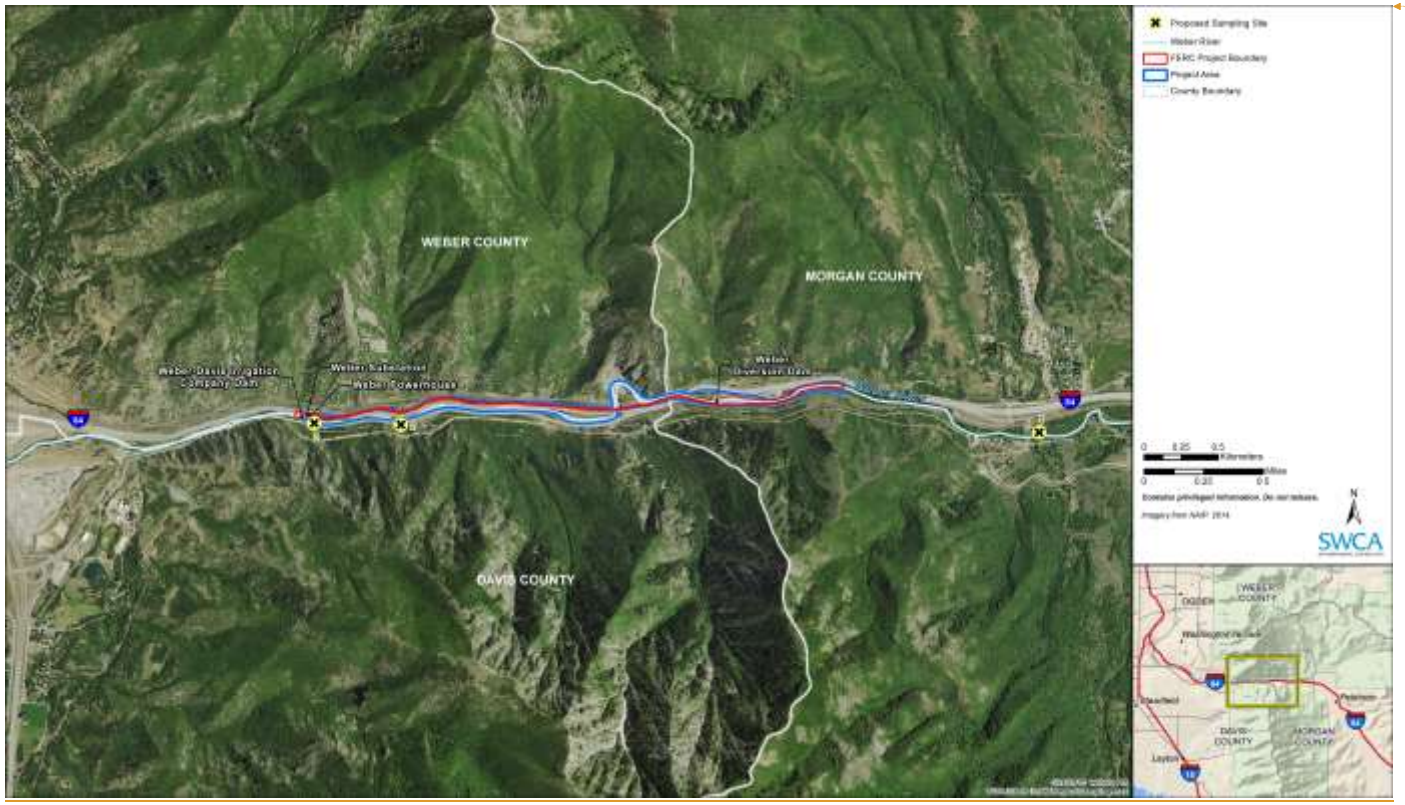

Figure 4.2-1. Proposed new water quality sampling locations.

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4.2.3 Fisheries and Aquatic Resources

The UDWR has been monitoring BCT and bluehead sucker populations in recent years so species status is well known (see Section 3.3.2 for further details). However, questions remain about the ability of both species to migrate ~~upstream~~up- and downstream of the project diversion. PacifiCorp proposes to study movement of both species in the Project Area between the bypass reach upstream of the powerhouse and the top of the diversion pool.

PacifiCorp proposes to study which species need passage upstream of the dam, under what operational conditions the diversion dam and the jump-pool ladder are passage barriers for trout and suckers, and to determine what factors make the dam passable or impassable for upstream or downstream migrating fish, including entrainment. Depending on the outcomes, PacifiCorp will perform a design analysis to determine what is needed to provide safe, efficient fish passage.

A detailed study proposal ~~will be~~covering these issues will be developed with license stakeholders and made available for review by interested parties by December 2015.

