IDYLWILDE HYROELECTRIC PROJECT

FEDERAL ENERGY REGULATORY COMMISSION

PROJECT NO. P-2829

PRE-APPLICATION DOCUMENT

Submitted by

LOVELAND WATER AND POWER
CITY OF LOVELAND, COLORADO
FEBRUARY 7, 2011

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Ralph Mullinix, Director

Steve Adams, Manager, Water Utilities

Bruno Lopez, Superintendent, Technical Services

Larry Howard, Senior Civil Engineer/Water Resources

Technical and Environmental Contractors:

Water Consult, Loveland, Colorado

ERO Resources Corporation, Denver, Colorado

Miller Ecological Consultants, Inc., Fort Collins, Colorado

IDYLWILDE HYDROELECTRIC PROJECT
FERC LICENSE P-2829
PRELIMINARY APPLICATION DOCUMENT

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1.0 Introduction

The City of Loveland (City) filed a request on February 7, 2011 for use of the Traditional License Process (TLP), Notice of Intent (NOI) and this Pre-application document (PAD) with the Federal Energy Regulatory Commission in order to obtain a new license for the existing 900 kilowatt Idylwilde Hydroelectric Project (FERC Project No. P-2829). The current license for the Idylwilde Project expires on March 8, 2016. Extension of the FERC license is subject to FERC regulations and compliance with the National Environmental Policy Act (NEPA). The result is a license renewal for a period of 30 years.

The Idylwilde Hydroelectric Project (Project) is located on the Big Thompson River along U.S. Hwy. 34 some fourteen miles west of the City of Loveland, Colorado, the licensee (Figure 1-1). (All figures referenced in this document are found in Section 5.0 Figures.) Planning for the Project began in 1912, leading to completion of the dam on U.S. Forest Service property in 1917. The hydroelectric plant was then completed on municipally owned property, allowing generation and distribution of energy from the project to begin on February 11, 1925. Operation by the licensee continues to the present day, having only been interrupted following destruction of the original dam and hydroelectric plant in the Big Thompson River Flood on July 31, 1976. The facilities were replaced and became fully operational in 1981. The location of project features, including the dam, penstock, and hydroelectric plant is shown on Figure 1-2.

Idylwilde Dam and sections of the penstock are located on National Forest land. The City has been granted an easement by the U.S. Forest Service for use of that land. The term of the easement is coincidental with the term of the current FERC license and expires on March 8, 2016. The Forest Service proposes to issue a special use permit in lieu of an easement upon expiration of the current easement. The Forest Service is cooperating with FERC regarding evaluation of impacts of relicensing and project operations and development of information needed to issue the special use permit, including compliance with the National Environmental Policy Act (NEPA).

Public notice of the filing was published in local and statewide newspapers. Copies of the TLP request and NOI were mailed to a broad list of interested parties. Comments were requested on the TLP request. All documents filed with FERC and related materials are available on the City website at http://www.ci.loveland.co.us/wp/power/Idylwilde_Hydro/Idylwilde_Hydro.htm. In addition, materials submitted to FERC, including public comments received on the relicensing process, can be obtained at http://www.ferc.gov.

Questions regarding the Project can be directed to Loveland Water and Power, City of Loveland, 200 N. Wilson Avenue, Loveland, CO, 80537, (970-962-3703).

2.0 Project Description, Related Permits, and Relicensing Plan

This section provides a description of the Idylwilde Hydroelectric Project, related permits that must be obtained, and the general plan and process for obtaining the renewed FERC license.

2.1 Project Description

The Idylwilde Hydroelectric Project (FERC Project No. P-2829) is located in Larimer County, Colorado on the Big Thompson River along U.S. Hwy. 34 approximately fourteen miles west of the City of Loveland, Colorado and fourteen miles east of the Town of Estes Park, Colorado (Figure 1-1). The project has a rated generating capacity of 900 kilowatts (kW).

Planning for the municipal project began in 1912, leading to completion of the dam on U.S. Forest Service property in 1917. The hydroelectric plant was then constructed on municipally owned property, now Viestenz-Smith Mountain Park, allowing generation and distribution of energy from the project to begin on February 11, 1925. Operation by the City continues to the present day, having only been interrupted by destruction of the original dam and hydroelectric plant in the Big Thompson River Flood on July 31, 1976. The facilities were replaced and became fully operational in 1981.

2.1.1 Existing FERC License

FERC issued the existing license for the Idylwilde Project on June 30, 1978 when the project had to be rebuilt due to the Big Thompson Flood. All terms and conditions of the existing license have been complied with in the reconstruction of the dam and subsequent operations. The existing license is available on the City of Loveland website.

2.1.2 Idylwilde Dam, Penstock and Reservoir

The dam is of concrete gravity construction (cover photo), built across the river with a structural height of 50.5 feet, an effective height of 24 feet above the stream bed, and a total length of 239.1 feet, creating a forebay reservoir with a surface area of 3.67 acres at spillway elevation, impounding some 45 acre-feet of water. The 36” diameter penstock, 9,534 feet in length, originates at the dam and delivers water to two 450 kilowatt turbine-generator units located in Loveland’s Viestenz-Smith Park. Two taps along the penstock provide access to water for fire protection, and 15 irrigation services are tapped into the line. The power generated is connected to the licensee’s distribution system through a 22kV transmission line 1,153 feet in length.

Idylwilde reservoir provides year around access for public fishing, with parking and vault toilets provided. Viestenz-Smith Park provides popular public facilities for recreation including picnicking and hiking, and for family gatherings, reunions and weddings. Domestic water and vault toilets are provided. A trailhead area adjacent to Viestenz-Smith Park is provided with vault toilets and parking for users of the five mile Round Mountain Trail maintained jointly by the licensee and U.S. Forest Service, and a separate nature trail approximately a mile in length, connecting to a

scenic overlook building constructed by the CCC (Civilian Conservation Corps) in the 1930's (Figure 1-2).

Details are provided below on the basic project components, with information taken from the as-built drawings in the files, when applicable. Elevations shown are relative to mean sea level (msl).

(1) Concrete gravity dam, total length 239.1', structural height 50.5' (El. 6033.5 – 5983.0') with about 24' to the spillway crest above the stream bed invert. The total length includes:

a. 99' non-overflow section with a crest elevation at 6,033.5' msl
b. 110' concrete ogee overflow spillway section with crest elevation 6017.0' msl
c. 30.1' non-overflow concrete inlet section with crest elevation 6,028.0' msl
d. 100-year flood flow elevation at 6,025.6' msl over the structure.

(2) 3.67-acre reservoir surface area at spillway elevation 6,017.0' msl, with approximately 45 acre-feet of total storage capacity, including approximately 10 acre-feet of active forebay capacity in the top 3' feet of the impoundment typically used for low flow generation (El. 6017.0' – 6014.0').

(3) Two cast iron slide gates to control operating releases from the reservoir:

a. 72" wide by 48" high bypass/sluice gate, with invert elevation 5,998' msl.
b. 36" x 36" intake for penstock leading to the powerhouse, centerline intake elevation 6,011.0' msl.

(4) 12" diameter outlet and pipeline for delivery of the current 7.0 cfs total minimum bypass flows (including 3.0 cfs as is required in existing FERC license P-2829). This pipeline was added pursuant to a June 9, 1994 Memorandum of Agreement between the licensee and the Colorado Division of Wildlife. Centerline intake elevation at the upstream face of the dam for the bypass is 6,012.33' msl.

(5) 8" pipeline for 3.0 cfs minimum bypass flows, in operating condition but currently kept closed, as the total bypass flow is carried in the 12" bypass outlet described above. Centerline intake elevation on the face of the dam is 6,012.33' msl, the same elevation as the 12" diameter pipeline now used to carry the entire 7.0 cfs minimum flow.

(6) Penstock of 9,534' length, 36" in diameter, constructed of 300' of concrete pipe and 9,234' of steel pipe. The penstock delivers water vertically 335.5' (El. 6033.5' – 5698.0') to elevation 5,698.0' msl, the centerline of the turbines. Seven hundred feet of the pipe immediately upstream of the power house is sleeved with 30" HDPE pipe. Along private property portions of the penstock 15 irrigation taps are located. Two fire protection taps also are located on the line. One is in the private property crossed by the line to provide fire protection to surrounding forest and structures, and one is located at the Round Mountain trailhead above Viestenz-Smith Park.

(7) 30’ x 26.5’ powerhouse, with 15’ visible above grade, located in Viestenz-Smith Park, owned by the licensee.

(8) Two 450-kilowatt (kW) turbine-generator units with a total installed capacity of 900 kW.

(9) 300-foot-long concrete tail race pipeline, 48 inches in diameter, discharging into a pond in Viestenz-Smith Park.

(10) 1,153-foot-long 22kV transmission line to feed power to the city’s electric distribution system.

(11) Appurtenant facilities

2.1.3 Current Operations

Currently, the project is operated year around primarily in ‘run of the river’ mode (Miller Ecological Consultants, 2010). When flows in the river are adequate for full diversion of power and bypass flows, the remaining water flows over the crest of the spillway. This is the normal flow pattern except during winter low flows. A minimum bypass flow of seven cubic feet per second is maintained through the dam to provide suitable aquatic habitat in the stream reach below. Up to 30 cubic feet per second (cfs) for power generation is diverted. The licensee has an existing diversion right for up to 74 cfs. During low flow periods, operation remains ‘run of the river’ except for the bypass flows.

For significant portions of the year, flows in the Big Thompson River are lower than necessary for full capacity generation. An annual generation of about 2.8 million kWh is experienced. This saves the equivalent of approximately 1,600 barrels of oil, 449 tons of coal, or 9.1 million cubic feet of natural gas each year. The estimated gross financial benefit to the City of power generation is approximately $98,000 per year (Howard, personal communication, 2011). The net financial benefit to the City is less after considering operating costs, which have not been estimated.

2.2 Related Permits

Relicensing of the Idylwilde Project will require obtaining a special use permit from the U.S. Forest Service and a water quality certification from the Water Quality Control Division, Colorado Department of Public Health and Environment.

2.2.1 U.S. Forest Service Special Use Permit

The Idylwilde Hydropower Facility is licensed by the Federal Energy Regulatory Commission (FERC Project P-2829, June 30, 1978) through March 8, 2016. The dam and sections of the penstock are on National Forest land. The City currently holds an easement from the U.S. Forest Service which expires on March 8, 2016.

U.S. Forest Service (USFS) will replace the existing easement for use of National Forest lands with either a new easement or a special use permit (U.S. Forest Service, 2010). Extension of the FERC license is subject to FERC regulations and compliance with the National Environmental Policy Act (NEPA). Issuance of the special use permit or easement for a 30 year concurrent period with the FERC license also requires compliance with NEPA. The Forest Service has agreed that compliance with NEPA for the FERC license will provide concurrent NEPA compliance for issuance of the Forest Service special use permit. USFS will be a cooperating agency in development of the EA by FERC, and will be involved in agency work group meetings.

2.2.2 State of Colorado Water Quality Certification

The Water Quality Control Division (Division) is authorized to certify, conditionally certify, or deny certification of federal licenses and permits in accordance with Section 401 of the Federal Clean Water Act (Colorado Department of Public Health and Environment 2003). This regulation applies to certification of Federal Energy Regulatory Commission licenses for hydropower projects. In reviewing the impacts of the project, the Division considers the impact of the project on water quality and achievement of water quality standards. If the project is adversely affecting water quality, the Division may specify measures to be taken by the project operator to ensure compliance with water quality standards.

2.3 Relicensing Plan and Process

This study plan identifies the process and schedule through 2013 resulting in issuance of the FERC license and USFS Special Use Permit. The process is described below:

PHASE/ACTIVITIES	RESPONSIBILITIES	DATE
Development of preliminary application document (PAD), notice of intent (NOI), and Traditional License Process (TLP)	City/consultants	February 7, 2011
File NOI, PAD, and TLP requests with FERC; make available to public/agencies; solicit comments on TLP within 30 days	City	February 7, 2011
Stakeholder and agency comments on City's Traditional License Process request	Stakeholders/agencies; City submits comments to FERC	March 9, 2011
FERC issues notice of proceeding and TLP	FERC	April 18, 2011

authorization		
Site visit; joint agency/public meeting on PAD	City/consultants	April-May, 2011
Comments on PAD due with study requests	Stakeholders/agencies	July, 2011
Develop final study plans	City/consultants	July through November, 2011
Conduct field studies	City/consultants	Summer, 2012
Develop and submit final draft license application for comment	City/consultants	November, 2012
Comments due on draft license application	Stakeholders/agencies	January, 2013
Develop and file final license application	City/consultants	May, 2013
Prepare EA, request public comments on EA, issue final licensing decision	FERC	March 8, 2016
Special Use Permit issued	USFS	March 8, 2016

2.4 References

Department of Public Health and Environment. 2003. Water Quality Control Commission Regulation No 82 - 401 Certification Regulation; 5 CCR 1002-82. March.

Howard, Larry. 2011. City of Loveland, Loveland Water & Power. January.

Miller Ecological Consultants, Inc. 2010. Technical Memorandum, Preliminary Hydrology for the Idylwilde Dam and Power Plant 2002-2009. Submitted to: Water Consult, Loveland, Colorado, Miller Ecological Consultants, Inc. December 2010.

U.S. Forest Service. 2010. Coordination meeting with City of Loveland staff. March.

3.0 Existing Environment and Resource Impacts

The existing environment in the vicinity of Idylwilde Project is described and impacts to resources are assessed. The following resources are described and assessed in this section.

- Geology and Soils
- Water Resources and Water Quality
- Fish and Aquatic Resources
- Wildlife Resources
- Botanical Resources
- Rare, Threatened, and Endangered Species
- Recreation and Land Use Resources
- Cultural Resources
- Tribal Resources

The need for mitigation measures is evaluated. Agency contacts and references are provided.

3.1 Geology and Soils

3.1.1 Existing Environment

The Project is in the Front Range of the Southern Rocky Mountain physiographic region. The region is characterized by a gently rolling upland block of Proterozoic (older than 542 million years ago (Ma)) crystalline rocks where summits decline gently eastward but canyons are steep, narrow, and deeply incised (Cole and Braddock 2009). The Project area consists of the narrow valley of the Big Thompson River in which the reservoir, dam, portions of the pipeline, and the hydroelectric plant and outfall are located; and steep rocky hillsides vegetated with grasses, ponderosa pine, and Douglas fir through which the majority of the pipeline passes.

