Chapter 4
Water Quality

4.1 Introduction

This chapter discusses regional water quality, identifies the potential impacts of the proposed project and alternatives on water quality in the project vicinity, and prescribes mitigation measures to avoid or minimize those impacts.

4.2 Affected Environment

For the purpose of this chapter, the affected environment consists of the construction and operation areas.

4.2.1 Sources of Information

Information in this chapter is based primarily on

- Truckee River Chronology (Nevada Division of Water Resource Planning 1996),
- Truckee Meadows Flood Control Project—Reconnaissance Report (U.S. Army Corps of Engineers 1997),
- Orr Ditch Decree (U.S. District Court for the District of Nevada 1944),
- Water Quality Control Plan for the Lahontan Region (California Regional Water Quality Control Board, Lahontan Region, 1995), and
- Truckee River Operating Agreement Draft EIR/EIS—Water Quality Appendix (U.S. Department of the Interior 1998).

4.2.2 Regional Setting

Surface water quality is primarily dependent upon the mineral composition of rocks in the upper source areas of a river. Further downstream, water quality continues to be influenced by the mineral characteristics of materials through which it flows and also by secondary contributions of other water types from

tributaries. Water quality is also affected by discharges from *point* and *nonpoint sources* (i.e., sources of discharge that originate from a distinct source or that come from prevalent or nonspecific sources, respectively).

The upper Truckee River basin is generally characterized by high-quality water conditions because of the nature of the high-elevation, alpine environment with deep annual snowpack, rainfall- and snowmelt-generated runoff, and a lack of substantial contributing waste sources from human activity.

Reservoirs and tributary streams provide cold water inflows to the Truckee River. Water impounded in reservoirs heats up in the summer and, if released from the top of the reservoir, can cause stream water temperature to increase when the water is released into the river system. Temperature data from 1970–1979, years that included both high flows and droughts, indicate that water temperature decreases slightly as water travels from Lake Tahoe through the upper canyon. The water is slightly cooled by inputs from Prosser Creek and the Little Truckee River, and warmed slightly by inflows from Donner and Martis Creeks (U.S. Geological Survey 1986). In the past, with operation of the Farad Power Plant, stream temperatures met state objectives at the Farad monitoring station near the Nevada state line (U.S. Geological Survey 1986). More recent data, collected between June 1993 and September 1998, show that the maximum daily temperature at Farad rarely exceeds 20°C (U.S. Geological Survey 1994–1999).

With the exception of occasional accidents, such as an oil pipeline leak that occurred upstream of Donner Lake in the winter of 1996–1997, waste inputs are minimal in the alpine regions of the Truckee River basin. Potential sources of pollutant discharges in the upper tributaries and reservoirs include runoff of salts used for ice control on roadways; petroleum-based pollutants such as fuels and oils from vehicular traffic; and soil erosion from road construction, development projects, and wildfires.

In general, concentrations of dissolved pollutants in the Truckee River increases downstream, as distance increases from the pure headwater tributaries and as contributions of runoff from developed areas and human activities increase. The major contributions of pollutants to the river in the upper Truckee River watershed, from Lake Tahoe and the other major reservoirs to the Nevada state line, are discharges of stormwater from the urbanized areas near Truckee and subsurface inputs of tertiary-treated wastewater from the Tahoe-Truckee Sanitation Agency's (TTSA's) 5.6-million-gallon-per-day (mgd) treatment plant near the mouth of Martis Creek.

Lake Tahoe water is considered a calcium bicarbonate water with total dissolved solids (TDS) of approximately 170 milligrams per liter (mg/L) and pH of less than 8.0. The TTSA plant has resulted in dramatic improvements in the reduction of nitrogen loading in the river. No violations of Nevada County water quality nitrogen standards were recorded at the state line between 1983 and 1991, the period for which there are data. However, more violations of the chloride standard occurred at Farad and Idlewild, primarily during drought years, than at other points along the entire river. These violations were attributed in large part

to the more restrictive standards established for the upper reaches of the river. Sources of chlorides could include wastewater, de-icing salts, or natural inputs from groundwater.

Although the importance of Juniper and Gray Creeks to the overall hydrology of the Truckee River is minor because of their intermittent tendencies (chapter 3), they have a substantial effect on water quality. During particularly severe thunderstorms, the Juniper and Gray Creek watersheds discharge considerable quantities of mud and debris into the Truckee River. The muddy discharges have been so severe that Reno's water treatment plants have been forced to close on several occasions (1965, 1992, 1995). Recent fires will also contribute to the degradation of water quality this winter.

4.2.3 Regulatory Setting

4.2.3.1 State Plans, Programs, and Policies

The Porter-Cologne Water Quality Control Act of 1969 (PCWQCA) established the nine Regional Water Quality Control Boards (RWQCB). The SWRCB is the primary state agency responsible for protecting the quality of the state's surface and groundwater supplies.

The SWRCB is required under section 303 of the Clean Water Act, and the California Water Code (§13240) to adopt water quality standards. In response to these requirements the Regional Water Quality Control Boards (RWQCB) have prepared Water Quality Control Plans (Basin Plans) that designate the beneficial uses of waters to be protected, along with the water quality objectives necessary to protect those uses. When establishing water quality objectives, the RWQCB must consider the past, present, and future beneficial uses, environmental characteristics, economics, and water quality conditions that could reasonably be achieved through the coordinated control of all factors that affect water quality. A Basin Plan must

- identify beneficial uses of water to be protected,
- establish water quality objectives for the reasonable protection of the beneficial uses, and
- establish a program of implementation for achieving the water quality objectives.

Basin Plans also provide the technical basis for determining waste discharge requirements, taking enforcement actions, and evaluating clean water grant proposals. Basin Plans are updated and reviewed every 3 years in accordance with Article 3 of the PCWQCA and Section 303(c) of the CWA. The Lahontan RWQCB adopted the most recent Basin Plan in 1995.

4.2.3.1.1 California Regional Water Quality Control Board, Lahontan Region—Basin Plan

Water quality in streams and aquifers of the region is guided and regulated by the Lahontan RWQCB. State policy for water quality control is directed at achieving the highest water quality consistent with the maximum benefit to the people of the state. To develop water quality standards consistent with the uses of a water body, the RWQCB attempts to classify historical, present, and future beneficial uses as part of its Basin Plan.

4.2.3.1.1.1 Beneficial Uses

The Lahontan Basin Water Quality Control Plan identifies the following beneficial uses of the Truckee River.