4.2.4 Botanical Resources

PacifiCorp proposes to conduct a sensitive plant survey in the PEA and a noxious weed survey in the Project Area to document the location and extent of noxious weed infestations. The sensitive plant survey will inventory and map locations of any rare, endangered, threatened, and otherwise special-status plant species in the PEA. As discussed in Section 3.4.3, there is one federally threatened plant species (Ute ladies'-tresses orchid) and one USFS R4 sensitive plant species (Burke's draba) that have the potential to occur in the vegetation communities and elevation ranges in the PEA.

A detailed study proposal for special status plant and animal species will be made available for review by interested parties by July 2015.

4.2.5 Terrestrial Wildlife Resources

While conducting the two botanical surveys described above in Section 4.2.4, wildlife observations will be recorded anecdotally. With the exception of surveys for yellow-billed cuckoo and smooth green snake within the Project Area, no protocol wildlife surveys are proposed because no significant impacts to wildlife are expected from continued operation of the Project, other than the temporary impacts discussed above regarding possible fish passage facility construction and operation.

A detailed study proposal for special status plant and animal species will be made available for review by interested parties by July 2015.

4.2.6 Cultural and Tribal Resources

4.2.6.1 Cultural Resources

Although it is unlikely that additional surveys within the Project Area would identify new cultural resources due to the heavy disturbances from the Interstate 84 and various UPR and pipeline ROWs, as well as the hydroelectric project, PacifiCorp proposes to conduct a formal cultural inventory in the Project's Area of Potential Effects (APE). The APE will be identified through consultation with the Utah State Historic Preservation Office (SHPO), appropriate tribes, and agencies. Cultural resources sites that are known to occur in the Project Area are described in Section 3.6.

A search of project, site, and preservation files at the UDSH was conducted on February 23, 2015 to identify cultural resources sites that are known to occur in the Project Area. In addition, GLO plat maps and several GIS layers were examined for potential cultural resources. In summary, two cultural resources sites are located in the Project Area: the Union Pacific Railroad and the Devil's Gate Weber Hydroelectric Power Plant Historic District. Of these two sites, only the Weber Historic District is a NRHP property.

This information will be used to develop a detailed study plan and cultural context for field survey of the APE. The cultural context will help form an opinion on the NRHP eligibility of any new cultural resources sites that are discovered during the field survey. If new cultural resources are discovered during field survey they will be documented on cultural site inventory forms. Inventory forms and NRHP eligibility recommendations will be submitted for agency and SHPO review. A detailed study proposal will be made available for review by interested appropriate parties by December 2015.

4.2.6.2 Tribal Resources

PacifiCorp will research ethnographic and ethnohistoric literature to prepare a context for the APE of traditional tribal land and resource use. Researchers will then consult with each of the potentially affected tribes to discuss any concerns they may have about potential effects of continued operation of the Project on traditional places and resources. Tribal concerns about confidentiality could preclude a site-specific inventory of traditional cultural places. A detailed study proposal will be made available for review by interested appropriate parties by December 2015.

4.2.7 Recreation

Based on the identified recreation issues in the Project Area, PacifiCorp proposes to conduct an assessment of existing recreation facilities, use, needs, and opportunities. Existing recreation facilities and opportunities in the Project vicinity will be identified and quantified using accepted protocols and methods. Use of recreation facilities in the Project Area, as summarized in Section 3.7, will continue to be monitored. Vehicles using the Weber Entrance Road ~~will~~ may continue to be counted, using the National Park Service's vehicle occupancy multiplier to estimate visitors to the existing recreation site in the Project Area. Direct observation and surveys may be used to quantify the types of recreation uses visitors to the site are experiencing. A projection of future

recreation demand for recreation opportunities in the Project Area will be based on a review of existing local, state, and federal management plans, consultation with agency representatives, vehicle count data, and quantified use-type data. The need for upgraded recreation site facilities, including a potential interpretive site regarding fish passage, possibilities for improved access to the bypassed reach, and potential whitewater boater opportunities including a potential egress site located on USFS lands near the Weber-Davis Irrigation diversion dam, will also be assessed. ~~A detailed study proposal will be made available for review by interested parties by December 2015.~~

PacifiCorp proposes to conduct a Whitewater Boating Study Plan to address comments expressed by American Whitewater regarding whitewater boating in the Weber River bypassed reach. The goal of the proposed study is to evaluate whitewater boating use on the Weber River and to determine whether there is an opportunity to enhance whitewater boating opportunities within the Project's bypassed reach. To conduct the study, PacifiCorp proposes to follow the Level 1 methodologies summarized in "Flows and Recreation: A Guide to Studies for River Professionals" (Whittaker, Shelby and Gangemi 2005).