3.1.2 Geology

3.1.2.1 Regional Geology

The geology in the Project area consists of Precambrian metamorphic and igneous bedrock (Figure 3.1-1). The majority of the Project area is underlain by metasedimentary rocks, primarily schist, biotite gneiss, and migmatite, which were formed from marine sediments and volcanic materials during regional deformation about 1,750 Ma. Palisade Mountain, adjacent to the north of the reservoir and dam site, is comprised of trondhjemite, an igneous rock that intruded into the metasedimentary bedrock about 1,726 Ma. The metasedimentary rocks underwent further metamorphism during the intrusion of the Boulder Creek Granodiorite to the south about 1,715 Ma (Braddock et al. 1970; Cole and Braddock 2009). Subsequent mountain building events (the latest being the Laramide orogeny, which started in the Late Cretaceous 70

to 80 Ma and ended in the early Tertiary 35 to 55 Ma) have folded, faulted, and upturned the bedrock into a complex landform.

The eastern portion of the pipeline passes through a fault zone of the Thompson Canyon fault, a major northwest-southeast structure that roughly follows the Big Thompson River and North Fork of the Big Thompson River for nearly 25 miles from the mouth of the Big Thompson Canyon to Icefield Pass in Rocky Mountain National Park. The Colorado Geological Survey (CGS) created a database of faults and folds that are known or suspected to have moved during the late Cenozoic (about the last 23.7 million years) (i.e., that cut Miocene or younger rocks). The current tectonic environment of Colorado initiated near the beginning of the Miocene Epoch. According to the CGS database, the Thompson Canyon fault is not listed and, therefore, is not known to have been active during this time period (Kirkham et al. 2004-2007).

3.1.2.2 Geologic Resources

The Project is in a region with limited geologic resources. Because the bedrock is composed of Precambrian metamorphic or igneous rock, there is no potential for oil and gas, coal, or paleontological resources. Metallic minerals, primarily beryl, have been mined in pegmatites to the west of the Project area, but these rock formations do not occur in the Project area. The Big Thompson River valley has only minor sand and gravel deposits; however, the metamorphic and granitic rocks in the area could be used as a source of aggregate for construction materials (Cappa et al. 2001).

3.1.3 Soils

The Project area crosses four soil map units described below and depicted on Figure 3.1-2 (Natural Resources Conservation Service 2010).

- **Map Unit 2703B** – Cypher-Ratake families complex, 5 to 40 percent slopes
- **Map Unit 2717B** – Cypher-Wetmore-Ratake families complex, 5 to 40 percent slopes
- **Map Unit 4703B** – Bullwark-Catamount families-Rock outcrop complex, 40 to 150 percent slopes

These soils are on mountain slopes. The parent materials consist of colluvium (sediment at the bottom of slopes transported by gravity), residuum (weathered bedrock), and/or slope alluvium, all derived from igneous and metamorphic rock. The soils are somewhat excessively drained and have a rapid permeability and a very low available water capacity. The shrink-swell potential for these soils is low. The erodibility of these soils is dependent on slope steepness; however, because these soils are shallow, well–drained, and composed of rock fragments, the potential for mass soil movement is minimized.

- **Map Unit 5101A** – Pachic Argiustolls-Aquic Argiudolls complex, 0 to 15 percent slopes

These soils are on stream terraces or alluvial flats. The parent materials consist of alluvium derived from igneous, metamorphic, and sedimentary rocks and deposited by the Big Thompson River. The soils on stream terraces are well drained, have a moderately high permeability, a

moderate available water capacity, and a low potential for erosion and mass soil movement. The soils on alluvial flats are poorly drained; have a moderately high permeability; have a low available water capacity except during occasional flooding from snowmelt runoff in May, June, and July; and have a moderate potential for erosion and mass soil movement because of their location in the river channel. Both types of soil have a low shrink-swell potential.

3.1.4 Project Area Conditions

The reservoir, dam, and a portion of the pipeline are in the river channel where steep slopes of cobbles, boulders, and bedrock predominate and the potential hazards of rockfall and slope instability are high (Soule et al. 1976). Above the south bank of the reservoir are near-vertical rock outcrops and steep hillsides that show evidence of erosion and landslides. This erosion may have initially been caused by the July 1976 Big Thompson flood and may be exacerbated by significant spring flows during snowmelt runoff. The variation of the reservoir level of 3 to 4 feet during winter operations is not likely to increase erosion of the hillsides. The north shore is lined with rock riprap and boulders likely installed during construction of the parking area above the reservoir. U.S. 34 separates the reservoir and dam from vertical rock outcrops and steep hillsides of unconsolidated rocks and boulders.

The pipeline segment from the dam to about 1 mile downstream, where a residential community is present, runs just below the ground surface along a terrace above the river made up of alluvial deposits of gravel, cobbles, and boulders. To the east of the community, the pipeline climbs up and through the steep hillsides to the south, thereby avoiding areas of rockfall and slope instability in this area. The pipeline crosses six drainages high up above the river on trestles, five of which are metal and one of which is wood, before descending below grade down a steep hillside to the hydroelectric plant and outfall, which are on Quaternary-age alluvial deposits. One area of erosion along the pipeline currently exists west of the residential community where surface flow from a steep drainage is undermining the pipeline. This has been discussed with the Forest Service. Remediation measures are under design (Morin, personal communication, 2011). No other evidence of erosion, mass soil movement, slumping, or other forms of instability is known along the pipeline.

3.1.5 Potential Impacts

3.1.5.1 Direct and Indirect Impacts

Relicensing and continued operation of the existing Project facilities would not affect geologic or soil resources.

3.1.5.2 Cumulative Impacts

The implementation of the Windy Gap Firming Project would slightly increase flows in the river in the Project area during some months (by up to 18 cfs during July) (Bureau of Reclamation 2007) (see Water Resources, section 3.2.1.6). These small increases in flow would not be significant enough to increase erosion, mass soil movement, or other forms of instability in the project area.

3.1.6 Mitigation Measures

No mitigation measures are recommended for geologic or soil resources.

3.1.7 Agencies Contacted

The agencies contacted for this report were City staff.

3.1.8 References

Braddock, W.A., P. Nutalaya, S.J. Gawarecki, and G.C. Curtin. 1970. Geologic map of the Drake quadrangle, Larimer County, Colorado, Geologic Quadrangle Map GQ-829, scale 1:24,000. United States Geological Survey. Denver, CO.

Bureau of Reclamation. 2007. Windy Gap Firming Project Draft Water Resources Technical Report. U.S. Department of the Interior, Bureau of Reclamation, Great Plains Region. December.

Cappa, J.A., N.V. Koenig, and R.E. Garrison. 2001. Evaluation of mineral and mineral fuel potential of Larimer County, state mineral lands administered by the Colorado State Land Board. Colorado Geological Survey. Denver, CO.

Cole, J.C. and W.A. Braddock. 2009. Geologic map of the Estes Park 30' x 60' quadrangle, north-central Colorado: U.S. Geological Survey Scientific Investigations Map 3039, 1 sheet, scale 1:100,000, pamphlet, 56 p. United States Geological Survey. Denver, CO.

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Kirkham, R.M., W.P. Rogers, L. Powell, M.L. Morgan, V. Matthews, and G.R. Pattyn. 2004-2007. Colorado Earthquake Map Server: Colorado Geological Survey Bulletin 52b. Available at: http://geosurvey.state.co.us/Default.aspx?tabid=270.

Morin, Melissa. 2011. Civil Engineer, Loveland Water and Power. Personal communication. February.

Natural Resources Conservation Service. 2010. Soils data mart. Available at: http://soildatamart.nrcs.usda.gov/. Downloaded spatial and tabular data for Arapaho- Roosevelt National Forest Area; Colorado; Parts of Boulder, Clear Creek, Gilpin, Grand, Park and Larimer Counties. Last accessed: November 2010.

Soule, J.M., W.P. Rogers, and D.C. Shelton. 1976. Geologic hazards, geomorphic features, and land-use implications in the area of the 1976 Big Thompson Flood, Larimer County, Colorado. Colorado Geological Survey. Denver, CO.

3.2 Water Resources and Water Quality

3.2.1 Water Resources

3.2.1.1 Water Rights

The Project has a decreed right to divert 74 cfs of water from the Big Thompson River at the NW¼ NW¼ of Section 1, Township 5 North, Range 71 West for the purpose of power generation. The appropriation date of the right is 1913 and the right was adjudicated in 1939 in Case #10077 (Colorado Division of Water Resources and Colorado Water Conservation Board (CDWR and CWCB) 2010). There are many other water rights, rights both junior and senior to the Project, upstream and downstream of the Project in the Big Thompson River basin (CDWR and CWCB 2010). However, these rights do not affect the operation of the Project and the Project, operating in accordance with the priority system, does not affect other water rights.

3.2.1.2 Instream Flow Water Rights

There are three instream flow water rights on the Big Thompson River in the vicinity of the Project, two upstream of the project and one below, all with appropriation dates of November 1989 (Table 3.2-A).

Table 3.2-A. Instream flow water rights in Project area.

Water Right Name	Decreed Amount May 1 – Oct. 31	Decreed Amount Nov. 1 – Apr. 30
Olympus to Drake	40 cfs	15 cfs
Drake to Idylwilde Reservoir	50 cfs	20 cfs
Below power plant to Dille Tunnel	50 cfs	20 cfs

Source: CDWR and CWCB 2010.

There is no instream flow right between the dam and the power plant return flow. A minimum flow is provided in this reach pursuant to an agreement between the City and the Colorado Division of Wildlife. A 1994 Memorandum of Agreement between the City and the Colorado Division of Wildlife, which requires a release of 7 cfs through Idylwilde Dam except during extremely low flow occurrences in the winter, when a release of 3 cfs is required (City of Loveland 1994) (see 3.3 Fish and Aquatic Resources section 3.3.8.2).

3.2.1.3 Bureau of Reclamation Releases to Big Thompson River from Lake Estes

The Colorado-Big Thompson Project (C-BT), the largest transmountain water diversion project in Colorado, commenced full operations in 1957. The C-BT Project provides water from the upper Colorado River basin to the South Platte River basin via the Alva B. Adams Tunnel to Mary's Lake in the upper Big Thompson River watershed. The C-BT Project delivers water to Lake Estes upstream of the Idylwilde Project.

According to the U.S. Bureau of Reclamation's *Standard Operating Procedure for Olympus Dam and Estes Power Plant* (Bureau of Reclamation 2010), minimum flows below Olympus Dam near Estes Park are maintained, with the caveat that the required release is the lower of either the flow listed below, or the actual inflows into Lake Estes:

Date	Minimum Flow (cfs)
November 1 – April 15	25
April 16 – 30	50
May 1 – 15	100
May 16 – 31	125
June 1 – August 15	125
August 16 – 31	100
September 1 – 15	75
September 16 – October 31	50

Flows greater than the minimums may be 'skimmed' by Reclamation at either Olympus Dam for diversion from the Big Thompson River to Pinewood Reservoir through the Polehill Tunnel or diverted at Dille Tunnel downstream of Idylwilde Project near the mouth of the Big Thompson River. The skimmed flows are used for power generation before returning to the river at the canyon mouth (Bureau of Reclamation 2010).

Reclamation's releases from Lake Estes have permanently altered the flow of the Big Thompson River into Idylwilde Reservoir since 1957, when current operations were initiated. The hydrograph of the river, however, is similar to an unregulated Colorado mountain stream with major runoff occurring in the spring and low flows for much of the rest of the year (see the following *Watershed and Streamflows* section). A number of tributaries enter the Big Thompson River between Lake Estes and Idylwilde Reservoir, particularly the North Fork Big Thompson River, contribute average monthly flows ranging from 7 to 120 cfs to the Big Thompson River mainstem (CDWR and CWCB 2010). There are no perennial tributaries between Idylwilde Dam and the tailrace return at Viestenz-Smith Mountain Park 1.6 miles downstream.

3.2.1.4 Big Thompson River Watershed and Streamflows

The drainage area for Idylwilde Reservoir, from the watershed divide to the dam, is 277 square miles. The gradient of the Big Thompson River downstream of Idylwilde Reservoir to the canyon mouth is 0.024. The diversion to the power plant and flows in the bypass reach are not directly gaged. There are stream discharge data for several locations in the Big Thompson River upstream and downstream of Idylwilde Dam.

A hydrology analysis technique was developed to compute inflow to the reservoir, penstock flows diverted to the hydroelectric plant, and bypass flows to the 1.6 mile reach of the Big Thompson between the dam and hydroelectric plant return flows (Miller Ecological Consultants, Inc. 2010). The period of record applied in this analysis for the gaged flows was January 1, 2002 to September 30, 2009. The combined gage data from two locations provides a reasonable estimate of inflow to the reservoir. These gages are:

- USBR Dille Tunnel diversions (State of Colorado – DILTUNCO).
- USGS gage for the Big Thompson River at the mouth of the canyon (06738000).
- Dille Tunnel diversions are added to the flows at the mouth of the canyon to estimate reservoir inflows.

Power generation data from 2002 to 2009 were used to calculate the inflow to the penstock. Bypass flows were calculated by subtracting the penstock flow from the inflow to the reservoir.

Using the same two gaging stations, the monthly minimum, mean, and maximum calculated flows of the river into Idylwilde Reservoir for water years (WY) 1957 to 2009 were calculated (Table 3.2-B).

Table 3.2-B. Monthly flow characteristics of the Big Thompson River to Idylwilde Reservoir, 1957-2009.

Month	Minimum Monthly Daily Flow (cfs)	Mean Monthly Flow (cfs)	Maximum Monthly Daily Flow (cfs)
January	4	23	74
February	4	23	49
March	6	29	252
April	8	77	1,885
May	26	246	2,146
June	42	388	1,975
July	67	276	1,500*
August	41	155	1,650
September	24	94	516
October	13	67	435
November	8	46	415
December	6	30	250

**July, 1976 flood not recorded. Gage was destroyed.*

Data from the two gaging stations were also used to generate a hydrograph of average daily inflows to Idylwilde for water years 1957 through 2009 (Figure 3.2-1). Peak flows typically occur in mid-June and the lowest flows (less than 30 cfs) typically occur from January through March.