1. **Municipal and Domestic Supply (MUN)—**Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.
2. **Agricultural Supply (AGR)—**Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation (including leaching of salts), stock watering, or support of vegetation for range grazing.
3. **Industrial Service Supply (IND)—**Uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well repressurization.
4. **Ground Water Recharge (GWR)—**Uses of water for natural or artificial recharge of ground water for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.
5. **Freshwater Replenishment (FRSH)—**Uses of water for natural or artificial maintenance of surface water quantity or quality.
6. **Hydropower Generation (POW)—**Uses of water for hydropower generation.
7. **Water Contact Recreation (REC-1)—**Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, whitewater activities, fishing, or use of natural hot springs.
8. **Noncontact Water Recreation (REC-2)—**Uses of water for recreational activities involving proximity to water, but where there is generally no body contact with water, nor any likelihood of ingestion of water. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.
9. **Commercial and Sport Fishing (COMM)—**Uses of water for commercial or recreational collection of fish, shellfish, or other organisms including, but

not limited to, uses involving organisms intended for human consumption or bait purposes.

10. **Cold Freshwater Habitat (COLD)—**Uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
11. **Wildlife Habitat (WILD)—**Uses of water that support terrestrial or wetland ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats or wetlands, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.
12. **Rare, Threatened, or Endangered Species (RARE)—**Uses of water that support aquatic habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened or endangered.
13. **Migration of Aquatic Organisms (MIGR)—**Uses of water that support habitats necessary for migration or other temporary activities by aquatic organisms, such as anadromous fish.
14. **Spawning, Reproduction, and/or Early Development (SPWN)—**Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.

4.2.3.1.1.2 Water Quality Objectives

The Basin Plan identifies the following adopted objectives, which apply to all surface waters in the region, to protect beneficial uses:

- **Ammonia:** Ammonia concentrations shall not exceed EPA's ammonia threshold for freshwater.
- **Bacteria, Coliform:** Waters shall not contain concentrations of coliform organisms attributable to anthropogenic sources, including human and livestock wastes.
- **Biostimulatory Substances:** Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect the water's suitability for beneficial uses.
- **Chemical Constituents:** Waters designated as MUN shall not contain concentrations of chemical constituents in excess of the maximum contaminant level or secondary maximum contaminant level based upon drinking water standards specified in the provisions of Title 22 of the California Code of Regulations. Waters designated as AGR shall not contain concentrations of chemical constituents in amounts that adversely affect the water's suitability for beneficial uses (i.e., agricultural purposes). Waters shall not contain concentrations of chemical constituents in amounts that adversely affect the water's suitability for beneficial uses.
- **Chlorine, Total Residual:** For the protection of aquatic life, total chlorine residual shall not exceed either a median value of 0.002 mg/L or a maximum

value of 0.003 mg/L. Median values shall be based on daily measurements taken within any 6-month period.

- **Color:** Waters shall be free of coloration that causes nuisance or adversely affects the water's suitability for beneficial uses.
- **Dissolved Oxygen:** The dissolved oxygen concentration, as percent saturation, shall not be depressed by more than 10%, nor shall the minimum dissolved oxygen concentration be less than 80% of saturation.
- **Floating Materials:** Waters shall not contain floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect the water's suitability for beneficial uses.
- **Oil and Grease:** Waters shall not contain oils, greases, waxes or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect the water's suitability for beneficial uses.
- **Nondegradation of Aquatic Communities and Populations:** All wetlands shall be free from substances attributable to wastewater or other discharges that produce adverse physiological responses in humans, animals, or plants or which lead to the presence of undesirable or nuisance aquatic life. All wetlands shall be free from activities that would substantially impair the biological community as it naturally occurs due to physical, chemical, and hydrologic processes.
- **Pesticides:** Pesticide concentrations, individually or collectively, shall not exceed the lowest detectable levels, using the most recent detection procedures available. There shall not be an increase in pesticide concentrations found in bottom sediments. There shall be no detectable increase in bioaccumulation of pesticides in aquatic life.
- **pH:** In fresh waters with designated beneficial uses of COLD or WARM, changes in normal ambient pH levels shall not exceed 0.5. For all other waters of the Lahontan Region, the pH shall not be depressed below 6.5 nor raised above 8.5.
- **Radioactivity:** Radionuclides shall not be present in concentrations which are deleterious to human, plant, animal, or aquatic life nor which result in the accumulation of radionuclides in the food web to an extent which presents a hazard to human, plant, animal, or aquatic life.
- **Sediment:** The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect the water's suitability for beneficial uses.
- **Settleable Materials:** Waters shall not contain substances in concentrations that result in deposition of material that causes nuisance or that adversely affects the water's suitability for beneficial uses.
- **Suspended Materials:** Waters shall not contain suspended materials in concentrations that cause nuisance or that adversely affect the water's suitability for beneficial uses.

- **Taste and Odor:** Waters shall not contain taste or odor-producing substances in concentrations that impart undesirable tastes or odors to fish or other edible products of aquatic origin, that cause nuisance, or that adversely affect the water's suitability for beneficial uses.
- **Temperature:** The natural receiving water temperature of all waters shall not be altered unless it can be demonstrated to the satisfaction of the RWQCB that such an alteration in temperature does not adversely affect the water's suitability for beneficial uses. For waters designated "cold," the temperature shall not be altered.
- **Toxicity:** All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life.
- **Turbidity:** Waters shall be free of changes in turbidity that cause nuisance or adversely affect the water for beneficial uses. Increases in turbidity shall not exceed natural levels by more than 10%.

The Basin Plan also has the following narrative objectives that apply specifically to the Truckee River. The "10% significance level" used in the following objectives is a 10% change compared against baseline conditions.

- **Algal Growth Potential:** The mean monthly algal growth potential shall not be altered to the extent that such alterations are discernible at the 10% significance level. This objective does not apply to Martis Creek; however, nuisance or pollution levels of algal growth potential shall not be discernible at these stations.
- **Biostimulatory Substances:** The concentration of biostimulatory substances shall not be altered in an amount that could produce an increase in aquatic biomass to the extent that such increases are discernible at the 10% significance level. This objective does not apply to Martis Creek or the Truckee River stations downstream of Martis Creek; however, no nuisance or pollution levels of algal biomass shall be discernible at these stations at any time.
- **Color:** The color shall not exceed an eight (8) Platinum Cobalt Unit mean of monthly means (approximately equivalent to the State of Nevada standard of a twelve (12) Platinum Cobalt Unit sample mean).
- **Dissolved Oxygen:** The dissolved oxygen concentrations shall not be depressed by more than 10%, below 80% saturation, or below 7.0 mg/L at any time, whichever is more restrictive.
- **pH:** Changes in normal ambient pH levels shall not exceed 0.5.
- **Species Composition:** The species composition of aquatic organisms shall not be altered to the extent that such alterations are discernible at the 10% significance level. This objective does not apply to Martis Creek or the Truckee River stations downstream of Martis Creek; however, alterations in

species composition which result in a nuisance or pollution shall not be discernible at these stations at any time.