The components of the Study Plan will include: (1) a literature review, which will include a summary of the whitewater boating recreation opportunities in the bypassed reach; 2) hydrologic description and analysis of Project-affected waters; and (3) interaction with and feedback from recreation users and stakeholders to report on flow-dependent recreation opportunities on the river segment impacted by Project operations. PacifiCorp will work with stakeholders to the license process to create a detailed Recreation Study Plan that will be made available for review by interested parties by December 2015.

4.2.8 Land Use

No land use studies are proposed because no impacts to this resource are anticipated from continued operation of the Project.

4.2.9 Aesthetics Resources

The discussion of aesthetic resources in Section 3.9 provides a useful description of the Project facilities, including location, size, visual characteristics, and photo documentation. No aesthetics and scenic resource studies are proposed because no impacts to this resource are anticipated from continued operation of the Project.

4.2.10 Socioeconomic Resources

The discussion of socioeconomic resources in Section 3.10 provides a useful description of these resources in the Project Area. No socioeconomic studies are proposed because no impacts to this resource are anticipated from continued operation of the Project.

4.3 Relevant Resource Management Plans

Section 10(a)(2)(A) of the Federal Power Act (FPA), 16 U.S.C. section 803 (a)(2)(A), requires the Commission to consider the extent to which a Project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the Project.

The Commission will accord FPA section 10(a)(2)(A) comprehensive plan status to any federal or state plan that:

(1) is a comprehensive study of one or more of the beneficial uses of a waterway or waterways;
(2) specifies the standards, the data, and the methodology used; and,
(3) is filed with the Secretary of the Commission.

The filed documents for the state of Utah and the United States that are listed in the Commission's July 2014 List of Comprehensive Plans were reviewed to determine their applicability to the Project. A Commission-listed Comprehensive Plan is determined to be applicable to the Project if the following criteria are met:

(1) The Project is under the jurisdiction of the plan.
(2) The Project is within the boundary of the waterway(s) that receive a beneficial uses from the plan.
(3) The plan's specified standards, data, and methodologies can be applied to the Project.

Of the 18~~515~~ listed plans, the following ~~five~~ eight were determined to be applicable and will be reviewed during the relicensing process to ensure that the Project is consistent with the plan's goals and objectives. Some of the Commission-listed plans have been updated and the current version is not listed. In these cases, PacifiCorp will review the most current version of each listed plan title:

1. Forest Service. 2003. Wasatch-Cache National Forest land and resource management plan. Department of Agriculture~~,~~ Salt Lake City, Utah. March 2003.
2. Utah Department of Natural Resources. 2006. Conservation and management plan for three fish species in Utah. Salt Lake City, Utah.
3. Utah Department of Natural Resources. 2006. Range-wide conservation agreement and strategy for roundtail chub,bluhead sucker, and flannelmouth sucker. Salt Lake City, Utah.
~~2.~~4. Utah Department of Natural Resources. 2014~~32013~~. 2014 Utah Statewide Comprehensive Outdoor Recreation Plan. Salt Lake City, Utah.
~~3.~~5. U.S. Fish and Wildlife Service. n.d. Fisheries USA: the recreational fisheries policy of the U.S. Fish and Wildlife Service. Washington, D.C.
6. Lentsch et al. . Conservation agreement and strategy for Bonneville cutthroat trout in the state of Utah.
~~4.~~7. Lentsch et al. 2000. Rangewide conservation agreement and strategy for Bonneville cutthroat trout rangewide.

5.8. Weber River Partnership. 2014. The Weber River Watershed Plan.. ~~Weber River Watershed Plan.. 2014.~~

Of the 18~~515~~ listed plans, the following 10 were determined to not be applicable to the Project and will not be further reviewed during relicensing:

1. Bureau of Land Management. 1990. Proposed Dixie resource management plan/final environmental impact statement. Department of the Interior, Cedar City, Utah.
2. Bureau of Land Management. 1993. Diamond Mountain resource area management plan. Department of the Interior, Vernal, Utah. Spring 1993.
3. Forest Service. 1986. Ashley National Forest land and resource management plan. Department of Agriculture, Vernal, Utah. October 8, 1986.
4. Forest Service. 1990. Fishlake National Forest land and resource management plan. Department of Agriculture, Richfield, Utah.
5. Forest Service. 1986. Manti-LaSal National Forest land and resource management plan. Department of Agriculture, Price, Utah.
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10. U.S. Fish and Wildlife Service. Canadian Wildlife Service. 1986. North American waterfowl management plan. Department of the Interior. Environment Canada. May 1986.