Current operations of the Project began in 2006. An analysis of computed inflows to the reservoir and bypass flows (Miller Ecological Consultants, Inc. 2010) was developed to provide average monthly reservoir inflow and bypass flows and flow duration curves for present operations (2006-2009). Average monthly reservoir flows for 2006-2009 are provided in Figure 3.2-2 and average monthly bypass flows are provided in Figure 3.2-3. Using the same data, flow duration curves were completed for the period of 2006-2009 for the reservoir inflow (Figure 3.2-4) and bypass flows (Figure 3.2-5).

On July 31, 1976, a large stationary thunderstorm released as much as 7.5 inches of rain in about one hour (and a total of about 12 inches in a few hours) in the Big Thompson River Canyon, downstream of Olympus Dam and southeast of Estes Park. The peak discharge in the Big Thompson River at the canyon mouth was estimated to be 31,200 cfs, which was far greater than the estimated 100-year flood or any other flood of record. The depth of the river increased from a few feet to nearly 20 feet (Jarrett and Costa 2006). The high water resulted in severe channel erosion and destruction of many constructed features along the Big Thompson River, including the Idylwilde Dam and hydroelectric plant. The dam and hydroelectric plant were subsequently rebuilt and returned to full service by 1981.

3.2.1.5 Direct and Indirect Impacts

Because reservoir operations will not change, there would be no effect on water storage in Idylwilde Reservoir, the existing flows of the Big Thompson River, or water rights below the reservoir.

3.2.1.6 Cumulative Impacts

The only reasonably foreseeable action is implementation of the Windy Gap Firming Project, which would slightly increase flows in the river in the Project area during some months (Table 3.2-C) in average flow years or wet years (Bureau of Reclamation 2007). This would be at most a 9 percent increase in the average monthly flow of the river. In April of a wet year, there would be an estimated flow decrease of 1 cfs (a 1 percent decrease), but flows would not decrease during any other month or in April of an average flow year. Flows during a dry year would not change. The increased flow would be brought through the Adams Tunnel to the Big Thompson River.

Table 3.2-C. Maximum possible monthly streamflow increase in Big Thompson River below Lake Estes due to Windy Gap Firming Project during an average or wet year.

Month	Predicted Monthly Flow Increase (cfs)
November – March	0
April	1
May	15
June	19
July	18
August	3
September – October	1

3.2.1.7 Mitigation Measures

Because the Project would not alter existing streamflows, water storage in Idylwilde Reservoir, or water rights on the Big Thompson River, no mitigation measures are recommended.

3.2.1.8 Agencies Contacted

The agencies contacted for this report were:

U.S. Geological Survey

U.S. Bureau of Reclamation
Ron Thomasson, Reclamation Eastern Colorado Area Office
11056 W. County Rd. 18E
Loveland, CO 80537-9711
970-667-4410
RThomasson@usbr.gov)

City of Loveland

Colorado Division of Water Resources

Colorado Water Conservation Board

3.2.1.9 References

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Colorado Division of Water Resources and Colorado Water Conservation Board (CDWR and CWCB). 2010. Streamflow, diversions and water rights information. Available at: http://cdss.state.co.us/DNN/default.aspx.

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3.2.2 Water Quality

3.2.2.1 Surface Water Quality Standards, Regulations, and Classifications

The Colorado Water Quality Control Commission (WQCC) has adopted water use classifications for streams, lakes, and reservoirs that identify the uses to be protected and adopted numerical standards for specific pollutants to protect those uses (Colorado Department of Public Health and Environment (CDPHE) 2010a). The Big Thompson River from the boundary of Rocky Mountain National Park to the Home Supply Canal diversion downstream of the canyon mouth (listed as Segment 2 of the Big Thompson River basin by the WQCC), as well as Idylwilde Reservoir (included in Segment 16 of the Big Thompson River basin, all lakes and reservoirs tributary to the Big Thompson River from the boundary of Rocky Mountain National Park to the Home Supply Canal diversion), are classified for the following uses:

- Aquatic Life Cold 1 (currently capable of sustaining a wide variety of cold water biota, including sensitive species, due to physical habitat, flows, or water quality conditions).
- Recreation Class E (surface waters used for primary contact recreation where the ingestion of small quantities of water is likely to occur, such as swimming and boating).
- Agriculture (suitable or intended to become suitable for irrigation of crops and not hazardous for livestock drinking water).
- Water supply (suitable or intended to become suitable for potable water supplies after receiving standard treatment).

The Big Thompson River in the Project area and Idylwilde Reservoir must be maintained and protected at their existing water quality unless it is determined by the WQCC that allowing lower water quality is necessary to accommodate important economic or social development in the area. No degradation is allowed unless deemed appropriate following an antidegradation review. Antidegradation review applies to the review of regulated activities with new or increased water quality impacts that may degrade water quality. Regulated activities mean any activities requiring a discharge permit or water quality certification under federal or state law.

Numeric standards for the Big Thompson River and Idylwilde Reservoir are provided in Table 3.2-D. There is no standard for phosphorus; however, the U.S. Environmental Protection Agency (EPA)-recommended concentration for streams is 0.1 mg/L (EPA 1986). For lakes or reservoirs, the recommended total phosphorus concentration to prevent or control eutrophication is 0.025 mg/L (EPA 1986). Eutrophication is an increase in the biological productivity of a lake or reservoir due to increased nutrient concentrations (generally nitrogen and phosphorus), which can result in a decrease in water clarity, reduced dissolved oxygen concentrations, degraded water quality, odors, and a decrease in fish and other aquatic life populations.

Table 3.2-D. Numeric water quality standards for Big Thompson River from boundary of Rocky Mountain National Park to Home Supply Canal diversion and Idylwilde Reservoir.

Parameter	Standard	Parameter	Standard
Physical and Biological		**Metals[1] (µg/L)**	
Dissolved oxygen (mg/L)	6.0	Aluminum (total, acute/chronic)	403.5/57.6
Dissolved oxygen, spawning (mg/L)	7.0	Arsenic (acute/chronic/water supply/agriculture)	340/150/0.02/100
pH (s.u.)	6.5-9.0	Cadmium (acute/chronic/water supply/agriculture)	0.31/0.13/5/10
Temperature[2] (maximum weekly average temperature, °C, Apr-Oct/Nov-Mar)	18.2/9.0	Chromium III (acute/chronic/water supply/agriculture	158.7/20.6/50/100
Temperature[2] (daily maximum, °C, Apr-Oct/Nov-Mar)	23.8/13.0	Chromium VI (acute/chronic/ water supply/agriculture)	16/11/50/100
E. coli (#/100 mL)	126	Copper (acute/chronic/water supply/agriculture)	3.1/2.4/1,000/200
Inorganic (mg/L)		Iron (chronic, total/water supply, diss)	1,000/300
Total ammonia[3] (acute/chronic)	6.77/2.8	Lead (acute/chronic/water supply/agriculture)	11.4/0.44/50/100
Chlorine (acute)	0.019	Manganese (acute/chronic/water supply/agriculture)	1,775/981/50/200
Chlorine (chronic)	0.011	Mercury (chronic/water supply)	0.01/2
Cyanide	0.005	Nickel (acute/chronic/water supply/agriculture)	125/14/100/200
Sulfide as H_2S	0.002	Selenium[4] (acute/chronic/water supply/agriculture)	18.4/4.6/50/20
Boron	0.75	Silver (acute/chronic/water supply)	0.14/0.005/100
Nitrite	0.05	Zinc (acute/chronic/water supply/agriculture)	38.7/29.3/5,000/2,000
Nitrate	10		
Chloride	250		
Sulfate	250		

[1] Most aquatic life dissolved metals standards are hardness dependent; values provided in Table 1 assume a hardness of 21 mg/L for the Big Thompson River. Acute and chronic dissolved standards are for aquatic life. Water supply and agricultural standards are for total recoverable metals. Exceptions are aluminum, which has total recoverable standards for aquatic life; iron, which has a chronic total recoverable standard for aquatic life and a dissolved standard for water supply; manganese, which has a dissolved standard for water supply; and mercury, which has a chronic total standard for aquatic life.

[2] The maximum weekly average temperature (MWAT) chronic standard is defined by the WQCC as the largest mathematical mean of multiple, evenly spaced daily temperatures over a 7-day consecutive period, with a minimum of three data points spaced evenly throughout the day. The daily maximum (DM) acute temperature standard is defined by the WQCC as the highest 2-hour average water temperature recorded during a given 24-hour period. Temperature standards are Tier CS-II based on fish species present.
[3] The aquatic life acute ammonia standard is pH and temperature dependent; an average pH of 7.9 was used and an average stream temperature of 8.5°C was used for the Big Thompson River. Ammonia standards are lower when stream temperature and/or pH is higher.
[4] Selenium is a bioaccumulative metal, subject to a range of toxicity values depending on numerous site-specific variables.
Sources: CDPHE 2010a, CDPHE 2010c.

3.2.2.2 Surface Water Quality

Water quality data were compiled from the U.S. Geological Survey (EarthInfo 2008), Colorado Water Quality Control Division (Hillegas, pers. comm. 2010), and the Big Thompson Watershed Forum (Shelley, pers. comm. 2010). The City and other organizations in the region participate in and financially support the water quality data collection program of the Big Thompson Watershed Forum. No water quality data have been collected from Idylwilde Reservoir. However, water quality data have been collected in the Big Thompson River about 1.5 miles above the reservoir (USGS site 402554105202100, Big Thompson River above North Fork Big Thompson at Drake, Colorado) and about 3.6 miles below the dam (USGS site 06736700, Big Thompson River above Dille Tunnel near Drake, Colorado). The two sites have very similar water quality. The river is generally of excellent quality at both locations. Data collected from 2000 to 2009 show some water quality standard exceedances (Table 3.2-E). The following standard exceedances occurred during the 2000 to 2009 period:

- pH slightly exceeded the standard (up to 9.2) in 2006 and 2007, once at the upstream location and three times at the downstream location during low-flow periods.
- *E. coli* counts exceeded the standard (as high as 600/100 mL) in 2004, 2005, and 2006; four times during June or July at the upstream location; and five times in July or September at the downstream location.
- Dissolved arsenic concentrations always exceed the total arsenic standard of 0.02 µg/L; the average dissolved arsenic concentration from 2000 to 2009 was 0.17 µg/L.
- Dissolved copper concentrations (as high as 5 µg/L) exceeded the acute aquatic standard twice at the upper location in June 2005 and October 2006, and once at the lower location in October 2006; and exceeded the chronic standard in 2005, 2006, 2007, and 2010 eight times at the upstream location and eight times at the downstream location.
- Dissolved lead concentrations (as high as 1.27 µg/L) exceeded the chronic aquatic standard twice in 2007 at the upstream location and once in 2007 at the downstream location.
- Dissolved silver concentrations exceeded the acute and chronic aquatic standards in 2004 five times from June through August at both locations (concentration was 0.2 µg/L during all of these sampling events).
- The daily maximum temperature standard of 23.8ºC for April through October was never exceeded, but it is not possible to determine if the MWAT standard of 18.2ºC for April through October was exceeded because temperatures were not measured more than once

- or twice per month. Single measured temperatures exceeded 18.2ºC in July 2001, 2002, and 2006; and August of 2002, 2003, and 2006 at one or both locations.

Whether chronic standards were actually exceeded for dissolved copper, lead, and silver is unknown because the samples were collected monthly and the elevated concentrations may not have been an ongoing chronic problem; however, the standards (CDPHE 2010c) state that both acute and chronic standards are not to be exceeded more than once every three years on average.

The nonattainment of water quality standards is reported every two years in the State of Colorado's 303(d) list (CDPHE 2010b). Stream segments, lakes, or reservoirs on the 303(d) list are considered impaired for one or more water quality parameters and a Total Maximum Daily Load (TMDL) is required to resolve the impairment. A TMDL is defined as a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources (EPA 2010). If an impairment is suspected and the data are not sufficient to draw a conclusion, the water segment is placed on the Monitoring and Evaluation (M&E) list. Segment 2 of the Big Thompson River is included in the state's 2010 303(d) list for copper, cadmium, zinc, and temperature; and on the M&E list for sulfide.

Of the 303(d)- and M&E-listed parameters, only copper was sampled at the sites upstream and downstream of Idylwilde Reservoir. Between 5 and 6 percent of the dissolved copper samples collected at the two locations exceeded the acute and/or chronic aquatic copper standard. Cadmium concentrations exceeded the acute aquatic life standard from 2003 to 2007 below a wastewater treatment plant near Estes Park and at Drake downstream of Miller Creek. Zinc concentrations exceeded the acute aquatic life standard from 2003 to 2005 at the same two locations and just below Lake Estes. The Colorado Water Quality Control Division does not have any recent sulfide data for the Big Thompson River at or near the Project area; therefore, the locations of past exceedances of the sulfide standard are unknown (Hillegas, pers. comm. 2010).

Most water quality parameters measured in the Big Thompson River at the upstream and downstream locations, including dissolved metals and some nutrients, do not show seasonal variation, except for the following parameters:

- Specific conductance, which is an indirect measurement of inorganic dissolved solids (e.g., chloride, nitrate, sulfate, phosphate, calcium, and sodium), is highest from November through April and lowest from late May through early July (during highest flows).
- Hardness, a measure of mineral content in water (primarily calcium and magnesium), is highest from February through April and lowest from late May through mid-July; during all times of the year, the water would be considered "soft," meaning low in minerals.
- Alkalinity, defined as the total concentration of alkaline salts (bicarbonate, carbonate, and hydroxide) in water, is also highest from January through April and lowest from late May through mid-July.
- Total organic carbon is generally highest from late May through June as a result of snowmelt runoff.

- Dissolved oxygen concentrations are lowest in July and August when river temperatures are highest (but have remained above 7 mg/L).
- Dissolved orthophosphate concentrations are highest from November through February (as high as 0.2 mg/L).
- Dissolved ammonia concentrations are highest from December through March (as high as 1.8 mg/L).

Table 3.2-E. Range of water quality concentrations for parameters measured between 2000 and 2009 in the Big Thompson River above and below Idylwilde Reservoir.