- **Taste and Odor:** The taste and odor shall not be altered.
- **Turbidity:** The turbidity shall not be raised above 3 Nephelometric Turbidity Units (NTU) mean of monthly means. (This objective is approximately equal to the State of Nevada standard of 5 NTU sample mean.)

4.2.3.1.1.3 Waste Discharge Prohibitions

The Basin Plan has specific waste discharge prohibitions for the Truckee River Hydrologic Unit (HU). The proposed project does not comply with waste discharge prohibitions specific to the Truckee River HU. Prohibition 4(c) states that

> The discharge or threatened discharge, attributable to human activities, of solid or liquid waste materials including soil, silt, clay, sand, and other organic and earthen materials to lands within the 100-year floodplain of the Truckee River or any tributary to the Truckee River is prohibited.

The California Water Code defines *waste* as follows:

> "Waste" includes sewage and any and all other waste substances, liquid, solid, gaseous, or radioactive, associated with human habitation, or of human or animal origin, or from any producing, manufacturing, or processing operation, including waste placed within containers of whatever nature prior to, and for purposes of, disposal. (California Water Code Section 13050(d).)

Therefore, soil materials captured in Baker tanks, human wastes captured in chemical toilets, or construction debris or trash stored in dumpsters are considered to be "waste" and are prohibited from being located in the 100-year floodplain or in a location that could result in a discharge to the 100-year floodplain.

Because the project site is located within a steep canyon, there is no practicable way that the project could be constructed within bounds of the waste discharge prohibitions, and an exemption must be obtained from the Lahontan RWQCB to construct the project.

The Lahontan RWQCB may grant exemptions to prohibition 4(c) above as it applies to the Truckee River HU for the repair or replacement of existing structures, provided that the repair or replacement does not involve the loss of additional floodplain area or volume. Because the proposed project would not be constructed within the same footprint as the pre-existing diversion structure, which was washed out in the 1997 flood, the RWQCB cannot grant an exception to prohibition 4(c) under the repair or replacement provisions.

However, the Lahontan RWQCB may also grant exemptions to prohibition 4(c) above as it applies to the Truckee River HU for the following categories of new projects:

- projects solely intended to reduce or mitigate existing sources of erosion or water pollution, or to restore the functional value to previously disturbed floodplain areas;
- bridge abutments, approaches, or other essential transportation facilities identified in an approved county general plan;
- projects necessary to protect public health or safety or to provide essential public services;
- projects necessary for public recreation; and
- projects that will provide outdoor public recreation within portions of the 100-year floodplain that have been substantially altered by grading and/or filling activities that occurred before June 26, 1975.

4.2.3.1.2 Water Quality Certification

Section 401 of the CWA (33 USC 1341) provides states with a mechanism to ensure that federally permitted activities meet applicable water quality requirements. Pursuant to Section 401, an applicant for a federal permit or license to conduct any activity that may result in a discharge into the waters of the United States must apply for water quality certification from the state in which the discharge originates or will originate. In issuing a certification, the state certifies compliance with certain provisions of the CWA, including water quality standards under Section 303. The certification must include any conditions necessary to meet requirements of the CWA and any other appropriate requirement of state law. The federal agency cannot grant the permit or license unless the state either issues or waives water quality certification, and the federal agency must include conditions of the state's certification as conditions of the federal permit or license.

The SWRCB is the state agency responsible for water quality certification in California. The principal water quality control statute in California is the PCWQCA (Water Code section 13000 et seq.), which provides for the adoption of water quality control plans. The water quality control plans incorporate water quality standards that include designated beneficial uses, water quality objectives, and the state's antidegradation policy. The designated uses identify the beneficial uses of a water body that are to be protected. The water quality objectives establish constituent concentrations, levels, or narrative statements, which will protect the designated beneficial uses. The antidegradation policy identifies the circumstances under which adverse changes in water quality may be allowed. For the SWRCB to issue a water quality certification, the SWRCB must determine that the activity will not violate water quality objectives,

beneficial uses are protected, and the activity meets the requirements of the state's antidegradation policy.

Water quality certification must address the impacts on water quality resulting from the activity as a whole, including operation of the project, and not just impacts resulting from the discharge. (*PUD No. 1 of Jefferson County v. Washington Dept. of Ecology* [1994] 511 U.S. 700 [114 S.Ct. 1900].) Consequently, in requiring an applicant to comply with water quality standards, the SWRCB is not limited to enforcement of numerical criteria. The SWRCB also may impose water quality conditions, including instream flow requirements, requiring the applicant to operate the project consistent with designated beneficial uses or as necessary to implement the state's antidegradation policy.

For hydroelectric projects, the SWRCB, as appropriate, will require the following conditions for waste discharge permits and/or conditions for Section 401 water quality certification:

- The applicant must implement temporary and permanent erosion and drainage control measures during project construction and operation, including ongoing cleanout of sediment from diversion structures and stabilization of all disturbed areas associated with the project (e.g., transmission lines, access roads).
- The applicant must mitigate impacts on water quality and instream beneficial uses that result from reduced flows.

4.2.3.1.3 Streambed Alteration Agreement

A Streambed Alteration Agreement (California Department of Fish and Game Section 1600 California Fish and Game Code—Streambed Alteration Agreement. Any person, government agency, or public utility proposing any activity that will divert or obstruct the natural flow or change the bed, channel, or bank of any river, stream, or lake, or proposing to use any material from a streambed, must first notify, consult, and obtain a streambed alteration agreement from DFG. As a general rule, this requirement applies to any work undertaken within the ordinary high-water mark (OHWM) of a wash, stream, or lake that contains or once contained fish and wildlife or supports or once supported riparian vegetation.

4.2.3.2 Federal Plans, Programs, and Policies

4.2.3.2.1 Clean Water Act and Associated Environmental Compliance

EPA has granted the State of California primacy in administering and enforcing the provisions of CWA and the National Pollutant Discharge Elimination System

(NPDES). NPDES is the primary federal program that regulates point-source discharges to waters of the United States.

The State of California adopts water quality standards to protect beneficial uses of state waters as required by Section 303 of CWA and PCWQCA. The Truckee River is listed as an impaired water body for sediment under Section 303(d) of CWA.

Placement of clean fill materials into the waters of the United States is regulated by Section 404 of CWA, which is administered by USACE. Under CWA, the state (i.e., the SWRCB) must issue or waive Section 401 water quality certification for the project to be permitted under Section 404. Water quality certification requires the evaluation of water quality considerations associated with dredging or placement of fill materials into waters of the United States.