5.0 SUMMARY OF CONTACTS

5.1 List of Contacts by Mail or E-mail

Table 5.1-1. List of Contacts – Weber Hydroelectric Project Relicensing

Name	Title	Agency
Paul Abate	Aquatics Branch Supervisor	U.S. Fish and Wildlife Service Utah Ecological Field Services Office
Dawn Alvarez	Fish Biologist	U. S. Forest Service
Jeff Budge	Operations and Engineering Manager	Provo River Water Users
Paul Burnett	Project Coordinator	Trout Unlimited
Paul Chase	Fisheries Biologist	U.S. Forest Service
Kevin Colburn	National Stewardship Director	American Whitewater
William Damery	Water Quality Management	Utah Division of Water Quality
Cleve Davis	Environmental Coordinator	Shoshone-Bannock Tribes Fish and Wildlife Department
Tage Flint	General Manager/CEO	Weber Basin Water Conservancy District
Anne Hansen	Land and Special Uses	U.S. Forest Service
Bill James	Wildlife Program Coordinator	Utah Division of Wildlife Resources
Jonathan Jones	Supervisor, Water Resource Group	Bureau of Reclamation
Kari Lundeen	Weber River Watershed/TMDL Coordinator	Utah Department of Environmental Quality Division of Water Quality
Justin Mahr	Contract Manager	Union Pacific Railroad
Cassie Mellon	Native Aquatics Program	Utah Division of Wildlife Resources
Ben Nadolski	Aquatic Biologist	Utah Division of Wildlife Resources
Wayne Pullan	Area Manager	Bureau of Reclamation
Ivan Ray	General Manager	Weber River Water Users Davis and Weber Co. Canal Company
Justin Record	Water Rights Coordinator	Bureau of Reclamation
Robert Sanchez	District Supervisor	Ogden Ranger District U. S. Forest Service
Nathan Small	Chairman	Shoshone-Bannock Tribes
Dan Stone	Policy Analyst	Shoshone-Bannock Tribes Fish and Game Department
Terry Swinscoe	Acting District Ranger	U.S. Forest Service Ogden Ranger District
Paul Thompson	Aquatics Program Manager	Utah Division of Wildlife Resources
Charles Vincent	Regional Coordinator	American Whitewater
Craig Walker	Aquatic Habitat Coordinator	Utah Division of Wildlife Resources

5.2 List of Individuals Contacted for Assistance

5.3 List of Meetings with Interested Parties

An initial Weber Hydroelectric Project Relicensing meeting was held March 5, 2015 at Ogden Ranger District Offices in Ogden, UT, for a presentation by PacifiCorp that provided an overview of the project and the preliminary relicensing process for initial interested parties. The meeting was facilitated by SWCA Environmental Consultants. Participants were asked to provide suggestions for other potential interested parties, to provide a statement of interest on behalf of their agency/organization, and to review and provide comments on a draft communication protocol for the interest group. The following individuals attended:

Eve Davies, PacifiCorp's Program Manager for Weber Relicensing
Kari Lundeen, Utah DEQ, Division of Water Quality
Bill Damery, Utah DEQ, Division of Water Quality
Dawn Alvarez, U.S. Forest Service
Paul Chase, U.S. Forest Service
Paul Abate, U. S. Fish and Wildlife Service
Cassie Mellon, Utah DNR, Division of Wildlife Resources
Craig Walker, Utah DNR, Division of Wildlife Resources
Paul Thompson, Utah DNR, Division of Wildlife Resources
Paul Burnett, Trout Unlimited
Jonathan Jones, U. S. Bureau of Reclamation
Bill James, Utah DNR, Division of Wildlife Resources
Anne Hansen, U.S. Forest Service
Ben Gaddis, SWCA Environmental Consultants
Lindsey Kester, SWCA Environmental Consultants
Jack Kolkman, PacifiCorp
Todd Olson, PacifiCorp
Frank Shrier, PacifiCorp

A second interest group meeting was held April 28, 2015 at Ogden Ranger District Offices in Ogden, UT. The purpose of this meeting was to review the working draft PAD, the statements of interest provided by participating agencies/organizations, to discuss the collaborative requirements of the alternative licensing process, and to review and approve the interest group's draft communication protocol. This meeting was also facilitated by SWCA Environmental Consultants.