Parameter	Big Thompson River near Drake (1.5 miles above the reservoir) [1]	Big Thompson River 3.6 miles below the reservoir [2]	Water Quality Standard
Physical and Biological			
Dissolved oxygen (mg/L)	7.1 - 14	7.5 – 13.9	6/7 (spawning)
Alkalinity (mg/L)	9 - 36	10 – 32	--
pH	7 – 9.1	7.1 – 9.2	6.5 – 9.0
Temperature (°C)	0 - 20	0 – 20	See Table 1
Specific conductance (µS/cm)	24 - 166	27 – 151	--
Turbidity (NTU)	<1 - 14	<1 – 11	--
Total organic carbon (mg/L)	2.4 – 9.5	1.9 – 9.6	--
E. coli (#/100 mL)	0 - 600	0 - 450	126/100 mL
Inorganic (mg/L)			
Total nitrogen	0.25 – 1.1	0.27 – 1.6	--
Total organic nitrogen	0.17 – 0.33	0.1 – 0.36	--
Dissolved ammonia	<0.002 – 0.682	<0.002 – 1.77	--
Total ammonia	NS	NS	6.77/2.8
Total ammonia + organic nitrogen	0.16 – 0.67	0.12 – 1.2	--
Boron	NS	NS	0.75
Chlorine	NS	NS	0.019 ac/0.011 ch
Cyanide	NS	NS	0.005
Sulfide as H_2S	NS	NS	0.002
Dissolved nitrate + nitrite	0.01 – 0.94	<0.013 – 0.62	10 NO_3/0.05 NO_2
Dissolved orthophosphate	0.003 – 0.415	0.004 – 0.21	--
Total phosphorus	0.013 – 0.167	0.011 – 0.155	0.1 (EPA recommended limit for streams)
Hardness at Ca CO_3	8 - 37	9 – 33	--
Dissolved calcium	2.6 – 12.9	2.8 – 13.1	--

Parameter	Big Thompson River near Drake (1.5 miles above the reservoir) [1]	Big Thompson River 3.6 miles below the reservoir [2]	Water Quality Standard
Dissolved magnesium	0.51 – 2.9	0.52 – 3.2	--
Dissolved sodium	1.4 – 12.7	1.4 – 9.3	--
Dissolved chloride	0.7 – 22.2	0.7 – 13.8	250
Dissolved potassium	0.27 – 2.4	0.35 – 1.5	--
Dissolved sulfate	1.5 – 8.8	1.8 - 12	250
Dissolved Metals (µg/L)			
Aluminum	NA	NA	No dissolved standard
Arsenic	0.08 – 0.3	0.1 – 0.3	340 ac/150 ch
Cadmium	NA	NA	0/31 ac/0.13 ch
Chromium	NA	NA	158.7 ac/206 ch Ch III 16 ac/11 ch Ch VI
Copper	0.7 - 5	0.7 – 4.5	3.1 ac/2.4 ch
Iron	13 – 169	20 – 126	300
Lead	0.03 – 1.27	0.04 – 0.45	11.4 ac/0.44 ch
Manganese	0.9 – 17.5	1.6 – 10.4	1,775 ac/981 ch
Mercury	<0.01 – 0.01	<0.02	0.01
Nickel	0.09 – 1.17	0.1 – 1.26	125 ac/14 ch
Selenium	0.05 – 0.2	0.05 – 0.3	18.4 ac/4.6 ch
Silver	<0.008 – 0.2	<0.008 – 0.2	0.14 ac/0.005 ch
Zinc	NA	NA	38.7 ac/29.3 ch

[1] USGS site 402554105202100, Big Thompson River above North Fork Big Thompson at Drake, Colorado.
[2] USGS site 06736700, Big Thompson River above Dille Tunnel near Drake, Colorado.
NS = parameter not analyzed for at this location.
-- indicates no numeric water quality standard.

3.2.2.3 Idylwilde Reservoir Characteristics

The physical characteristics of Idylwilde Reservoir are provided in Table 3.2-F (Howard, pers. comm. 2010).

Table 3.2-F. Physical characteristics of Idylwilde Reservoir.

Surface area	3.67 acres
Volume	45 acre-feet at normal maximum elevation
Maximum depth	24 feet
Mean depth	12 feet
Average flushing rate	1/day at lowest mean monthly flow of 23 cfs
Shoreline length	2,643 feet
Substrate composition	sand

The flushing rate is considerably higher due to flows through the reservoir being higher than 23 cfs much of the year. In addition, the volume of the reservoir has been reduced over time due to sediment deposition. Based on the minimum average flows 2002-2009 (Miller Ecological Consultants, 2010), the flushing interval would be once per day, not considering sediment buildup. Based on average flows 2002-2009, the flushing rate would be approximately five times per day.

3.2.2.4 Potential Impacts

Because reservoir operations will not change, there would be no effect to the existing water quality of the reservoir or of the Big Thompson River below Idylwilde Reservoir.

Direct and Indirect Impacts

Continued operation of the existing Project facilities will not impact water quality.

Cumulative Impacts

The only reasonably foreseeable action is implementation of the Windy Gap Firming Project, which would slightly increase flows in the river in the Project area during some months in average flow years or wet years (Bureau of Reclamation 2007) (See Water Resources section 3.2.1.6). The effect of this water on concentrations of other water quality parameters in the Big Thompson River has not been estimated, but is likely to be minor. The Idylwilde Project will not further increase total nitrogen, total phosphorus, or any other water quality concentrations.

3.2.2.5 Mitigation Measures

No mitigation measures are recommended for water quality.

3.2.2.6 Agencies Contacted

The agencies contacted for this report were:

Big Thompson Watershed Forum
Zack Shelley, Program Director, BTWR
Room 159
800 South Taft Ave.
Loveland, CO 80557
970-613-6163
zshelley@btwatershed.org)

Colorado Water Quality Control Division
Robert Hillegas, Physical Sciences Researcher/Specialist, Environmental Data Unit, WQCD
4300 Cherry Creek Drive South
Denver, CO 80246-1530
303-692-3137
Rhillega@smtpgate.dphe.state.co.us)

U.S. Geological Survey
Northern Colorado Water Conservancy District
Esther Vincent, Water Quality Manager, NCWCD
220 Water Ave.
Berthoud, CO 80513
970-532-7700
evincent@ncwcd.org)

City of Loveland

3.2.2.7 References

Bureau of Reclamation. 2007. Windy Gap Firming Project Draft Water Resources Technical Report. U.S. Department of the Interior, Bureau of Reclamation, Great Plains Region. December.

Colorado Department of Public Health and Environment (CDPHE). 2010a. Water Quality Control Commission Regulation #38: Stream Classifications and Water Quality Standards for the Big Thompson River. Effective November 30, 2010.

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3.3 Fish and Aquatic Resources

3.3.1 Existing Environment

The study area for project impacts is the Big Thompson River between the Idylwilde Project dam and Viestenz-Smith Park, a distance of 1.6 miles. Data on fisheries and water quality related to fisheries is presented for sites above and below the study area. This section of the river has a relatively steep gradient and is confined between canyon walls and U.S. Highway 34. Much of this section of the river was reconstructed as a result of the Big Thompson River Flood of 1976. River flow is controlled by upstream releases from Lake Estes and localized runoff. There are no tributary perennial streams between the Idylwilde Dam and the park. Peak flows generally occur in June, mid flows in August, and base flows in the winter (W.J. Miller & Associates, 1993).

3.3.2 Fisheries Management

The Colorado Division of Wildlife does not stock the Big Thompson River because trout are reproducing naturally (Swigle, 2010). The river from downstream of Lake Estes to Waltonia Bridge (Figure 3.3-1) is subject to catch and release fishing regulations. The river from Waltonia Bridge, through the study area, and downstream to the mouth of the canyon has a bag limit of four trout per day.

3.3.3 Fish Population Data

Fish population data were obtained from the Colorado Division of Wildlife database (H. Vermillion, personal communication, November 3, 2010; B. Swigle, personal communication, November 30, 2010). Data were available for several sites upstream and downstream of the dam and park and for several years (Figure 3.3-1). However, some sites were only sampled once. Sites upstream of Idylwilde Dam include Habitat Improvement, Grandpa's, Chuck's Place, Twin

Pines, Handicap Ramp, and Waltonia Bridge. Fish sampling sites in the bypass reach include Below Idylwilde Dam and Above Big Thompson Indian Village. Sites downstream of the bypass reach include Cedar Cove, and Narrows State Wildlife Area. The Cedar Cove site is on private land and is not accessible to the public, which limits fishing pressure and harvest.

Fish were primarily collected via a two-pass-removal electrofishing effort, although for some sites and dates only a single pass was completed. Site lengths ranged from 300 to 600 feet.

The fish community consists primarily of non-native rainbow trout (*Oncorhynchus mykiss*) and non-native brown trout (*Salmo trutta*) (Miller Ecological Consultants, 2011). The most common native species are longnose dace (*Rhinichthys cataractae*) and longnose sucker (*Catostomus catostomus*). Species that have occasionally been captured include: white sucker (*Catostomus commersoni*), Snake River cutthroat trout (*Oncorhynchus clarkii* ssp.), brook stickleback (*Culaea inconstans*), fathead minnow (*Pimephales promelas*), brook trout (*Salvelinus fontinalis*), and tiger muskie (*Esox lucius* x *Esox masquinongy*).

3.3.3.1 Above Idylwilde Dam

Some trends in the fish community are apparent. At all sites above the dam, the most abundant species (calculated as fish per mile) was rainbow trout. At the Habitat Improvement site, trout catch rates have declined since 1995 with the exception of 2000. At Chuck's Place, there has been a large drop in captured rainbow trout since 1999. Brown trout have also declined, but not as much. At the Twin Pines site, capture rates for rainbow trout have generally declined, although this site has not been sampled since 2000. There was no real trend for brown trout. At the Handicap Ramp site, brown trout have generally been declining since 1999. Rainbow trout numbers declined greatly from 1999 to 2000 but have since been increasing. At the site below the Waltonia bridge, brown trout numbers have increased in the past few years, while rainbow trout catch has varied. At Grandpa's, capture was steady for the two years it was sampled.

3.3.3.2 Bypass Reach

Brown trout was most abundant below Idylwilde Dam, above Big Thompson Indian Village in the Bypass Reach; however, the sites below Idylwilde Dam and above Big Thompson Indian Village were only sampled once.

3.3.3.3 Downstream of the Bypass Reach

Brown trout were most abundant at Narrows SWA. The Cedar Cove site had more rainbow trout than brown trout but, again, this site was only sampled once. Finally, at the Narrows SWA site, brown trout have increased while rainbow trout catch rates have varied. Catch rates varied between sites for a given year. Information on life stages, age, and growth rates was not available. Brown trout young-of-year typically emerge in May and rainbow trout in June (Swigle 2010).

3.3.4 Fish Habitat

A minimum flow study was conducted in 1992 using the Instream Flow Incremental Methodology by W.J. Miller & Associates (1993). This method can quantify the amount of suitable fish habitat at any specified flow and allows one to assess habitat changes as a function of flow (Bovee et al. 1998). Habitats (riffles and pools) were mapped throughout the bypass reach and 17 transects were placed within the reach to describe stream hydraulics and microhabitat features.

The following habitats (as a percent of total habitat) were present during the study: high-gradient riffle (31.4%), low-gradient riffle (7.4%), pocket water (24.1%), pools less than 3 feet deep at low flow (36.1%), and pools 3-6 feet deep at low flow (3.6%). Data from the 17 transects were input into the Physical Habitat Simulation System (PHABSIM), which is a set of models that simulate river hydraulics and fish habitat. Simulated river hydraulics were modeled for pocket water, pools less than 3 feet deep, and high-gradient riffles. These simulated river hydraulics were coupled with fish habitat suitability criteria to calculate the habitat area (weighted usable area) for each species and life stage.

Results from both habitat mapping and individual transect data showed that spawning habitat was very limited. Spawning areas were usually isolated pockets of gravels that could not be accurately modeled with PHABSIM. PHABSIM simulations determined that the most abundant habitat type for adults of both trout species was pool habitat with depths of less than three feet at low flow. The most abundant habitat for juveniles of both species was pocket water. Rainbow trout fry habitat was highest in pocket water and brown trout fry habitat was highest in pools with depths less than three feet at low flow. A duration analysis of flow regimes and habitat determined that the most limiting habitat was for adults of both trout species.

3.3.5 Macroinvertebrates

Macroinvertebrates were collected in October 1992 (W.J. Miller & Associates, 1993) to assess population and species abundance in the bypass reach. Thirty-two taxa were collected from three Hess samples (Table 3.3-A). Shannon-Weaver diversity was 3.51, which is a value associated with unpolluted waters (Ward et al. 2002) (Table 3.3-B). Shannon-Weaver evenness was 0.7 and is also associated with unpolluted waters (Ward et al. 2002). Mayflies, caddisflies, and chironomid midges were the most abundant macroinvertebrates. A high density of macroinvertebrates indicates that food is not a limiting factor for trout.

Macroinvertebrates were also categorized into functional feeding groups, which are based on the acquisition of nutritional resources (Merritt and Cummins 1996; Ward et al. 2002). Functional feeding groups provide a measure of macroinvertebrate community function as opposed to other metrics that measure community structure. Rivers that provide a variety of feeding opportunities usually maintain good representation in each corresponding functional feeding group. Numerous variables (including habitat quality) may affect the proportions of certain functional feeding groups. Typically, the Collector-Gatherer group is dominant in western streams (Ward et al. 2002) and this was the case in the bypass reach.

Table 3.3-A. Macroinvertebrates collected from the bypass reach, October 1992.