Based on USACE discretionary approval of the Section 404 dredge and fill permit, USACE will also have to ensure compliance with

- NEPA, by preparing an environmental assessment or issuing a permit under an existing nationwide permit;
- Section 7 of ESA, as described in chapter 6, "Aquatic Resources";
- Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands); and
- Section 106 of the National Historic Preservation Act, as described in chapter 10, "Cultural Resources."

4.2.3.2.2 National Pollutant Discharge Elimination System—Stormwater Discharge Permits

Section 402 of the Clean Water Act mandates that construction activities disturbing 5 or more total acres comply with the requirements of the NPDES. The construction activities outlined in the project description would disturb more than 5 acres and therefore would be subject to NPDES requirements. NPDES compliance can be achieved by obtaining coverage under California's general construction activity stormwater permit from the SWRCB. The Lahontan RWQCB administers the stormwater permit program for the Truckee River Hydrologic Unit.

The conditions of the stormwater permit require that project proponents submit a notice of intent to discharge stormwater and prepare and implement an SWPPP that includes a site map and a description of proposed construction activities. In addition, the SWPPP must describe the best management practices (BMPs) that will be implemented to prevent accelerated soil erosion, sedimentation, and the discharge of other construction-related pollutants (e.g., petroleum products, solvents, paints, cement) that could contaminate surface and groundwater resources. Permittees are required to conduct annual monitoring and reporting to

ensure that BMPs are correctly implemented and that they are effective in controlling the discharge of stormwater- and nonstormwater-related pollutants.

4.3 Impact Assessment Methodology

4.3.1 Analytical Approach

Each potential impact was evaluated by qualitatively estimating the effects of the project on water quality and comparing those effects to the significance criteria identified below. Additionally, water quality effects as they affect beneficial uses are also discussed in chapter 6, "Aquatic Resources" and chapter 9, "Recreation."

4.3.2 Criteria for Determining Significance

Specific criteria for determining the significance of water resources impacts were based on general criteria recommended in Appendix G of the State CEQA Guidelines. The State CEQA Guidelines state that a project would have a significant impact on water quality if it would

- violate any water quality standards or waste discharge requirements,
- substantially degrade water quality.

Existing regulatory standards (specifically, the Lahontan RWQCB's Basin Plan) for hazardous materials and for ambient water quality were used to define the significance of water quality impacts. Any alteration of surface water quality, including, but not limited to, changes in temperature, dissolved oxygen, or turbidity, is considered a significant impact if it affects identified beneficial uses or violates the water quality objectives.

4.4 Impacts and Mitigation Measures of Alternative A: Proposed Project

4.4.1 Construction-Related Impacts

Impact 4-1: Degradation of Surface Water Quality during Project Construction

The severity of construction-related water quality impacts is dependent upon soil erosion potential; construction practices; the frequency, magnitude, and duration of precipitation events; and the proximity of construction activities to the river

channel. An overview of the beneficial uses and water quality objectives, and potential effects of project construction and operation is provided in table 4-1.

Construction activities would expose disturbed and loosened soils to erosion caused by rainfall, water, and wind. Most natural erosion occurs at slow rates; however, the rate of erosion increases when the land is cleared or altered and left disturbed. Construction activities remove the protective cover of vegetation and diminish the soil's natural resistance to rainfall-impact erosion. Sheet erosion occurs when slope length and runoff velocity increase on disturbed areas. As runoff accumulates, it concentrates into rivulets that cut grooves (rills) into the soil surface. If the flow is sufficient, these rills may develop into gullies.

Sedimentation is the settling out of soil particles transported by water. Sedimentation occurs when the velocity of water in which soil particles are suspended is slowed sufficiently to allow particles to settle out. Larger particles such as gravel and sand settle out more rapidly than fine particles such as silt and clay. Sediment is considered a pollutant by the RWQCB, and it transports other adsorbed pollutants, such as nutrients, hydrocarbons, and metals.

Excessive sediment can cause increased turbidity and reduced light penetration, resulting in the reduction in prey capture for sight-feeding predators, reduction of light available for photosynthesis, clogging of the gills and filters of fish and aquatic invertebrates, reduced spawning and juvenile fish survival, smothering of bottom dwelling organisms, changes in substrate composition, and reduction in aesthetic values. Concentrations of nutrients and other pollutants (such as metals and certain pesticides) associated with sediment particles can also increase. Although these effects are usually short-term and diminish greatly after revegetation, sediment and sediment-borne pollutants may be remobilized under certain hydraulic conditions.

Although sediment from erosion is the pollutant most frequently associated with construction activity, other pollutants of concern include toxic chemicals and miscellaneous wastes. A typical construction site houses many chemicals or compounds that can be hazardous to aquatic life if they enter a watercourse. Gasoline, oils, grease, solvents, lubricants, and other petroleum-based products are commonly used in construction activities. Many petroleum products contain a variety of toxic compounds and impurities and tend to form oily films on the water surface, altering oxygen diffusion rates. Concrete, soap, trash, and sanitary wastes are other common sources of potentially harmful materials.

The proximity of construction activities to watercourses increases the potential for spilled toxic substances to enter the water. Washwater from concrete batch facilities, equipment, and tools, as well as other waste dumped or spilled on the construction site, can easily lead to seepage of pollutants into watercourses. Accidental spills of construction chemicals into a watercourse may also occur.

The impact of toxic construction-related materials on water quality is determined largely by the duration and timing of activities. Construction occurring in the dry season has less potential to cause soil and channel erosion or runoff of toxic

chemicals into streams. However, low summer flows are less capable of diluting pollutants that enter the stream.

The potential for construction-related activities to cause adverse water quality impacts will be minimized through the preparation and implementation of a SWPPP, as described in section 4.2.3.2.2, and a hazardous spill prevention and recovery program (appendix C). Construction timing, techniques, and BMPs identified in the project description and SWPPP will substantially reduce the potential for accelerated erosion, discharge of construction related pollutants, and adverse effects on water quality. Therefore, this impact is considered ***less than significant***. No mitigation is required.

Impact 4-2: Degradation of Water Quality due to Inundation of Active Construction Area and Associated Equipment

Construction activities would occur in the floodplain and channel of the Truckee River. Floodflows may inundate the active construction area and associated equipment if construction occurs during a major flood event. Direct damage to construction equipment or inundation of equipment that causes a release of fuel, oil, hydraulic fluids, antifreeze, sanitary waste, or other substance is considered ***significant.***

Implementation of Mitigation Measure 4-1 would reduce this impact to a less-than-significant level.