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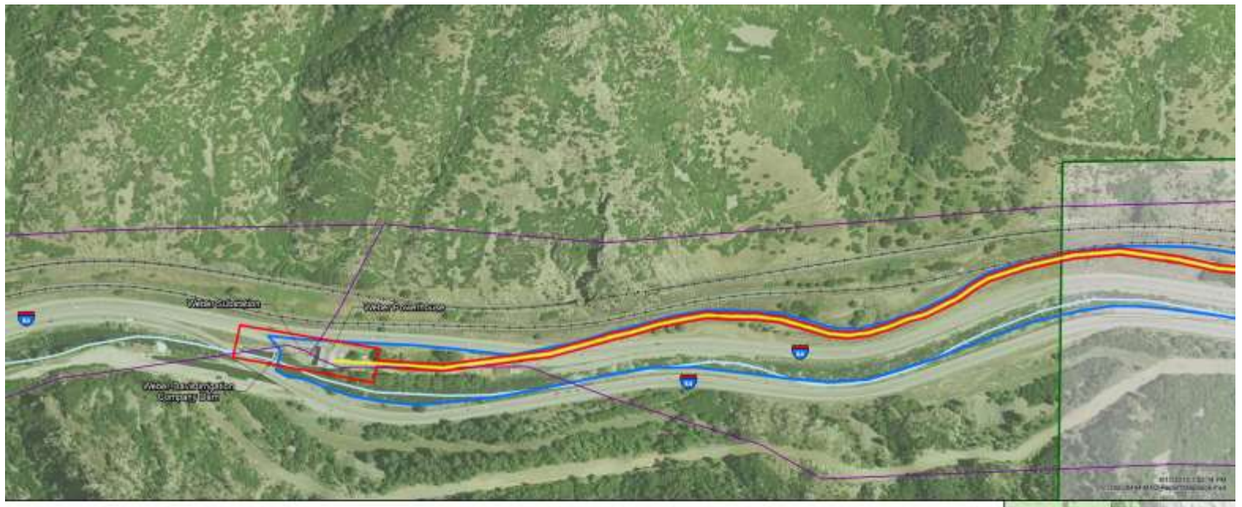
Appendix A

Project Maps


Map 1 of 3
Penstock/Flowline
Non-project Transmission Line
Weber River
Railroad
FERC Project Boundary
Project Area
Wasatch-Cache National Forest Boundary
Private
0
100
200
Meters
0
250
500
Feet
Imagery from NAIP 2014
Contains privileged information. Do not release.


WEBER COUNTY
MORGAN COUNTY
DAVIS COUNTY
N
SWCA

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Map 2 of 3

Penstock/Flowline
Non-project Transmission Line
Weber River
Railroad
FERC Project Boundary
Project Area
Wasatch-Cache National Forest Boundary
Private

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0 250 500 Feet

Imagery from NAIP 2014

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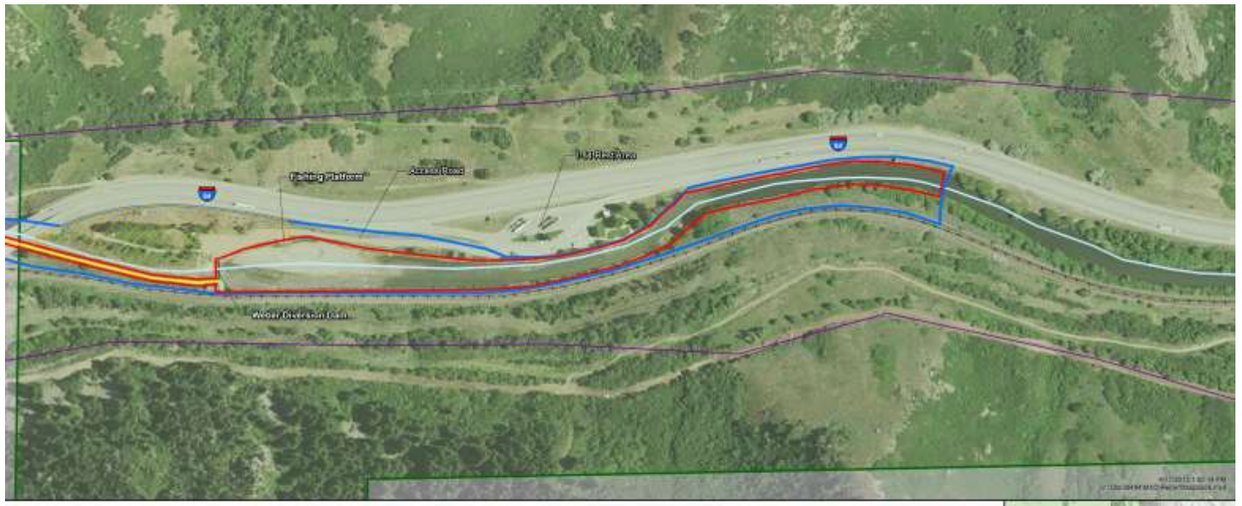

Map 3 of 3

- Penstock/Flowline
- Non-project Transmission Line
- Weber River
- Railroad
- FERC Project Boundary
- Project Area
- Weber Recreation Site
- Wasatch-Cache National Forest Boundary
- Private

0 100 200 Meters
0 250 500 Feet

Imagery from NAIP 2014

Contains privileged information. Do not release.