Big Thompson--below Idylwilde Dam 1992			Group	Sample 1 Rep 1	 2 Rep 2	 3 Rep 3	Total	Mean
Ephemeroptera								
Ephemerellidae	Drunella	grandis	sc	2	5	1	8	2.67
	Ephemerella	infrequens	sh	21	64	28	113	37.67
Baetidae	Baetis	sp.	cg	58	209	81	348	116.00
	Baetodes	sp.	sc		2	2	4	1.33
Heptageniidae	Epeorus	sp.	cg	2	2	7	11	3.67
Leptophlebiidae	Paraleptophlebia	sp.	cg		21	11	32	10.67
Plecoptera								
Perlidae	Claassenia	sabulosa	pr		3	1	4	1.33
Perlodidae	Isoperla	sp.	pr		12		12	4.00
	Skwala	parallela	pr	1	1		2	0.67
Chloroperlidae	Plumiperla	sp.	pr		1	6	7	2.33
Trichoptera								
Brachycentridae	Brachycentrus	americanus	cf		2	1	3	1.00
Hydropsychidae	Hydropsyche	occidentalis	cf		2	1	3	1.00
	Hydropsyche	oslari	cf	32	326	53	411	137.00
Glossosomatidae	Protoptila	sp.	sc	72	18	96	186	62.00
Rhyacophilidae	Rhyacophila	sp.	pr	10	21	5	36	12.00
Lepidostomatidae	Lepidostoma	sp.	sh	56	23	54	133	44.33
Hydroptilidae	Leucotrichia	sp.	sc	1			1	0.33
Coleoptera								
Elmidae	Heterlimnius	corpulantus	cg	1	5	4	10	3.33
	Optioservus	sp.	sc	26	65	18	109	36.33
Chironomidae								
Chironomidae	Tanypodinae		pr	1	4	2	7	2.33
	Diamesinae		cg	9	13	9	31	10.33
	Orthocladiinae		cg	187	128	295	610	203.33
		Orthocladius/Cricotopus	cg	207	112	98	417	139.00
		Eukiefferiella	cg	36	47	27	110	36.67
Other Diptera								
Athericidae	Atherix	pachypus	pr	1	2	3	6	2.00
Tipulidae	Antocha	sp	cg	12	6	5	23	7.67
	Hexatoma	sp.	pr		1		1	0.33
Empididae	Clinocera	sp.	pr	8	4	9	21	7.00
Psychodidae	Pericoma	sp.	cg			1	1	0.33
Other								
Planariidae	Dugesia	sp.	cf	10	21	25	56	18.67
Sperchonidae	Sperchon	sp.	cg	14	2	7	23	7.67
Lebertiidae	Lebertia	sp.	cg	1	2	4	7	2.33
Totals				768	1124	854		915.33

Table 3.3-B. Macroinvertebrate metrics for samples collected in the bypass reach.

October 1992 Type of Information	Big Thompson River Bypass reach
Total Macroinvertebrate Density (#/m^2)	10643
Total # of Taxa	32
EPT Index	17
Shannon-Weaver Diversity Index	3.51
Shannon-Weaver Evenness Index	0.701
Functional Feeding Group (% Composition)	
Collector-Filterers	17.23
Collector-Gatherers	59.10
Predators	3.50
Scrapers	11.22
Shredders	8.96

3.3.6 Water Quality for Aquatic Species

Water quality data for the Big Thompson River were obtained from two USGS gages. The first gage is located near Drake, upstream of the confluence with the North Fork Big Thompson River (Station ID 402554105202100). The second gage is downstream of Idylwilde Dam, upstream of the Dille Tunnel Diversion (Station ID 06736700). Water quality parameters were typically measured once per month. The period of record analyzed for this report was 2000 to 2010. (http://nwis.waterdata.usgs.gov/co/nwis/qwdata/?site_no=402554105202100, http://nwis.waterdata.usgs.gov/co/nwis/qwdata/?site_no=06736700)

Water quality measurements from the two gages were compared to the U.S. Environmental Protection Agency (EPA)'s National Recommended Water Quality Criteria, if available (USEPA 2009). The Criteria Maximum Concentration (CMC) is an estimate of the highest concentration to which an aquatic community can be exposed briefly without resulting in an unacceptable effect. The Criterion Continuous Concentration (CCC) is an estimate of the highest concentration to which an aquatic community can be exposed indefinitely without resulting in an unacceptable effect.

The water quality parameters of arsenic, copper, iron, lead, and mercury were below both chronic and acute levels based on EPA CMC and CCC criteria at both sites.

COPPER: For copper, specific criteria are not provided because the bioavailability of copper is affected by temperature, pH, suspended particles, dissolved organic compounds, and various inorganic cations and anions (USEPA 2007). Nevertheless, the EPA has determined "species mean acute values" and "species mean chronic values" for some species. For rainbow trout, the mean acute value is 22.19 µg/L and the mean chronic value is 23.8 µg/L. For brown trout, the mean chronic value is 29.9 µg/L. Copper measured at the sites was well below these levels.

pH: pH was mostly within the range recommended by the EPA and was above 9.0 for only a few samples.

ALKALINITY: Alkalinity levels followed a cyclical pattern at both sites with the highest levels occurring in February/March and the lowest levels occurring in June/July. The EPA gives a CCC of 20 mg/L as $CaCO_3$. The upstream site had an average alkalinity of 22 mg/L, with a range from 9-36 mg/L. The downstream site had an average alkalinity of 21 mg/L, with a range of 10-32 mg/L. Both sites have alkalinity levels above the CCC. However, Thurston et al. (1979) have debated the EPA standard, stating that natural waters have alkalinities that can vary by orders of magnitude and therefore setting an absolute limit is impossible. They stated that a more appropriate recommendation would be for alkalinity to not increase or decrease by more than 25 percent from the natural level. Since the natural alkalinity level is not known, it is difficult to ascertain if the range of alkalinities observed should be a matter of concern.

NITROGEN, PHOSPHOROUS, TURBIDITY: For nitrogen, phosphorus, and turbidity, the EPA has developed some reference conditions. These represent minimally-impacted stream conditions (USEPA 2000, 2001). Reference conditions are provided for ecoregions and level III subecoregions. The Big Thompson River is in a transition area between Southern Rockies (subecoregion 21) and Western High Plains (subecoregion 25) and so information will be provided from both subecoregions. For nitrogen, the reference condition for the Southern Rockies is 0 mg/L; for the Western High Plains it is 0.72 mg/L. The average nitrate-nitrite concentration at the two sites was 0.26 mg/L and was higher at the upstream site. For phosphorus, the reference condition for the Southern Rockies is 0.006 mg/L; for the Western High Plains it is 0.06 mg/L. The average phosphorus concentration at the site upstream of the dam was 0.05 mg/L; downstream of the dam it was 0.03 mg/L. Finally, for turbidity, the reference condition for the Southern Rockies is 1.65 NTU; for the Western High Plains it is 12.6 NTU. The average turbidity was 2.7 NTU upstream of the dam and 2.8 NTU downstream of the dam.

TEMPERATURE: Over a ten-year period, water temperature varied from approximately 0°C to 20°C at both sites (Figure 3.3-4). The Colorado Department of Public Health and Environment's Water Quality Control Division has established acute and chronic temperature criteria (CDPHE 2010). The Big Thompson River would be considered a Tier II river, meaning that the temperature criteria apply to where coldwater species are expected to occur, excluding cutthroat and brook trout. From April through October, the chronic temperature criterion is 18.3°C and the acute temperature criterion is 23.9°C. From November through March, the chronic temperature criterion is 9.0°C and the acute temperature criterion is 13.0°C. Over the last ten years water temperature has not been above acute levels as measured at the two sites. Water temperatures were above 9.0°C from November through March on three dates at the upstream site. Water temperatures were above 18.3°C from April through October on five dates at the upstream site and 4 dates at the downstream site. CDPHE defines the chronic standard for temperature as the weekly average temperature, which is the average of multiple, equally-spaced, daily temperatures over a seven-day consecutive period (CDPHE 2010). As the temperature data at the two sites were recorded only once per month, it is unknown if water temperatures truly were above chronic levels as defined by the CDPHE.

Rainbow trout in streams select temperatures between 12 and 19°C (Raleigh et al. 1984a). Good growth and survival for brown trout also occurs between 12 and 19°C (Raleigh et al. 1984b). Zero degrees Celsius is the lowest tolerable temperature for both species. Therefore, the temperature range for the Big Thompson River as recorded at the USGS gages is nearly optimal for both rainbow and brown trout (Figure 3.3-4).

DISSOLVED OXYGEN: Dissolved oxygen ranged from 7.1 to 14.0 mg/L from 2000 to 2010 (Figure 3.3-5). Oxygen levels peak in the winter months and are at their lowest in the summer months. Raleigh et al. (1984a, 1984b) recommended at least 7 mg/L up to 15°C and 9 mg/L above 15°C. It is apparent from Figure 3.3-5 that dissolved oxygen levels are often below 9 mg/L when water temperatures are above 15°C. The CDPHE standard is 6.0 mg/L and 7.0 mg/L for spawning.

SUMMARY: In general, water quality is good at both sites, which suggests that water quality within the study area is also good. The parameter of most concern is dissolved oxygen at higher temperatures.

3.3.7 Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act was established for the protection of the United States' marine fisheries. The act focuses on highly migratory species that use the continental shelf of the Unites States and anadromous species that spawn in rivers or estuaries (NOAA 2007). No essential fish habitat as defined by the Act is present in the Big Thompson River and no anadromous, catadromous, or migratory fish species are present either.

3.3.8 Potential Impacts

3.3.8.1 Direct and Indirect Impacts

The fishery in the Big Thompson River is in good condition with healthy fish. There is a decrease in rainbow trout downstream from Idylwilde dam for unknown reasons. The fish populations in most locations are healthy with as many as 3000 trout per mile reported in 2009. Fish data in the bypass reach has not been sampled since 1992 but populations were good at that time (W.J. Miller & Associates 1993).

Portions of the Idylwilde Hydroelectric Project, including the dam, reservoir, and part of the penstock, are on U.S. Forest Service land. The Project therefore is subject to a U.S. Forest Service Special Use permit (USDA Forest Service 1994). The permit requires the determination of the minimum flow needed to sustain trout habitat within the 1.6-mile bypass reach (from the dam to Viestenz-Smith Park). The main time period of interest for establishing a minimum flow is during the winter base flow season. The minimum flow study conducted by W.J. Miller & Associates (1993) determined that a flow of 7.1 cfs is sufficient to sustain trout habitat. This flow also met the Forest Service's Forest Plan Standard in 1992, which states that a minimum flow must maintain at least 40% of the habitat potential 100% of the time. The city modified the outlet and operations to release 7.0 cfs, pursuant to a June 9, 1994 Memorandum of Agreement between the Colorado Division of Wildlife and the City (City of Loveland, 1994). These release

rates have occurred except for several days in 2002 during a severe drought (Miller Ecological Consultants, 2010).

Based on the available data, water quality appears to be good for aquatic species. The monthly data for water temperature do not allow a complete analysis but the data indicate that water temperatures are close to the optimal range for trout. The state water quality standards for copper, cadium, zinc and pH have been exceeded in the Big Thompson River.

Continued operation of the project is unlikely to impact fish and aquatic resources.

3.3.8.2 Cumulative Impacts

The only reasonably foreseeable action is implementation of the Windy Gap Firming Project, which would slightly increase flows in the river in the Project area during some months in average flow years or wet years (see Water Resources section 3.2.1.6). The small increases in flow would not be significant enough to impact fishery and aquatic resources in the Project area.

3.3.9 Agencies Contacted

Colorado Division of Wildlife

3.3.10 References

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3.4 Wildlife Resources

3.4.1 Commercially Important Wildlife

Big game species likely to occur in the Project vicinity include American elk (*Cervus elaphus*), mule deer (*Odocoileus hemionus*), black bear (*Ursus americanus*), bighorn sheep (*Ovis canadensis*), and mountain lion (*Felis concolor*) (NDIS 2010c). These species are often found

along riparian corridors and in ponderosa pine forest. Human disturbance from U.S. 34 may prevent a large population of these species from occurring within the Project area.

Furbearing species likely to be present in the Project area include the American badger (*Taxidea taxus*), American beaver (*Castor canadensis*), bobcat (*Lync rufus*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), common muskrat (*Ondatra zibethicus*), and raccoon (*Procyon lotor*).

3.4.2 Other Wildlife

The reservoir and riparian habitat downstream of the reservoir may provide foraging and nesting habitat for raptors, and nesting could also occur in the ponderosa pine forest. Raptors, or birds of prey, are protected by the MBTA. Bald and golden eagles are also protected under the BGEPA. The golden eagle, bald eagle, osprey, Swainson's hawk, red-tailed hawk, American kestrel, and great horned owl may occur in the Project vicinity.

Other wildlife species likely to be present in the Project vicinity include smaller mammals such as the Nuttall's cottontail (*Sylvilagus nuttallii*) and Abert's squirrel (*Sciurus aberti*). Common bird species found in ponderosa pine forest include Steller's jay (*Cyanocitta stelleri*), American robin (*Turdus migratorius*), and Pygmy nuthatch (*Sitta pygmaea*). Birds likely to occur in the riparian and wetland areas include mountain chickadee (*Poecile gambeli*), song sparrow (*Melospiza melodia*), American dipper (*Cinclus mexicanus*), yellow warbler (*Dendroica petechia*), and western wood-pewee (*Contopus sordidulus*).

3.4.3 Direct Impacts

The reservoir could impede movement for big game species along the riparian corridor. Human activities associated with the reservoir, such as maintenance activities and recreation, may cause wildlife to avoid the reservoir and surrounding habitat. The continued operation of the Project is not likely to have a significant impact to the general wildlife in the area.

3.4.4 Cumulative Impacts

The only reasonably foreseeable action is implementation of the Windy Gap Firming Project, which would slightly increase flows in the river in the Project area during some months (Table 3.4-A) in average flow years or wet years (Bureau of Reclamation 2007) (See Water Resources section 3.2.1.6). These small increases in flow would be too small to impact any wildlife resources in the Project area. Cumulative impacts from the continued operation of the facility in combination with the Windy Gap Firming Project would be negligible.

3.4.5 Mitigation Measures

No mitigation measures are necessary.

3.4.6 Agencies Contacted

The agencies contacted for this report were:

Larry Howard
City of Loveland
200 N. Wilson Avenue
Loveland, Colorado 80537
970-962-3703

Michael Menefee
Colorado Natural Heritage Program
Colorado State University
1474 Campus Delivery
Fort Collins, CO 80523-1474
970-491-7331

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3.5 Botanical Resources

3.5.1 Existing Environment

The Project is in the Big Thompson Canyon in Larimer County, Colorado at an elevation of approximately 6,000 feet. The reservoir is on the Big Thompson River, a perennial stream shown on the U.S. Geological Survey (USGS) Drake topographic quadrangle (USGS 1984). Most of the length of the penstock is buried. The penstock crosses several tributary drainages to the Big Thompson River on six constructed bridges between the reservoir and the hydroelectric plant (see Figure 1-2). The drainages are shown on the USGS Drake topographic quadrangle as intermittent drainages that flow only during periods of runoff (snowmelt or precipitation). Water from the hydroelectric plant discharges into a small pond in Loveland's Viestenz-Smith Mountain Park. The pond connects to the Big Thompson River.