Mitigation Measure 4-1: Locate construction equipment and supplies outside the 100-year floodplain

The project applicant or its contractors will not store or locate above-ground storage tanks, chemical toilets, or any hazardous materials in the 100-year floodplain between December and April. Heavy equipment, such as excavators and bulldozers, will be parked outside the normal high-water mark when not in use during the flood season. This measure will minimize the potential for floodwaters to contact equipment and cause a release of fuel, oil, hydraulic fluids, antifreeze, sanitary waste, or other substance.

4.4.2 Operation-Related Impacts

Impact 4-3: Violation of Water Quality Standards during Project Operation

An overview of the beneficial uses and water quality objectives, and potential effects of resulting from project construction and operation is provided in table 4-1. As described in chapter 3, "Hydrology," implementation of the project would substantially reduce the quantity of water in the Truckee River between the Farad Diversion Dam and the water's point of return from the Farad Power Plant. Lower flows could result in higher summer temperatures and more winter ice formation resulting in stresses on aquatic ecosystems. Other Basin Plan water quality standards, which are primarily chemical objectives, would not be affected by operation of the proposed project. Because operation of the project would not discharge substances or cause the discharge of substances to the Truckee River, the chemical characteristics of the Truckee River would be unchanged.

The Basin Plan states that the natural receiving water temperature of all waters shall not be altered unless it can be demonstrated to the satisfaction of the RWQCB that such an alteration in temperature does not adversely affect the water's suitability for beneficial uses, such as COLD, WILD, RARE, MIGR, and SPWN. The Basin Plan further states that for waters designated as "Cold Freshwater Habitat (COLD)," such as the Truckee River, shall not be altered.

A number of factors can alter water temperatures in rivers: flow rate, shade, reservoir storage, and releases. River width and depth, which are linked to flow, also affect water temperature, especially during periods of low-to-moderate flows during the summer and fall. Water that flows in a deeper and narrower river absorbs less heat from the sun than a shallower and wider river under similar flow conditions.

A water quality model was developed for the Truckee River as part of the TROA draft EIR/EIS. The model uses flow and temperature data collected at the Farad gaging station as the upstream boundary condition, so it cannot be used to evaluate the proposed project. However, bivariate statistical analysis of the model output indicated that 92% of the variability in mean daily water temperature is caused by variation in mean daily air temperature; flow variability contributed to a portion of the remaining variability (U.S. Department of the Interior 1998).

The USGS has intermittently measured daily minimum and maximum water temperatures upstream and downstream of the Floriston diversion reach. Most measurements were between 1980 and 1997. Data were evaluated from the following sites, in upstream to downstream order: upstream of Prosser Creek, Prosser Creek (tributary), I-80, Little Truckee River (tributary), Bronco Creek (tributary), Floriston (summer data only from 1970), Farad gage (downstream of the Farad Power Plant), Verdi, Mogul, Reno, and Sparks. These measured data show that water temperatures upstream of Prosser Creek can be relatively warm

during the summer, sometimes as warm as the water temperatures measured much farther downstream at Reno and Sparks. As the Truckee River flows downstream, however, it is often made cooler in the summer by the relatively cool water of Prosser Creek and the Little Truckee River. The measured temperatures at the Farad gage shows that the river is generally still relatively cool at this location compared to upstream of Prosser Creek, although water temperatures at Farad may occasionally exceed 19°C (66°F).

The water temperatures measured at the Farad gage cannot be assumed to be the summer temperatures within the diversion reach because the diverted water returns to the river upstream of the gage. When summer water temperatures were measured at Farad, the flows were generally above 400 cfs. To better evaluate water temperatures within the diversion reach and the effect of diverting water, water temperatures were measured during July and August of 2001 and the effects of variable flow within the diversion reach were evaluated with a water temperature model. Temperatures were measured in the Truckee River upstream of the Little Truckee River, at Floriston, at the Farad Power Plant, at Fleisch Dam, and at the downstream end of the Little Truckee River.

Water temperatures were simulated with a spreadsheet-based hourly water temperature model that has been developed at Jones & Stokes. The model simulates temperatures in the Truckee River from the Little Truckee River (mile 0) to the Fleisch diversion (mile 12.2), with the Floriston diversion reach located approximately between river miles 7 and 9. Time-series inputs to the model for July–August 2001 included hourly air temperature, dewpoint temperature, and wind speed from Truckee airport; solar radiation from Reno; flow from the Farad and Little Truckee River gages; and water temperatures from upstream of the Little Truckee River and the downstream end of the Little Truckee River (for upstream starting temperatures). Other inputs included channel geometry and vegetation shade parameters estimated visually and from aerial photographs, and topographic angle and stream orientation estimated from USGS topographic maps.

Water temperatures were simulated for July–August 2001 flow and meteorological conditions to determine whether the model could match the measured temperatures. Results showed that the model can simulate temperatures accurately, with average deviation between simulated and measured daily minimum, mean, and maximum temperatures remaining less than 0.5°C for all downstream locations (Floriston, Farad, and Fleisch). Flows for the July–August 2001 evaluation period remained high at approximately 600 cfs, so the accuracy of the model estimates for channel geometry at low flow cannot be evaluated.

Simulation results from 3 flow scenarios are evaluated for this EIR. In each of these scenarios, the flow upstream of Floriston was assumed to be 485 cfs and the upstream starting temperature at the Little Truckee River was determined from the measured water temperatures during July–August 2001. The 3 scenarios are as follows:

Table 4-1. Evaluation of Project Effects on Water Quality Objectives and Beneficial Uses

Objective	Potential Project Effects		Effect of Project Construction	Effect of Project Operation	Mitigation or Minimizing Technique
	Cons.	Op.			
Ammonia	✔	—	During construction, chemical toilets would be provided for workers. A leak or spill from a chemical toilet could release ammonia to the floodplain or the river.	Operation of the project would not release or cause the release of wastewater, animal wastes, or other ammonia-containing substances to the Truckee River.	Mitigation Measure 4-1: Locate Construction Equipment and Supplies Outside the 100-Year Floodplain.
Bacteria, Coliform	✔	—	A leak or spill from a chemical toilet could release human wastes to the floodplain or the river.	Operation of the project would not release or cause the release of human or animal wastes to the Truckee River.	Mitigation Measure 4-1: Locate Construction Equipment and Supplies Outside the 100-Year Floodplain.
Biostimulatory Substances:	✔	—	A leak or spill from a chemical toilet could release human wastes to the floodplain or the river. In addition, any soil materials disturbed during construction could be eroded and transport nutrients to the river.	Operation of the project would not release or cause the release of biostimulatory substances to the Truckee River.	The potential for construction-related activities to cause adverse water quality impacts would be minimized through the preparation and implementation of a stormwater pollution prevention plan (SWPPP); a hazardous spill prevention and recovery program; and Mitigation Measure 4-1: Locate Construction Equipment and Supplies Outside the 100-Year Floodplain.
Chemical Constituents	✔	—	A leak or spill from a chemical toilet could release human wastes and chemicals to the floodplain or the river. In addition, any soil materials disturbed during construction could be eroded and transport nutrients to the river.	Operation of the project would not release or cause the release of chemical substances to the Truckee River.	Mitigation Measure 4-1: Locate Construction Equipment and Supplies Outside the 100-Year Floodplain.
Chlorine, Total Residual	✔	—	A leak or spill from a chemical toilet could release human wastes and chemicals, including chlorine (a disinfectant) to the floodplain or the river.	Operation of the project would not release or cause the release of chlorinated water or other chlorinated substances to the Truckee River.	Mitigation Measure 4-1: Locate Construction Equipment and Supplies Outside the 100-Year Floodplain.