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Appendix B

Project Photos

Figure 1. Recreation site and parking area.

Figure 2. Recreation site looking east.

Figure 3. ADA-accessible fishing platform, forebay de-watered.

Figure 4. Fishing access below Weber diversion dam.

Figure 5. Fish ladder.

Figure 6. Fish ladder with slide gate opening, calibrated annually for minimum stream flow.

Figure 7. Weber diversion dam spilling; intake house and beginning of flowline visible.

Figure 8. Forebay with safety boom, looking east from Weber dam.

Figure 9. Weber project diversion dam radial gates; forebay de-watered.

Figure 10. Weber River immediately downstream of Weber Dam looking west; unburied concrete flowline segment visible on river-left bank.

Figure 11. Pipeline trestle river crossing with I-84 in the background.

Figure 12. Weber River below project diversion dam with railroad tracks and utility ROWs visible.

Figure 13. Weber River between diversion dam and power house, with freeway bridge crossing supports.

Figure 14. Weber River below diversion dam showing development projects on slope above the river.

Figure 15. Historic cottage near powerhouse.

Figure 16. Historic cottage near powerhouse.

Figure 17. Weber powerhouse with substation and transmission infrastructure.

Figure 18. Weber powerhouse.

Figure 19. Generating unit in powerhouse.

Figure 20. Weber powerhouse and transmission line.

Figure 21. Weber-Davis Irrigation Company diversion dam under I-84; gates open.

Figure 23. Historic photo of Weber powerhouse, circa 1914.

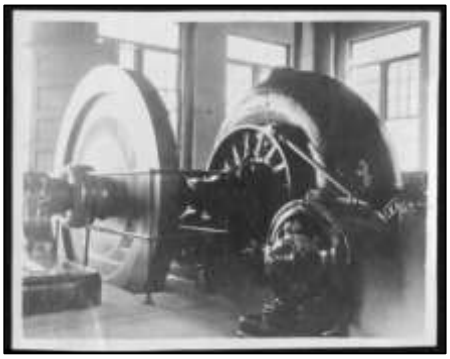

Figure 24. Historic photo of generating unit, circa 1914.

Figure 25. Historic photo of Weber powerhouse, circa 1945.

Figure 26. Historic photo with old highway, concrete flowline, intake and diversion dam.

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Appendix C

Letter: Operation of 1938 Power Water Agreement

GARY R. HERBERT
Governor
SPENCER J. COX
Lieutenant Governor

State of Utah
DEPARTMENT OF NATURAL RESOURCES
Division of Water Rights

MICHAEL R. STYLER
Executive Director

KENT L. JONES
State Engineer/Division Director

January 21, 2014

REED COZENS
WEBER RIVER COMMISSIONER
PO BOX 151
LAYTON UT 84041

RE: Operation of 1938 Power Water Agreement

Dear Reed:

The purpose of this letter is to provide you instructions regarding the operation of the 1938 Power Water Agreement. As you know, we have met with many of the water users and held a public meeting on October 29, 2013 to discuss this issue. We have received comments from several entities and we have included our response to many of these comments at the end of this letter, which we are copying to interested parties. The background and concepts regarding the agreement are described in the draft document presented at the public meeting and in other records.

These instructions address three different periods: a storage period, a trade period, and a spill period.

STORAGE PERIOD

Power Company Entitlement (PCENT)
The power company is entitled to divert up to 365 cfs under its 1903 priority water right (35-8061) when it is available in priority. The power company entitlement (PCENT) is determined by calculating the natural flow of the river at Gateway and subtracting the water that prior rights are entitled to receive. The natural flow at Gateway is the measured flow at Gateway plus the net storage above Gateway plus the exports above Gateway. The lone, significant prior right on the system during the storage period is Davis and Weber Counties Canal Company's (DWCCC's) 1896 priority right to 13,000 AF of storage in East Canyon Reservoir. The remaining natural flow at Gateway, up to 365 cfs, is PCENT. The storage period starts at the end of the irrigation season on approximately October 15 and goes to April 15.

Power Water Originating Above Echo Dam (PWOAE)
During the storage period, power water may be diverted directly through the Weber-Provo Canal (WPC), it may be stored, or it may be used to generate power. In order to ensure that the power right is not enlarged, only power water originating above Echo Dam (PWOAE) may be diverted through the WPC or stored. PWOAE only exists when the natural flow of the river between Gateway and Echo Dam (minus DWCCC's portion) is not sufficient to provide 365 cfs. In some cases PWOAE may be the entire natural flow of the river above Echo Dam, but PWOAE cannot

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be greater than what is needed to supply 365 cfs at Gateway. PWOAE is a crucial value because it represents the maximum amount of power water available under the agreement. PWOAE can be 1) diverted through the WPC, 2) stored, or 3) allowed to flow downstream for power generation, as described respectively in the next three paragraphs.