3.5.2 Vegetation

The north bank of the reservoir consists mostly of large riprap, with a few narrowleaf cottonwood (*Populus angustifolia*), elm (*Ulmus* sp.), and Russian olive (*Elaeagnus angustifolia*) trees above the bank. Upland species observed along the northern terrace surrounding the parking lot include crested wheatgrass (*Agropyron desertorum*), intermediate wheatgrass (*Thinopyrum intermedium*), smooth brome (*Bromopsis inermis*), rabbitbrush (*Chrysothamnus nauseosus*), horseweed (*Conyza canadensis*), and common mullein (*Verbascum thapsus*). The south bank of the reservoir is a steep cliff and eroded bank, with ponderosa pine (*Pinus ponderosa*) and Douglas-fir (*Pseudotsuga menziesii*) forest above the bank. The reservoir does not contain riparian vegetation. The reservoir has steep slopes with upland species abutting wetland vegetation.

The penstock is, in part, along a riparian terrace downstream of the reservoir for a distance of 3,100 feet. Farther east, the penstock is in a ponderosa pine forest with a smooth brome-

dominant understory. The hydroelectric plant and pond are in a landscaped park, with mostly ponderosa pine, landscape variety shrubs, and mowed bluegrass (*Poa* sp.) dominating the vegetation.

3.5.3 Wetlands and Riparian Vegetation

The areas of riparian and wetland vegetation are shown on Figure 3.5-1. Table 3.5-A lists species found in the wetland and riparian habitat in the Project area and their wetland indicator status (Sabine 1994; Weber and Wittmann 2001). The river banks are steep due to U.S. 34 embankments bordering the river, the penstock, riverside development, and steep cliffs; therefore, the riparian and wetland habitat is limited.

Table 3.5-A. Prevalent wetland and riparian species within the Project area.

Species Name	Common Name	Wetland Indicator Status – Region 8*
Trees		
Elaeagnus angustifolia	Russian olive	FAC
Pinus ponderosa	Ponderosa pine	FACU-
Populus angustifolia	Narrowleaf cottonwood	FAC
Shrubs		
Alnus incana ssp. *tenuifolia*	Thinleaf alder	FACW
Salix exigua	Sandbar willow	OBL
Graminoids		
Bromopsis inermis	Smooth brome	UPL
Juncus arcticus subsp. *ater*	Baltic rush	OBL
Pascopyrum smithii	Western wheatgrass	FACU
Phalaroides arundinacea	Reed canarygrass	FACW+
Schoenoplectus lacustris subsp. *creber*	Softstem bulrush	OBL
Sporobolus	Dropseed	FAC/FACU-

*OBL – Obligate Wetland—Occurs with an estimated 99 percent probability in wetlands.
FACW – Facultative Wetland—Estimated 67 to 99 percent probability of occurrence in wetlands.
FAC – Facultative—Equally likely to occur in wetlands and nonwetlands (34 to 66 percent probability).
FACU – Facultative Upland—67 to 99 percent probability in nonwetlands, 1 to 33 percent in wetlands.
UPL - Upland – >99 percent probability in nonwetlands in this region.
NI No Indicator or no information available.
Positive and negative signs are used to more specifically define frequency of occurrence in wetlands; a positive sign indicates a frequency toward the higher end of a category (more frequently found in wetlands), and a negative sign indicates a frequency toward the lower end of a category (less frequently found in wetlands).
Source: Sabine (1994); Weber and Wittmann (2001).

3.5.3.1 Wetlands and Littoral Habitat

A jurisdictional wetland delineation was not conducted within the Project area. Wetland vegetation occur along the edges of the reservoir and the outlet pond. Wetland vegetation was

identified based on the *National List of Plant Species that Occur in Wetlands* (Sabine 1994, Table 1). A 1- to 3-foot-wide fringe of reed canarygrass (*Phalaroides arundinacea*) occurs along most of the reservoir's edge. The width of the wetland vegetation might vary depending on the level of the reservoir, but due to the steep slopes, no wide benches occur along the reservoir. A small island occurs in the western end of the reservoir and contains wetland vegetation dominated by willow (*Salix* sp.), reed canarygrass, and thinleaf alder (*Alnus incana* ssp. *tenuifolia*). Patches of wetland vegetation dominated by softstem bulrush (*Schoenoplectus lacustris* subsp. *creber*) are also present within the small outlet pond in Viestenz-Smith Mountain Park. The total amount of wetland vegetation in the reservoir and pond associated with the Project is 0.61 acre.

The reservoir contains a small amount of littoral habitat when the reservoir level is low.

Wetland vegetation along the 1.6 mile reach of the river between the dam and pond outlet is dominated by willow (*Salix* sp.), thinleaf alder, sedges (*Carex* sp.), and reed canarygrass.

3.5.3.2 Riparian Vegetation

Riparian vegetation occurs along segments of the penstock for a distance of 3,100 feet where the penstock is adjacent to the Big Thompson River. In these segments, the penstock is buried beneath a riparian terrace, dominated by ponderosa pine (*Pinus ponderosa*) and sandbar willow (*Salix exigua*), with an understory of smooth brome (*Bromopsis inermis*), dropseed (*Sporobolus* sp.), and western wheatgrass (*Pascopyrum smithii*). Narrowleaf cottonwoods (*Populus angustifolia*) also occur along the terrace.

Riparian vegetation occurs along the 1.6 mile reach of Big Thompson River between the reservoir and the hydroelectric plant. It is limited in extent due to the steep river banks in this reach. Riparian vegetation along the river is similar to the vegetation along the penstock described above, with narrowleaf cottonwoods and ponderosa pine dominating the overstory and smooth brome, dropseed, and western wheatgrass dominating the understory. The outlet pond does not contain riparian vegetation. The amount of riparian vegetation in the Project area is 2.70 acres.

3.5.4 Potential Impacts

3.5.4.1 Vegetation

Continued operation of the Project would have no direct or indirect impacts to the existing vegetation communities. The existing plant communities would be maintained, which are a mix of native and nonnative species. The fluctuations in water levels at the reservoir might allow for new establishment of native and nonnative species when water levels are low. However, minor fluctuations in reservoir levels normally occur only during winter months, when flows are low. During the spring, summer, and fall, flows into the reservoir are much higher than diversions through the penstock (Miller Ecological Consultants, Inc. 2010). Flow over the spillway would be maintained, with virtually no change or a small increase in reservoir elevation. Some riparian and wetland habitat would likely be inundated due to the reservoir that would otherwise provide

habitat for various wildlife species; however, due to the small size of the reservoir, the facility would not have a significant impact on vegetation.

3.5.4.2 Wetlands and Riparian Vegetation

Continued operation of the existing Idylwilde Project facilities will not impact wetlands or riparian vegetation. Some riparian and wetland vegetation is likely inundated due to the presence of the reservoir. Due to the small size of the reservoir, the facility does not cause a significant loss to vegetation. Wetland and riparian vegetation along the Big Thompson River between the reservoir and pond outlet is not impacted due to the small amount of diverted water. If the reservoir was not present, some existing wetland vegetation would be inundated, while other wetland vegetation would likely form at a higher elevation along the banks.

3.5.5 Cumulative Impacts

The only reasonably foreseeable action is implementation of the Windy Gap Firming Project, which would slightly increase flows in the river in the Project area during some months in average flow years or wet years (see Water Resources section 3.2.1.6). The small increases in flow would not be significant enough to impact botanical resources, wetlands, or riparian vegetation in the Project area.

3.5.6 Mitigation Measures

Mo mitigation measures are recommended for botanical resources, wetlands, or riparian habitat in the Project area.

3.5.7 Agencies Contacted

The agencies contacted for this report were:

Larry Howard
City of Loveland
200 N. Wilson Avenue
Loveland, Colorado 80537
970-962-3703

Michael Menefee
Colorado Natural Heritage Program
Colorado State University
1474 Campus Delivery
Fort Collins, CO 80523-1474
970-491-7331

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3.6 Rare, Threatened, and Endangered Species

3.6.1 Federally Listed Plant Species

The U.S. Fish and Wildlife Service (Service) lists several threatened and endangered plant species potentially affected by projects in Larimer County (Table 3.6-A) (Service 2010).

Table 3.6-A. Federally threatened, endangered, and candidate plant species potentially affected by projects in Larimer County.

Common Name	Scientific Name	Status*	Habitat	Potential Habitat Present in Project Area
Colorado butterfly plant	*Gaura neomexicana* ssp. *coloradensis*	T	Subirrigated, alluvial soils on level floodplains and drainage bottoms between 5,000 and 6,000 feet in elevation	Yes
North Park phacelia	*Phacelia formosula*	E	Sparsely vegetated areas on steep ravines, sandy hills, or bluffs in North Park	No
Ute ladies'-tresses orchid	*Spiranthes diluvialis*	T	Moist to wet alluvial meadows, floodplains of perennial streams, and around springs and lakes below 6,500 feet in elevation	Yes
Western prairie fringed orchid**	*Platanthera praeclara*	T	Moist to wet prairies and meadows	No

*T = Threatened Species, E = Endangered Species.

**Water depletions in the South Platte River may affect the species and/or critical habitat in downstream reaches in other counties or states.

Source: Service 2010.

The North Park phacelia does not have suitable habitat within the Project vicinity. The western prairie fringed orchid is discussed in the Wildlife section under Platte River species. The Colorado butterfly plant and Ute ladies'-tresses orchid are discussed below. No critical habitat for any of these species occurs within the Project vicinity.

Ute Ladies'-Tresses Orchid and Colorado Butterfly Plant

The Colorado butterfly plant (CBP) and Ute ladies'-tresses orchid (ULTO) are federally threatened species found in similar habitat along streams and wet meadows in the Colorado Front Range (Service 1992). The CBP is a short-lived perennial herb found in moist areas of floodplains. It occurs on subirrigated alluvial soils on level or slightly sloping floodplains and drainage bottoms at elevations from 5,000 to 6,400 feet (NatureServe 2006). The ULTO occurs at elevations below 6,500 feet in moist to wet alluvial meadows, floodplains of perennial streams, and around springs and lakes where the soil is seasonally saturated within 18 inches of the surface. Generally, ULTO occurs where the vegetative cover is relatively open and not overly dense or overgrazed. These species have not been recorded in the Project vicinity or in the Big Thompson River drainage (Service 1992). The reservoir contains steep rocky banks that likely would prevent the establishment of CBP or ULTO. Although areas of gravelly substrate occur on the riparian terrace downstream of the reservoir, the terrace is dominated by mesic and upland species, and does not contain any species usually associated with CBP or ULTO.

3.6.2 Federally Listed Wildlife Species

The Service lists several threatened and endangered wildlife species potentially affected by projects in Larimer County (Table 3.6-B). Many of the species listed as federally threatened, endangered, or as candidate or proposed species do not have suitable habitat within the Project vicinity, including the black-footed ferret, Canada lynx, greater sage-grouse, and mountain plover. The species that have potential habitat or that may be adversely impacted by the Project are discussed below. No critical habitat for any federally listed species occurs in the Project vicinity.

Table 3.6-B. Federally threatened, endangered, and candidate wildlife species potentially affected by projects in Larimer County.

Common Name	Scientific Name	Status*	Habitat	Potential Habitat Present in Project Area
Mammals				
Black-footed ferret	*Mustela nigripes*	E	Active prairie dog towns	No
Canada lynx	*Lynx canadensis*	T	Climax boreal forest with a dense understory of thickets and windfalls	No
Preble's meadow jumping mouse	*Zapus hudsonius preblei*	T	Shrub riparian/wet meadows	Yes
Birds				
Greater sage-grouse	*Centrocercus urophasianus*	C	Sagebrush flats or hills between 6,000 and 8,500 feet in elevation	No
Interior least tern**	*Sterna antillarum athalassos*	E	Sandy/pebble beaches on lakes, reservoirs, and rivers	No
Mexican spotted owl	*Strix occidentalis*	T	Closed canopy forests in steep canyons	Yes
Mountain plover	*Charadrius montanus*	P	Shortgrass prairie	No
Piping plover**	*Charadrius melodus*	T	Sandy lakeshore beaches, river sandbars	No
Whooping crane**	*Grus americana*	E	Mudflats around reservoirs and in agricultural areas	No

*T = Threatened Species, E = Endangered Species, C = Candidate Species, P = Proposed species for listing.
**Water depletions in the South Platte River may affect the species and/or critical habitat in downstream reaches in other counties or states.
Source: Service 2010.

Preble's Meadow Jumping Mouse

Preble's meadow jumping mouse (Preble's) is a federally threatened species found in stream and riparian habitats along the Colorado Front Range and southeastern Wyoming. Preble's are known to occur 7 miles upstream of the reservoir along the North Fork Big Thompson River (Shenk 1998). Several trapping surveys conducted within 10 miles downstream of the reservoir

found no Preble's (Wildland Consultants 2001a, 2001b; Meaney and Ruggles 1999). The reservoir does not contain suitable habitat for Preble's because the banks are very steep and provide little shrub habitat. Although the riparian terrace downstream of the reservoir provides some shrub habitat suitable for Preble's, the presence of U.S. 34 and rocky banks along the river likely preclude a population of Preble's from occurring.

Platte River Species

The interior least tern (Sternula antillarum), piping plover (Charadrius melodus), whooping crane (Grus aermicana), and western prairie fringed orchid (Platanthera praeclara) are federally listed species that rely on habitat provided by the Platte River system. The Service has determined that historical and new depletions to the Platte River basin adversely affect federally listed species and their designated critical habitat along the Platte River in central Nebraska.

The Project area does not provide suitable habitat for the interior least tern, piping plover, or whooping crane; and the western prairie fringed orchid does not occur in Colorado. The proposed Project would not directly affect these species.

Mexican Spotted Owl

The Mexican spotted owl (spotted owl) is a federally threatened species that inhabits areas with steep exposed cliffs; canyons that are characterized by piñon-juniper; and old-growth forests mixed with Douglas-fir, ponderosa pine, and white fir. The steep exposed cliffs along the Big Thompson Canyon provide potential habitat for the spotted owl, and spotted owls are known to occur in Larimer County (NDIS 2010a). The known occurrence, however, is likely historical because no observations have been documented with the Colorado Natural Heritage Program (2011).