Table 4-1. Continued

Objective	Potential Project Effects		Effect of Project Construction	Effect of Project Operation	Mitigation or Minimizing Technique
	Cons.	Op.			
Color	✔	—	Soil materials disturbed during construction could be eroded and transport sediment to the river that could alter the color of the water.	Operation of the project would not result in the discharge or cause a discharge of materials that would alter the color of the water in the Truckee River.	The potential for construction-related activities to cause adverse water quality impacts would be minimized through the preparation and implementation of a SWPPP and a hazardous spill prevention and recovery program.
Dissolved Oxygen	✔	✔	A leak or spill from a chemical toilet could release human wastes and chemicals to the floodplain or the river. In addition, any soil materials disturbed during construction could be eroded and transport nutrients to the river. These constituents may increase the chemical oxygen demand and depress the dissolved oxygen (DO) concentration.	Operation of the project would not result in the discharge or cause a discharge of materials that could depress the DO of the water in the Truckee River. Possible temperature effects that could alter the DO concentration were evaluated in detail and found to be less than significant. (Impact 4-4)	The potential for construction-related activities to cause adverse water quality impacts would be minimized through the preparation and implementation of a SWPPP and a hazardous spill prevention and recovery program.
Floating Materials	✔	—	Construction debris, supplies, and equipment located on the floodplain could become floatable materials during a flood.	Operation of the project would not discharge or cause a discharge of floating materials to the Truckee River.	The potential for construction-related activities to cause adverse water quality impacts would be minimized through the preparation and implementation of a SWPPP and a hazardous spill prevention and recovery program.
Oil and Grease	✔	—	Construction equipment working in the river or on the floodplain may be a source of oil and grease.	Operation of the project would not result in the discharge or cause a discharge of oil or grease to the Truckee River.	The potential for construction-related activities to cause adverse water quality impacts would be minimized through the preparation and implementation of a SWPPP and a hazardous spill prevention and recovery program.

Table 4-1. Continued

Objective	Potential Project Effects		Effect of Project Construction	Effect of Project Operation	Mitigation or Minimizing Technique
	Cons.	Op.			
Nondegradation of Aquatic Communities and Populations	✔	✔	Construction would temporarily affect the aquatic communities. The river would be forced to 1 bank to allow construction and then forced to the opposite bank to allow the remaining construction.	Operation of the project would not result in degradation of aquatic communities and populations. However, Mitigation Measure 9-1, which calls for reducing project diversions to support recreation flows, could alter the hydrologic pattern and affect the aquatic invertebrate populations. This issue is discussed in chapter 6, "Aquatic Resources," and chapter 9, "Recreation"; adoption of the California Department of Fish and Game ramping criteria would prevent significant effects on the aquatic community.	Mitigation Measure 6-1: Ensure that Adequate Fish Passage Conditions Exist in the Temporary Diversion Channel and Main Channel during Construction. Mitigation Measure 6-2: Prepare and Implement a Monitoring and Evaluation Program to Ensure Long-Term Fish Protection. Mitigation Measure 6-3: Maintain a Minimum Flow of 150 cfs in the Operation Area at All Times during Project Operation. Mitigation Measure 6-5: Limit the Magnitude and Rate of Flow Fluctuations that are under Control of the Operator
Pesticides	—	—	Construction would not require the use of pesticides.	Operation of the project would not result in the discharge or cause a discharge of pesticides to the Truckee River.	None needed.
pH	✔	—	Construction activities in the river or on the floodplain may be a source of oil and grease, concrete, and other chemical pollution that could affect pH.	Operation of the project would not result in the discharge or cause a discharge of materials that would alter the pH of the water in the Truckee River.	The potential for construction-related activities to cause adverse water quality impacts would be minimized through the preparation and implementation of a SWPPP and a hazardous spill prevention and recovery program.
Radioactivity	—	—	Construction would not require the use of radionuclides.	Operation of the project would not result in the discharge or cause a discharge of radionuclides to the Truckee River.	None needed.

Table 4-1. Continued

Objective	Potential Project Effects		Effect of Project Construction	Effect of Project Operation	Mitigation or Minimizing Technique
	Cons.	Op.			
Sediment	✔	—	Soil materials disturbed during construction could be eroded and transport sediment to the river.	Operation of the project would not cause bed or bank scour and may help to stabilize the river banks, reducing the discharge of materials that may cause elevated suspended sediment loads.	The potential for construction-related activities to cause adverse water quality impacts would be minimized through the preparation and implementation of a SWPPP and a hazardous spill prevention and recovery program.
Settable Materials	✔	—	Soil materials disturbed during construction could be eroded and transport settable materials to the river.	Operation of the project would not cause bank scour and may help to stabilize the riverbanks, reducing discharge of settable materials to the Truckee River.	The potential for construction-related activities to cause adverse water quality impacts would be minimized through the preparation and implementation of a SWPPP and a hazardous spill prevention and recovery program.
Suspended Materials	✔	—	Soil materials disturbed during construction could be eroded and transport suspended materials to the river.	Operation of the project would not cause bed or bank scour and may help to stabilize the river banks, reducing discharge of materials that may increase turbidity and concentrations of suspended materials.	The potential for construction-related activities to cause adverse water quality impacts would be minimized through the preparation and implementation of a SWPPP and a hazardous spill prevention and recovery program.
Taste and Odor	✔	—	Soil materials disturbed during construction could be eroded and transport materials to the river that could impart a taste or odor to the water.	Operation of the project would not result in the discharge or cause a discharge of materials that would alter the taste or odor of the water in the Truckee River.	The potential for construction-related activities to cause adverse water quality impacts would be minimized through the preparation and implementation of a SWPPP and a hazardous spill prevention and recovery program.
Temperature	—	✔	Construction of the project would not alter water temperatures.	Operation of the project would not alter the temperature of the Truckee River. An extensive evaluation of water temperatures is presented in Impact 4-4.	Mitigation Measure 6-4: Verify Water Temperature Effects of Project and Implement Mitigation Measures if Warranted.