Power Water Diverted Through the WPC (PWDIV)
The first portion of PWOAE that needs to be accounted for is power water diverted through the WPC (PWDIV). PWDIV may be all or a portion of PWOAE on a given day. There may also be days when the amount of water diverted through the WPC exceeds PWOAE. On those days, the extra diversion should be charged to Provo River Water Users Association (PRWUA) power water storage and credited to Weber River Water Users Association (WRWUA) under Water Right 35-8739 (A9568).

Power Water Stored (PWSTO)
PWOAE that does not get diverted through the WPC may be stored. The actual amount of power water stored (PWSTO) may, however, be less than what was available to store. PWSTO includes water stored by WRWUA and PRWUA as well as water stored by the power company.

Power Water Not Diverted or Stored (PWNDS)
Not all PWOAE has to be diverted or stored. The power water not diverted or stored (PWNDS) flows down the river and is available for direct diversion into the power plant.

Withheld Weber River Waters (WWRW)
Withheld Weber River Waters (WWRW) is the sum of PWDIV and PWSTO minus any power water stored by the power company. At the end of the storage period, WWRW is divided equally between WRWUA and PRWUA.

Power Water Accounting
In addition to WRWUA's half of WWRW, they may have also stored water under Water Right 35-8739 (A9568). All of this storage, as well as any other storage belonging to them under the agreement, must be accounted for under 35-8739, which has an annual limit of 74,000 AF. PRWUA's half of WWRW should be accounted for as "power water."

TRADE PERIOD

At the end of the storage period on April 15, diversion and storage of power water ceases and the trade period begins. PRWUA may trade its power water storage across the WPC only when there are "excess flows" in the river above Echo Reservoir. This will ensure that other water rights on the system are not impaired by the trade.

Excess Flows in the River Above Echo Reservoir
Excess flow may be diverted into the WPC from the Weber River or from Beaver Creek. Excess flow is natural flow that, in the absence of the agreement, would have flowed in the stream past these diversions in order to satisfy either storage rights in Echo Reservoir or direct flow rights below Echo Dam. These "excess flows" are thus excess to the upper river, but not excess to the river as a whole.

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Operating the Trade

Excess flows that are diverted into the WPC must be replaced by PRWUA's stored power water. If Echo Reservoir is filling under 35-8739 while the water is being traded across the WPC, then a like quantity of PRWUA's stored power water must be credited to WRWUA to complete the trade. The power water traded to WRWUA is part of the 74,000 AF they are entitled to store under 35-8739. If water is being traded across the WPC when the natural flow of the system is insufficient to allow storage in Echo Reservoir, then a like quantity of PRWUA's stored power water must be released below Echo Dam to satisfy direct flow demands. This trade can be completed–regardless of the priority cut on the river–to the extent that excess flows exist at the WPC diversions.

SPILL PERIOD

Power water not owned by WRWUA is stored on a space-available basis, meaning that it can be spilled out of storage if not used or traded first. Any storage owned by the power company is the first water to spill; PRWUA power water spills next. Since Echo Water is often stored in other reservoirs, a "paper spill" normally occurs before a physical spill. Once Echo Reservoir is credited with 74,000 AF of storage in any or all reservoirs, a spill begins as additional water is stored. Additional physical storage must be credited to WRWUA and any water that is "paper spilled" must be credited to the next appropriator, which is Weber Basin Water Conservancy District (WBWCD). Any PRWUA storage remaining on July 1 becomes property of WRWUA, except that WRWUA is limited to 74,000 AF of storage and additional storage is credited to WBWCD.

IMPLEMENTATION

These instructions should be followed unless and until written instructions are received from the State Engineer that modify these procedures. Thanks for your efforts in learning the system and distributing water in what has been less than optimal circumstances.

Sincerely,

Kent Jones, P.E.
Utah State Engineer

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RESPONSE TO SELECTED WATER USER COMMENTS

Comment (General): Several water users requested that we provide direction on issues not specifically related to the power water agreement.

Response: The purpose of these instructions to the commissioner is to address the operation of the 1938 power water agreement, so the instructions are generally limited to that issue. We understand that there are additional concerns about operations on the system such as: priority of the various water rights, administration of storage in Smith and Morehouse Reservoir, maximizing water use for all federal projects, capturing diurnal flows, allocating extra allotment water, delivery of Echo shares, distribution in times of shortage, and other issues. We urge all parties to continue to study these issues and to continue to cooperate in addressing them. We will also continue to work with the various entities to resolve issues not specifically covered by these instructions.