3.6.3 Federally Listed Aquatic Species

Greenback cutthroat trout

The greenback cutthroat trout (Oncorhynchus clarkii stomias) is a federally- and state-threatened species. Habitat requirements of greenback cutthroat trout are similar to other species of trout. Stream trout require four kinds of habitat: spawning habitat, nursery or rearing habitat, adult habitat, and overwintering habitat (Behnke 1992). Insufficient habitat in any one of these habitat types will limit trout populations. Spawning occurs in gravel substrate and is initiated in the spring when water temperatures reach 5-8°C (USFWS 1998). Rearing habitat should provide protective cover and be of low velocity and is found at stream margins, side channels, and small tributaries (Behnke 1992). Once trout reach lengths of 125-150 mm (after their second year) they move into riffles and will establish territories in deep pools and undercut banks (Behnke 1992). As adults, trout generally live at water depths of 0.3 meters or greater in areas where slow waters for resting are adjacent to fast waters where feeding occurs and where protective cover is provided (Behnke 1992). Along the Front Range, adult overwintering habitat is the most limiting factor influencing trout populations (Gerhardt 1993).

The Big Thompson River is within the historic range of greenback cutthroat trout. A population exists in a section of upper West Creek within the Big Thompson River drainage (Gerhardt et al. 1993). However, this location is over 15 miles upstream of Idylwilde Dam and greenback cutthroat trout have never been documented in the Big Thompson River downstream of its confluence with West Creek (Gerhardt 1993). A biological assessment conducted by the U.S. Forest Service in 1993 and a biological opinion issued by the U.S. Fish and Wildlife Service in 1994 concluded that operation of the Idylwilde Hydroelectric Project should have no effect on greenback cutthroat trout since the species has never been documented below Idylwilde Dam (Gerhardt 1993, USFWS 1994).

Pallid sturgeon

The pallid sturgeon (Scaphirhynchus albus) is federally-endangered and occurs primarily in the Missouri and lower Mississippi rivers. It prefers large river habitats with strong currents and sand or gravel substrate (USFWS 1993). Backwater areas with slower water velocities are used by many aquatic species as nursery habitat and for feeding and it is likely that pallid sturgeon use these areas as well (USFWS 1993). Not much is known regarding reproduction or spawning behaviors. Spawning occurs in June and July and gelatinous egg masses need hard substrate for attachment. Free embryos and larvae are pelagic and are buoyant immediately after hatching (Gerhardt 1993).

While the pallid sturgeon has never been documented in the Big Thompson River, there is some concern over evaporative water loss from Idylwilde Reservoir—water that would normally flow into the South Platte River, Platte River, and eventually the Missouri River. Recovery efforts for pallid sturgeon have focused on the timing and amount of flow conveyed to the mainstem Missouri River. Flow thresholds have not been established for the sturgeon. Therefore, any upstream water depletion could potentially affect the species (Gerhardt 1993, USFWS 1994).

According to FWS, of the 17 occurrences of pallid sturgeon in the lower Missouri River basin since 1980, 8 were in the Missouri River near the Platte River confluence or from the Platte River itself. FWS has determined that the Platte River is important to the recovery of the species. The U.S. Fish and Wildlife Service (USFWS 1994) has concluded that any flow depletions to the South Platte and Platte rivers (and consequently the Missouri River) “may adversely affect” pallid sturgeon.

The Idylwilde Hydroelectric Project depletes 0.7 acre-feet of water per year (Gerhardt 1993). The U.S. Forest Service determined that this is a relatively insignificant amount that is unlikely to negatively affect pallid sturgeon (Gerhardt 1993). While USFWS stated that the depletions from the Idylwilde Hydroelectric Project are small, they “nonetheless, contribute to the incremental and cumulative depletions within the [Platte River] basin, and similarly, to a small portion of the cumulative, adverse effect on downstream habitat” (USFWS 1994).

3.6.4 State Listed and Rare or Imperiled Wildlife Species

The majority of species on the Colorado Division of Wildlife (CDOW) threatened and endangered list do not have suitable habitat within the Project vicinity (CDOW 2010). The species potentially affected by the Project are discussed below.

Bald Eagle

The bald eagle (Haliaeetus leucocephalus) is a state-listed threatened species protected by the Bald and Golden Eagle Protection Act (BGEPA) that nests and overwinters in Colorado. Typical bald eagle nesting habitat consists of forests or wooded areas that contain tall, aged, dying, and dead trees (Martell 1992). No known nest sites occur within a 2-mile radius of the Project vicinity (NDIS 2010b). The reservoir provides some foraging habitat for bald eagles. The riparian areas downstream of the reservoir provide suitable nesting and roosting habitat, and the ponderosa pine forest also provides suitable nesting habitat.

American Peregrine Falcon

The American peregrine falcon (Falco peregrinus anatum) is a Colorado species of concern and is protected under the Migratory Bird Treaty Act (MBTA). The CDOW has recommended buffers around active peregrine falcon nest sites. Peregrines prefer nesting on rugged, remote cliffs (Craig and Enderson 2004). Nests can be found in the Rocky Mountains at elevations up to 11,811 feet (White et al. 2002). The reservoir may provide hunting habitat for the American peregrine falcon, and the surrounding cliffs and ponderosa pine forest provides potential nesting habitat.

River Otter

The river otter (Lutra canadensis), a state threatened species, inhabits high quality perennial rivers that support abundant fish or crustaceans within many habitats ranging from semidesert shrublands to montane and subalpine forests. River otters require ice-free water in winter, which means they are usually found at low to moderate elevations (Fitzgerald et al. 1994). In Colorado, river otters have mainly been found on large rivers with adjacent riparian habitat. It is unlikely river otters are present in the Project vicinity because of the lack of riparian habitat and because the reservoir is typically frozen in the winter.

Townsend's Big-Eared Bat

The Townsend's big-eared bat (Corynorhinus towsendii) is a state species of special concern. In Colorado, the bat is usually found in abandoned mines, sagebrush, semidesert scrub, piñon-juniper forests, and ponderosa pine woodlands (Adams 2003). The ponderosa pine forest in the Project area provides suitable habitat for the Townsend's big-eared bat.

Northern Leopard Frog

The northern leopard frog (Rana pipiens) is a state species of concern that prefers the banks and shallow portions of marshes, wet meadows, ponds, lakes, and streams particularly where rooted aquatic vegetation is present. Potential habitat for the northern leopard frog is present along the margins of the reservoir, downstream of the reservoir along the river, and along the pond in Viestenz-Smith Mountain Park, where wetland vegetation is present.

Common Garter Snake

The common garter snake (Thamnophis sirtalis) is a state species of concern that inhabits marshes, ponds, and edges of streams. In Colorado, the common garter snake is restricted to floodplains of the South Platte River and its tributaries, and appears to prefer floodplains of streams (Hammerson 1999). The common garter snake is usually found below 6,000 feet in elevation. The Project area lies in a relatively narrow floodplain and is at the upper elevation limit of common garter snakes and, therefore, it is unlikely the species is present.

3.6.5 Direct and Indirect Impacts

3.6.5.1 Federally Listed Plant Species

It is unlikely the Project vicinity supports a population of CBP or ULTO, and the Project would have no effect on CBP or ULTO. The continued operation of the Project would have no impact on any of these species or their habitat, and would not decrease the likelihood of the survival or recovery of these species.

3.6.5.2 Federally Listed Wildlife Species

The Platte River Recovery Implementation Program (Program) was created to provide Endangered Species Act (ESA) compliance for water users in the Platte River basin upstream of the Loup River confluence in Nebraska for effects on the target species and critical habitat, while managing certain land and water resources to provide benefits for those species. The Service issued a programmatic biological opinion in 2006, which determined that the Program, including the continuation of existing and certain new water-related activities in the Platte River basin, is not likely to jeopardize the continued existence of the four target species nor adversely modify designated critical habitat in Nebraska (USFWS 2006).

The City is a member of the South Platte Water Related Activities Program (SPWRAP), which provides ESA compliance for its members regarding depletions to the Platte River and effects to these species (SPWRAP 2010). Therefore, there would be no new effects to the interior least tern, piping plover, whooping crane, and western prairie fringed orchid from the continued operation of the Project.

Suitable habitat for Preble's and the Mexican spotted owl is present in the Project vicinity; however, the Project has existed for several decades and impacts to these species would have already occurred. The continued operation of the Project would have no impact on any of these

species or their habitat, and would not decrease the likelihood of the survival or recovery of these species.

3.6.5.3 Federally Listed Aquatic Species

The Big Thompson River is within the historic range of greenback cutthroat trout (a federally listed threatened species). A population exists in a section of upper West Creek within the Big Thompson River drainage (Gerhardt et al. 1993). However, this location is over 15 miles upstream of Idylwilde Dam and greenback cutthroat trout have never been documented in the Big Thompson River downstream of its confluence with West Creek (Gerhardt et al. 1993). A biological assessment conducted by the U.S. Forest Service in 1993 and a biological opinion issued by the U.S. Fish and Wildlife Service in 1994 concluded that operation of the Idylwilde Hydroelectric Project should have no effect on greenback cutthroat trout since the species has never been documented below Idylwilde Dam (Gerhardt 1993, USFWS 1994). No impacts greenback cutthroat trout will occur as a result of continued operation of the Project.

The other federally listed species potentially affected by the project is pallid sturgeon. While the pallid sturgeon has never been documented in the Big Thompson River, there is some concern over evaporative water loss from Idylwilde Reservoir—water that would normally flow into the South Platte River, Platte River, and eventually the Missouri River. Recovery efforts for pallid sturgeon have focused on the timing and amount of flow conveyed to the mainstem Missouri and Mississippi rivers. Flow thresholds have not been established for the sturgeon and, therefore, any water depletion could potentially affect the species (Gerhardt 1993, USFWS 1994). The Idylwilde Hydroelectric Project depletes 0.7 acre-feet of water per year (Gerhardt 1993). The U.S. Forest Service determined that this is a relatively insignificant amount that is unlikely to negatively affect pallid sturgeon (Gerhardt 1993). However, the U.S. Fish and Wildlife Service (FWS) (1994) has stated that any flow depletions to the South Platte and Platte rivers (and consequently the Missouri River) "may adversely affect" pallid sturgeon. The Platte River Recovery Program offsets depletions with contributions of water and habitat improvement projects in the Central Platte River, Nebraska. The City of Loveland participates in that program to offset the minor depletion from reservoir evaporation (SPWRAP 2010).

3.6.5.4 State Listed Species

The Project area contains suitable habitat for the bald eagle, American peregrine falcon, river otter, Townsend's big-eared bat, northern leopard frog, and common garter snake. River otter habitat in the Project area is suboptimal and the Project area is at the upper elevational limit of the known distribution of the common garter snake; thus, it is unlikely that either species occurs in the Project area. The reservoir may provide foraging habitat for bald eagles and American peregrine falcons. Although the reservoir may inundate areas that would otherwise provide habitat for the northern leopard frog, suitable habitat is still present along the edge of the reservoir, downstream along the river, and at the outlet pond. The continued operation of the Project would have no impact on any of these species or their habitat, and would not reduce the likelihood of the survival and recovery of these species.

3.6.5.5 Cumulative Impacts

The only reasonably foreseeable action is implementation of the Windy Gap Firming Project, which would slightly increase flows in the river in the Project area during some months (Table 3.6-C) in average flow years or wet years (Bureau of Reclamation 2007) (see Water Resources section 3.1.2.6). These small increases in flow would be too small to impact any wildlife or botanical resources in the Project area. Cumulative impacts from the continued operation of the facility in combination with the Windy Gap Firming Project would be negligible.

3.6.6 Mitigation Measures

The City's continued membership in the SPWRAP mitigates depletion impacts on Platte River species due to the continued operation of the Idylwilde Hydroelectric Plant (SPWRAP, 2010). No additional mitigation measures are necessary.

3.6.7 Agencies Contacted

The agencies contacted for this report are:

Larry Howard
City of Loveland
200 N. Wilson Avenue
Loveland, Colorado 80537
970-962-3703

Michael Menefee
Colorado Natural Heritage Program
Colorado State University
1474 Campus Delivery
Fort Collins, CO 80523-1474
970-491-7331

3.6.8 References

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Section 3.7 Recreation and Land Use Resources

3.7.1 Land Uses

The Project facilities are in south-central Larimer County, Colorado, about 14 miles west of the City and 14 miles east of Estes Park. The Project involves a combination of National Forest land, private land, and land owned by the City. Private lands are primarily used for residential homes and vacation cottages along the south bank of the river to the east of the dam. Most of this area is encompassed by the 2 Eagles Resort, which provides room and vacation cabin rentals (2 Eagles Resort 2010). The general land use setting and recreation facilities are shown on Figure 3.7-1.

The dam and reservoir are on National Forest land, immediately adjacent to the U.S. 34 corridor. After leaving National Forest land near the reservoir, the pipeline crosses multiple private parcels before reaching City-owned land (Larimer County 2010). The pipeline then reenters and crosses National Forest land for about 2,700 feet before reaching City land associated with the Viestenz-Smith Mountain Park. The hydroelectric plant is within the park.

The City currently has an easement for the dam, reservoir, and portions of the pipeline corridor on National Forest land. This easement expires in 2016. The City will apply for a special use permit to continue use of National Forest land (Howard, pers. comm. 2010). Research conducted by the City has not revealed any easements or agreements with private property owners along the pipeline (Howard, pers. comm. 2010).

3.7.2 Recreational Uses

The Project area is within the scenic Big Thompson Canyon, which is a recreation thoroughfare for visitors to the nationally important recreation areas of Estes Park and Rocky Mountain National Park. The canyon itself also provides a variety of land and water based recreational opportunities.

3.7.2.1 Water-based Recreation: Big Thompson Canyon, including Idylwilde Reservoir, is used as a recreational fishery, supporting both fly fishing and bait fishing. This reach of river includes a natural brown trout population, and is considered a fishing "hot spot" by the Colorado Division of Wildlife (CDOW 2010). The section of river below the dam is known locally to be a high quality fishery (2 Eagles Resort 2010). The Big Thompson River is not classified as a gold-medal trout stream (Colorado Fishing Network 2010).

The Big Thompson River through the Project area is used as a kayak run when the river flows are sufficient (above about 300 cfs) (Stafford and McCutchen 2007). While kayaking below the dam is becoming increasingly popular (Clark, pers. comm. 2011), it is not a major kayaking destination and is generally not used for rafting.