Table 4-1. Continued

Objective	Potential Project Effects: Cons.	Potential Project Effects: Op.	Effect of Project Construction	Effect of Project Operation	Mitigation or Minimizing Technique
Toxicity	✔	—	A leak or spill from a chemical toilet could release human wastes and chemicals to the floodplain or the river. Construction activities in the river or on the floodplain may be a source of oil, grease, or other toxic chemical pollution.	Operation of the project would not result in the discharge or cause a discharge of toxic materials to the Truckee River.	The potential for construction-related activities to cause adverse water quality impacts would be minimized through the preparation and implementation of a SWPPP; a hazardous spill prevention and recovery program; and Mitigation Measure 4-1: Locate Construction Equipment and Supplies Outside the 100-Year Floodplain.
Turbidity	✔	—	Soil materials disturbed during construction could be eroded and transport materials to the river that could increase the turbidity of the water.	Operation of the project would not cause bed or bank scour and may help to stabilize the riverbanks, reducing the discharge of materials that may increase turbidity.	The potential for construction-related activities to cause adverse water quality impacts would be minimized through the preparation and implementation of a SWPPP.
The Basin Plan also has the following narrative objectives that apply specifically to the Truckee River					
Algal Growth Potential	NA	NA	Not applicable to this reach of the river.	Not applicable to this reach of the river.	None needed.
Biostimulatory Substances	NA	NA	Not applicable to this reach of the river.	Not applicable to this reach of the river.	None needed.
Color	✔	—	Soil materials disturbed during construction could be eroded and transport sediment to the river that could alter the color of the water.	Operation of the project would not result in the discharge or cause a discharge of materials that would alter the color of the water in the Truckee River.	The potential for construction-related activities to cause adverse water quality impacts would be minimized through the preparation and implementation of a SWPPP.
Dissolved Oxygen	✔	✔	A leak or spill from a chemical toilet could release human wastes and chemicals to the floodplain or the river. In addition, any soil materials disturbed during construction could be eroded and transport nutrients to the river. These constituents may increase the COD and depress the DO concentration.	Operation of the project would not result in the discharge or cause a discharge of materials that would depress the DO of the water in the Truckee River. Possible temperature effects that could alter the DO concentration were evaluated in detail and found to be less than significant. (Impact 4-4)	The potential for construction-related activities to cause adverse water quality impacts would be minimized through the preparation and implementation of a SWPPP.

Table 4-1. Continued

Objective	Potential Project Effects		Effect of Project Construction	Effect of Project Operation	Mitigation or Minimizing Technique
	Cons.	Op.			
pH	✔	—	Construction activities in the river or on the floodplain may be a source of oil and grease, concrete, and other chemical pollution that could affect pH.	Operation of the project would not result in the discharge or cause a discharge of materials that would alter the pH of the water in the Truckee River.	The potential for construction-related activities to cause adverse water quality impacts would be minimized through the preparation and implementation of a SWPPP.
Species Composition	NA	NA	Not applicable to the project reach of the river.	Not applicable to the project reach of the river.	None needed.
Taste and Odor	✔	—	Soil materials disturbed during construction could be eroded and transport materials to the river that could impart a taste or odor to the water.	Operation of the project would not result in the discharge or cause a discharge of materials that would alter the taste or odor of the water in the Truckee River.	The potential for construction-related activities to cause adverse water quality impacts would be minimized through the preparation and implementation of a SWPPP.
Turbidity	✔	—	Soil materials disturbed during construction could be eroded and transport materials to the river that could increase the turbidity of the water.	Operation of the project would not cause bed or bank scour and may help to stabilize the river banks, reducing the discharge of materials that may increase the turbidity of the Truckee River.	The potential for construction-related activities to cause adverse water quality impacts would be minimized through the preparation and implementation of a SWPPP.
Beneficial Uses Identified in the Basin Plan for the Truckee River.					
Municipal and Domestic Supply (MUN)	—	—	Construction of the project would not interrupt the flow of water to downstream users.	Operation of the project has no consumptive use that would decrease water available for other uses.	None needed.
Agricultural Supply (AGR)	—	—	Construction of the project would not interrupt the flow of water to downstream users.	Operation of the project has no consumptive use that would decrease water available for other uses.	None needed.
Industrial Service Supply (IND)	—	—	Construction of the project would not interrupt the flow of water to downstream users.	Operation of the project has no consumptive use that would decrease water available for other uses.	None needed.

Table 4-1. Continued

Objective	Potential Project Effects: Cons.	Potential Project Effects: Op.	Effect of Project Construction	Effect of Project Operation	Mitigation or Minimizing Technique
Groundwater Recharge (GWR)	—	—	Construction of the project would not interrupt the flow of water to downstream uses.	Operation of the project has no consumptive use that would decrease water available for other uses.	None needed.
Freshwater Replenishment (FRSH)	—	—	Construction of the project would not interrupt the flow of water to downstream uses.	Operation of the project has no consumptive use that would decrease water available for other uses.	None needed.
Hydropower Generation (POW)	—	✔	Construction of the project would not interrupt the flow of water to downstream uses.	Operation of the project would allow realization of the identified beneficial use.	Beneficial effect. No mitigation needed.
Water Contact Recreation (REC-1)	✔	✔	Construction of the project may temporarily be a barrier to navigation. See chapter 9, "Recreation."	Operation of the project would reduce instream flows, thus reducing the opportunities for water contact recreation in the affected reach of the river. See chapter 9, "Recreation."	Mitigation Measure 9-1: Implement Appropriate Measures to Ensure Public Safety during Project Construction. Mitigation Measure 9-2: Maintain 2 Weeks per Month of Recreational Flows from April to September, When Available.
Noncontact Water Recreation (REC-2)	—	—	Construction of the project would not inhibit noncontact recreation.	Operation of the project would not inhibit noncontact recreation.	None needed.
Commercial and Sport Fishing (COMM)	—	✔	Construction would not substantially affect the fishery.	Operation of the project would cause substantial dewatering of the affected reach of the river, reducing the available habitat for fishes. See chapter 6, "Aquatic Resources."	Mitigation Measure 6-1: Ensure that Adequate Fish Passage Conditions Exist in the Temporary Diversion Channel and Main Channel during Construction. Mitigation Measure 6-2: Prepare and Implement a Monitoring and Evaluation Program to Ensure Long-Term Fish Protection. Mitigation Measure 6-3: Maintain a Minimum Flow of 150 cfs in the Operation Area at All Times during Project Operation.