Comment from Provo Reservoir Water Users Company (PRWUC): Delivery of Echo shares has priority over delivery of power water through the WPC.

Response: This comment appears to be supported by the power water agreement. We recognize that Echo Shares delivery has, at times, been difficult to coordinate with simultaneous delivery of power water and that Echo Shares delivery has not always corresponded optimally with demand. We will work with the Weber River and Provo River Commissioners, with input from the water users, to develop a process that ensures fair delivery of Echo Shares through the WPC.

Comment from WBWCD: WBWCD is dependent on high flows of the Weber River. Any changes in operation resulting in less water available jeopardizes the water supply to its customers.

Response: The intent of the instructions to the commissioner is for water to be distributed in accordance with the water rights and historical distribution practices such that there is no harm to any water right. Additionally, we expect that water rights owned by the Bureau of Reclamation will be managed by the Bureau, subject to the limitations of each of the water rights, in accordance with their interests.

Comment from WBWCD: We are supportive of online tools that will help in the accounting of water.

Response: Experience has shown us that transparency in the distribution of water helps the water users to gain trust in the system. There may be costs to some water users to make this data available on a real-time basis, but we think that the benefits to the water users will be well worth the costs.

Comment from PRWUA: In order to address disputes in a timely and cost-effective manner, there needs to be an informal process involving the state engineer, the river commissioner, and the affected parties to resolve these disputes.

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Response: We are hopeful that this ongoing process of water user participation and education, in conjunction with future tools that provide transparency and clarity to operations, will help us avoid many potential disputes. However, as new issues do arise, we agree that these issues need to be addressed quickly. If there are disputes between Federal Project Operators we expect that the Bureau will take the lead in arbitrating these disputes. Disputes between other water users should be handled by the River Commissioner, if possible. When necessary, the State Engineer may issue specific instructions to the commissioner in order to address an issue.

Comment from Dennis Marchant: Winter power water should be assigned a 1938 priority date and delivered based on that date in accordance with 73-3-21.1(2)(a).

Response: Winter power water is stored under a 1903 priority date. Delivery of storage water is governed by 73-3-20(1) which says, in part, "Any person having stored that person's appropriated water in a reservoir for a beneficial purpose shall be permitted to withdraw the water at the times and in the quantities as the person's necessities may require if the withdrawal does not interfere with the rights of others." This applies to storage water taken "either above or below the point where emptied into the stream, body of water or reservoir."

Comment from Dennis Marchant: Upstream storage water owned by Fish Lake Reservoir Co., Marchant Extension Irrigation Co., Smith and Morehouse Reservoir Co., Kamas Lake, and Weber Basin should not be called on to implement upstream Echo Exchanges.

Response: We believe this to be correct. Echo storage may only be exchanged above the reservoir by diverting excess natural flow.

Comment from Dennis Marchant: Water delivered through the WPC should be measured at the points of diversion and at the end of the canal to properly account for gains or losses occurring in the canal.

Response: Since 1970 the commissioner has reported the WPC measurement at the end of the canal at the gage in Francis. However, between 1932 and 1969 the commissioner reported measurements at the beginning of the canal in Oakley, or at Oakley plus the diversion from Beaver Creek, or at Oakley and Francis. It's not clear why the change was made in 1970, but perhaps it was because it was easier to make one measurement rather than two or three. For 2014 we are instructing the commissioner to continue to use the measurement obtained at Francis as in recent years. However, we are reviewing this aspect of the operation and may change it in a future year.

Comment from WRWUA: The priority of original water rights should be followed except where change applications have been approved.

Response: Water right priorities are the basis for distribution of water in Utah and must be protected. Changes, exchanges, and agreements between water users may not operate to the detriment of any other water user. The primary purpose for issuing instructions to the commissioner regarding the power water agreement, while following a public process to allow for input from water users, is to ensure that third-party water rights are not impaired.

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Comment from WRWUA: There needs to be better measurement, accounting, reporting, coordination and communication regarding the water.

Response: These things are all important in the operation of the river. We support improvements in all of these areas and believe that this ongoing process of water user participation and cooperation has been, and will continue to be, helpful in addressing these areas.

Comment from Bureau of Reclamation: We hope to have regular meetings in the future with PRWUA, WRWUA, WBWCD, and the State to discuss water operations of the Weber River Basin.

Response: We are supportive of ongoing meetings and discussions to coordinate the operation of the Weber River and to address ongoing issues.

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