Table 4-1. Continued

Objective	Potential Project Effects		Effect of Project Construction	Effect of Project Operation	Mitigation or Minimizing Technique
	Cons.	Op.			
Cold Freshwater Habitat (COLD)	✔	✔	Construction would not substantially affect the quantity of available habitat. See chapter 6, "Aquatic Resources."	Operation of the project would cause substantial dewatering of the affected reach of the river, reducing the available habitat. See chapter 6, "Aquatic Resources."	Mitigation Measure 4-2: Limit Flume Diverisons During Low-Flow Periods Mitigation Measure 6-3: Maintain a Minimum Flow of 150 cfs in the Operation Area at All Times during Project Operation. Mitigation Measure 6-4: Verify Water Temperature Effects of Project and Implement Mitigation Measures if Warranted.
Wildlife Habitat (WILD)	—	—	Construction would not substantially affect the quantity of available wildlife habitat.	Operation of the project would not substantially affect the quantity of available wildlife habitat.	None needed.
Rare, Threatened, or Endangered Species (RARE)	—	—	Construction would not substantially affect the quantity of available habitat.	Operation of the project would not cause substantial loss of habitat for threatened and endangered species.	None needed.
Migration of Aquatic Organisms (MIGR)	✔	—	Construction of the project may temporarily be a barrier to migration. See chapter 6, "Aquatic Resources."	Operation of the project would not affect migration, as the project includes fish passage features. See chapter 6, "Aquatic Resources."	Mitigation Measure 6-1: Ensure that Adequate Fish Passage Conditions Exist in the Temporary Diversion Channel and Main Channel during Construction. Mitigation Measure 6-2: Prepare and Implement a Monitoring and Evaluation Program to Ensure Long-Term Fish Protection.
Spawning, Reproduction, and/or Early Development (SPWN)	✔	✔	Construction would not substantially affect the quantity of available habitat. See chapter 6, "Aquatic Resources."	Operation of the project would cause substantial dewatering of the affected reach of the river, reducing the available habitat for fishes. See chapter 6, "Aquatic Resources."	Mitigation Measure 6-2: Prepare and Implement a Monitoring and Evaluation Program to Ensure Long-Term Fish Protection. Mitigation Measure 6-3: Maintain a Minimum Flow of 150 cfs in the Operation Area at All Times during Project Operation.

Note: ✔ = Potential effect; — = No effect.

- *60-cfs Scenario:* 425 cfs diversion, 60 cfs in the diversion-reach channel, and 400 cfs returning to the river at the Farad Power Plant. (There is a flume loss of 25 cfs.)
- *150-cfs Scenario:* 335 cfs diversion, 150 cfs in the diversion-reach channel, and 310 cfs returning to the river at the Farad Power Plant.
- *485-cfs Scenario:* No diversion.

In these simulations, the temperature of the water flowing through the diversion flume was assumed to remain unchanged. A more complete model description and additional simulation results are provided in a technical memorandum report (Jones & Stokes, 2002.).

The results of these simulations (figure 4-1) show that the effect of the diversion on average water temperature at the downstream end of the diversion reach is minimal. The average water temperature just upstream of the Farad Power Plant was 17.6°C (63.7°F) with the 60-cfs scenario and 17.5°C (63.5°F) with the 485-cfs scenario. The diversion has a larger (but still small) effect on maximum water temperatures, with a 0.6°C increase between the 485-cfs and 60-cfs scenarios. Maximum water temperatures are affected more by the diversion because the reduction in flow causes a reduction in channel depth, which causes an increase in the diurnal temperature range (water temperature fluctuates more in shallow water). Temperatures downstream of the diversion are essentially unaffected by the diversion because the water returning through the Farad power plant restores the temperature to values similar to those expected without the diversion.

Whether a water temperature threshold would be crossed as a result of diversion is dependent on the temperature of the water entering the diversion reach. This temperature is variable and is dependent on the ratio of the coldwater to warmwater sources for the Truckee River and meteorological conditions. Even when water temperature is close to the maximum allowable temperature for streams designated as cold in the Basin Plan, 19°C (66°F), the diversion is unlikely to cause average temperatures to exceed 19°C because the expected increase in average temperature of 0.1°C is so small.

Based on simulated temperature increases, the potential temperature effects in the diversion reach would not violate any water quality standards or alter surface water quality to the point where it affects beneficial uses, and are therefore considered ***less than significant***. However, because model assumptions about channel dimensions at low flows and possible warming of the diverted water could not be tested against measured temperatures, water temperatures should be monitored during the first summer of diversion operation to verify that the simulated small temperature effects are correct.

Implementation of a verification program, and implementing corrective measures as necessary, would ensure that this impact is less than significant. The program and measures are described in chapter 6 under Mitigation Measure 6-4.

Mitigation Measure 6-4: Verify water temperature effects of the project and implement mitigation measures if warranted

This mitigation measure is described in chapter 6, "Aquatic Resources."

Impact 4-4: Transportation Losses Adversely Affecting Beneficial Uses

Replacement of the Farad Diversion Dam would result in up to 25 cfs of water being removed from the river and used to convey water to generate power and maintain the flume in a wet condition. The project applicant refers to these as "transportation losses," as water leaks or splashes from the flume while being conveyed to the power plant and these waters are not used to generate power. The leaking water ultimately evaporates, percolates, or returns to the Truckee River, downstream, at reduced volumes. During high flows these losses are negligible with respect to overall river volume. During critical water years with very low flows, these losses could be a substantial portion of the instream water. However, as power generation is reduced, the transportation losses are reduced; ultimately, when the turbines are to be shut down for an extended period of time, only 5 to 7 cfs are needed to maintain the flume in wet condition.

Transportation losses may adversely affect beneficial uses (i.e., Cold Freshwater Habitat) of the river because this water reduces the in-stream flow needed for aquatic resources. Because this effect would result in an impact to beneficial uses during low-flow periods, this impact is considered ***significant.***

Implementation of the following mitigation measure would reduce this impact to a less-than-significant level.

Mitigation Measure 4-2: Limit flume diversions during low-flow periods

At flows below 150 cfs, the project applicant will not divert more than 5-7 cfs, to keep the flume wet or will implement other measures to ensure water is not wasted or used unreasonably, thus protecting the beneficial uses identified in the Basin Plan. Other possible measures include sealing leaks in the flume with nontoxic sealant or lining the flume with high-density polyethelene (HDPE) plastic. Sealing the leaks or lining the flume would result in the loss of approximately 0.5 acre of wetland vegetation that is currently created by keeping the flume wet.