3.7.2.2 Land-based Recreation

Reservoir Facilities: Recreation facilities at Idylwilde Reservoir include a highway turnoff and parking area along the north side of the reservoir, a pit toilet, and an informational kiosk. This area is a popular wayside stop for visitors traveling through the canyon and is used for fishing access and sightseeing (including viewing nearby bighorn sheep) (Howard, pers. comm. 2010). There is paved parking for handicapped access near the pit toilet, but no handicapped access to the reservoir.

Viestenz-Smith Mountain Park: The City's Viestenz-Smith Mountain Park encompasses the hydroelectric plant on the eastern end of the Project area. The park is the most popular recreation destination within the Big Thompson Canyon, providing a variety of amenities including two large picnic areas, a playground, restrooms, a nature information center, and environmental education facilities (City of Loveland Parks and Recreation 2010a; Clark, pers. comm. 2011). The ruins of the former hydroelectric plant, destroyed in the 1976 flood, provide a historical interpretation opportunity. Across the highway to the south, the park also includes parking and trailhead facilities. The rebuilt hydroelectric plant is on the southern edge of the park near U.S. 34. The power plant tailrace discharges to a pond in the park, which drains to the Big Thompson River.

Trails: The Round Mountain National Recreation Trail (NFS trail #969) is on City and National Forest land on the eastern end of the Project area. The trailhead is along the south side of U.S. 34 across from the Viestenz-Smith Mountain Park. This trail system includes two trails that diverge about ¼ mile from the trailhead – the Foothills Nature Trail and the Summit Adventure Trail. The Foothills Nature Trail is a 1-mile segment that includes multiple nature and historical interpretation stations. The 4.5-mile Summit Adventure Trail climbs 2,700 feet to the summit of

Sheep Mountain (City of Loveland Parks and Recreation 2010b, 2010c; USDA Forest Service 2007) (Figure 3.7-1). The existing Idylwilde pipeline crosses the Round Mountain Trail twice, within the first ½ mile of the trail, as it descends toward the hydroelectric plant.

3.7.2.3 Current and Future Recreation Needs

The 2008 Colorado Statewide Comprehensive Outdoor Recreation Plan (SCORP) identifies the following recreation trends relevant to the Project area (Colorado State Parks 2008):

- Sightseeing, scenic driving, and walking are among the top 10 most popular outdoor activities in Colorado.
- About 41 percent of Colorado's population participate in trail-related activities (e.g., hiking), 33 percent participate in wildlife viewing, 15 percent participate in fishing, and 11 percent participate in paddle sports (e.g., kayaking).
- More than 75 percent of Coloradans participate in outdoor recreation activities on a weekly basis.
- The average distance traveled to recreate outdoors was 17 miles during the week and 41 miles on the weekend.
- Roughly one-half of survey participants identify "forests and/or lakes with limited trails, camping, boating, and fishing opportunities" as their preferred destination.

The SCORP does not identify any specific recreation needs that are relevant to the Project area.

The City's current (City of Loveland Parks and Recreation 2001) Parks Master Plan shows no alterations planned for recreation facilities over a 10-year horizon. That plan may be updated over the next several years, but there is currently no discussion about changes at Viestenz-Smith Mountain Park or Idylwilde Reservoir (City of Loveland Parks and Recreation 2001; Howard, pers. comm. 2010).

Shoreline management: The Project area contains a small diversion reservoir that does not have shoreline facilities or a shoreline management plan.

Special Designations: The Big Thompson River is not designated as, or eligible for inclusion in the National Wild and Scenic River System, and has no state-level protections or special designations. Reaches of the Big Thompson River above and below the Project area are included in the state's instream flow program (see the *Water Resources* section). However, the reach between the dam and tailrace return does not have an instream flow water right. None of the public lands within or adjacent to the Project area are designated as, or are under study for inclusion as, a Wilderness.

3.7.3 Potential Impacts

3.7.3.1 Direct and Indirect Impacts

Relicensing and continued operation of the existing Idylwilde Project facilities will not affect any recreation or land use resources.

3.7.3.2 Cumulative Impacts

Implementation of the Windy Gap Firming Project would slightly increase flows in the river in the Project area during some months (by up to 18 cfs during July) (see Water Resources section 3.2.1.6). These small increases in flow would not affect fishing in Idylwilde Reservoir or along the Big Thompson River through the Project area. Likewise, such small increases could benefit kayaking opportunities through the Project area, but those benefits would be negligible.

The Upper Front Range 2035 Regional Transportation Plan (CDOT 2008) identifies general goals and strategies for improvements to the U.S. 34 corridor through the Project area. The overall vision is to increase mobility, improve safety, and maintain system quality. Implementation of the general strategies outlined in the plan would benefit recreation resources in the Project area by improving the safety and accessibility of the highway corridor for visitors.

3.7.4 Mitigation Measures

No mitigation measures are recommended for recreation or land use resources.

3.7.5 Agencies Contacted

The agencies contacted for this report were:

Larry Howard
City of Loveland
200 N. Wilson Avenue
Loveland, Colorado 80537
970-962-3703

Adam Clark
Mountain Park Specialist
City of Loveland
970-962-3432

3.7.6 References

2 Eagles Resort. Estes Park Hotels, Cabins, Lodging: 2 Eagles Resort. 2010. Available at: http://www.2eaglesresort.com/index.html. Last accessed: November 24.

City of Loveland Parks and Recreation. 2001. Loveland Parks and Recreation Master Plan. October 16.

City of Loveland Parks and Recreation. 2010a. Viestenz-Smith Mountain Park Handout.

City of Loveland Parks and Recreation. 2010b. Foothills Nature Trail. Available at: http://www.ci.loveland.co.us/parksrec/FNT.htm. Last accessed: November 15.

City of Loveland Parks and Recreation. 2010c. Summit Adventure Trail. Available at: http://www.ci.loveland.co.us/parksrec/SAT.htm. Last accessed: November 15.

Clark, Adam. 2011. City of Loveland. Personal communication with Bill Mangle, ERO Resources Corporation. January 13.

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Stafford, E. and K. McCutchen. 2007. Whitewater of the Southern Rockies. Wolverine Publishing, Silt, CO.

USDA Forest Service. 2007. Round Mountain Trail (#969). Informational handout. Canyon Lakes Ranger District, Arapaho & Roosevelt National Forest. Fort Collins, CO. Last updated: January.

Section 3.8 Cultural and Historic Resources

3.8.1 Current Survey

A file and literature review was conducted with the Colorado Historical Society Office of Archaeology and Historic Preservation (CHS OAHP; ERO, 2011). The review area included Sections 1 and 2, Township 5 North, Range 71 West; Section 7, Township 5 North, Range 70

West of the 6th Principal Meridian in Larimer County, Colorado. A shapefile of the Project area was submitted to the OAHP with a request for a file search. Results were electronically provided on November 18, 2010.

The review identified one previous cultural resource inventory conducted within the Project area. Survey LR.FS.NR110 was conducted in 1977 for the reconstruction of Idylwilde Dam and associated facilities after the 1976 flood (Weber and Anderson 1977). Facilities and pipeline corridors surveyed included the dam site, a new hydroelectric plant, the existing pipeline corridor, and a proposed pipeline corridor between Big Thompson River and U.S. 34 that does not appear to have been built after the 1977 inventory. According to Weber and Anderson (1977), most of the 3,200 feet of the existing pipeline from the dam site to the community of Idylwilde was also destroyed by the 1976 flood. In addition to the replacement of almost 3,200 feet of pipeline west of Idylwilde, 1,000 feet of pipe southeast of Idylwilde was replaced due to its antiquity and ongoing deterioration. The dam, hydroelectric plant, and existing pipeline corridor surveyed are the same facilities included in the current Project.

3.8.2 Known Resources

While the previous inventory did not record any cultural resources in or near the Project area, several facilities included in the current Project area are historic cultural resources. The Idylwilde Hydroelectric Project began energy distribution in 1925. Although the original dam and hydroelectric plant were replaced after their destruction in the 1976 flood, both the reservoir and pipeline are potential historic properties. Neither of these resources has been formally recorded or evaluated for their eligibility to be listed on the National Register of Historic Places (NRHP).

The total pipeline length is 9,534 feet. At least a portion of the pipeline was replaced after World War II (Foothills Nature Trail 2011). Based on the previous 1977 inventory report, at least 4,200 feet of this pipeline was replaced after the 1976 flood. No sections of the pipeline have been replaced since 1977 (Howard, pers. comm. 2011). The entire pipeline is now steel, and five of the six wooden trestles have been replaced with steel (Pitts, pers. comm. 2011). Although the pipeline is most likely not eligible for the NRHP, formal documentation is required before an eligibility recommendation is rendered.

The project area also crosses the Round Mountain Trail (Figure 3.7-1) which was built by the Conservation Civilian Corps (CCC) in the 1930s. Portions of the trail have been rebuilt by the Loveland Ranger Force, a group of teenagers from Loveland (Summit Adventure Trail 2011). Other potential historic resources include some of the facilities at the Viestenz-Smith Mountain Park that were built by the CCC in the 1930s. Formal documentation is necessary before eligibility of these resources can be assessed.

3.8.3 Potential Impacts

The current Project only requires relicensing of the FERC Project No. P-2829. No modifications to existing facilities or disturbance within the Project area are anticipated; therefore, there is no direct effect to historic properties.

3.8.3.1 Direct and Indirect Impacts: Relicensing and continued operation of the existing Project facilities would not affect any cultural resources.

3.8.3.2 Cumulative Impacts: The proposed Project would have no cumulative impacts on cultural resources.

3.8.4 Mitigation Measures

No mitigation measures are recommended for cultural resources.

3.8.5 Agencies Contacted

The agency contacted for this report was:

Sarah Rothwell
Colorado Historical Society
Office of Archaeology and Historic Preservation
1300 Broadway
Denver, CO 80203-2137

3.8.6 References

ERO Resources Corporation. 2011. Cultural and Historic Resources - Idylwilde Hydroelectric Project. Denver, CO. January.

Foothills Nature Trail. 2011. City of Loveland Parks and Recreation Website. Available at: http://www.ci.loveland.co.us/parksrec/SAT.htm. Last accessed: January 17.

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Pitts, Tom. 2011. Personal communication with ERO Resources Corporation.

Summit Adventure Trail. 2011. City of Loveland Parks and Recreation website. Available at: http://www.ci.loveland.co.us/parksrec/SAT.htm. Last accessed: January 17.

Weber, D. and C.J. Anderson. 1977. Archaeological Reconnaissance of the Loveland Dam, Pipeline and Power Plant Site. Reports of the Laboratory of Public Archaeology No. 7. Prepared for L.J. Green & Associates. On file, Colorado Historical Society, Office of Archaeology and Historic Preservation.

Section 3.9 Tribal Resources

3.9.1 Impacts

No tribal lands or water rights occur in the vicinity of the Project. No cultural or historic tribal resources have been identified that are impacted by Project operations or would be impacted by the re-licensing of the Project (ERO, 2011).

3.9.2 Mitigation

No mitigation is proposed for tribal resources.

3.9.3 References

ERO Resources Corporation. 2011. Cultural and Historic Resources - Idylwilde Hydroelectric Project. Denver, CO. January.

4.0 Preliminary Issues and Recommended Studies

4.1 Geology and Soils

No preliminary issues related to geologic and soil resources were identified. No additional studies are recommended for geologic and soil resources.

4.2 Water Resources and Water Quality

4.2.1 Water Resources

Inflows to the reservoir and penstock and bypass flows are not directly measured. Inflow to the reservoir can be reasonably calculated by adding the measured flows of the Big Thompson River at the mouth of the canyon (USGS gage 06738000) to the Bureau of Reclamation Dille Tunnel diversions (State of Colorado site DILTUNCO). Penstock flows can be calculated from power generation data and turbine characteristics. Bypass flows can be calculated by subtracting the penstock flow from the inflow to the reservoir (Miller Ecological Consultants, Inc. 2010).

It is recommended 1) that improvements be made in measuring and recording water levels at the reservoir to increase reliability, and 2) that recording of hours of operation and output of the generators be automated to increase the accuracy of calculated penstock and bypass flows.

4.2.2 Water Quality

Due to the rapid flushing rate of the reservoir, there is likely little or no effect on water quality in or downstream of the reservoir. This is substantiated by water quality data collected upstream and downstream of the Project. .

It is recommended 1) that the City periodically review data being collected upstream and downstream of the Project to determine if the Project is affecting water quality and 2) that water temperature data be collected as described in Section 4.3.

4.3 Fish and Aquatic Resources

Information/Data Gaps
The reservoir and bypass reach have not been sampled for fish or invertebrates in recent years. In addition, water quality data for the reservoir and bypass reach has not been monitored on a continuous basis. Recommended activities to fill information gaps are provided below.

FISH POPULATIONS

Objective: Identify current status and potential impact of bypass on fish populations.

The fish community has been sampled at several locations along the Big Thompson River over many years. Nevertheless, sampling within the 1.6-mile bypass reach could provide more information as to whether the hydroelectric project is having any effect on the fish community. Electrofishing a 500-foot section within the bypass reach using standard CDOW procedures (fall sampling in September or October) would be sufficient to describe the fish community. A single sampling is recommended in fall of 2011.

Recommended Data Collection: Fish sampling for population and species composition in the bypass reach in the fall of 2011 for at least one 500 foot section.

MACROINVERTEBRATE COMMUNITY

Objective: Identify current status of macroinvertebrate populations.

While data regarding the macroinvertebrate community were collected within the bypass reach, the data are now nearly 20 years old. More up-to-date information about the macroinvertebrate community would be useful not only in describing the availability of food for trout but also because certain macroinvertebrate metrics are indicators of stream health.

Recommended Data Collection: Macroinvertebrate sampling in the bypass reach, upstream of the reservoir and downstream of the tailrace. The sampling should occur in late September or early October 2011 at the listed locations. Three replicate quantitative samples should be collected in riffle habitat at each location.

WATER TEMPERATURE

Objective: Identify the potential temperature impacts of the project.

No data is available on potential temperature impacts of the project.

Recommended Data Collection: Hourly water temperature data in the reservoir, Big Thompson River upstream of the reservoir, downstream of the dam, in the tailrace and downstream of the tailrace collected for a period of 12 months. This data collection would require installation of data loggers and a once per month retrieval of the data.

4.4 Wildlife Resources

No preliminary issues or additional studies are necessary regarding wildlife resources.

4.5 Botanical Resources

No preliminary issues or additional studies are necessary regarding botanical resources, wetlands, riparian, or littoral habitat.

4.6 Rare, Threatened and Endangered Species

No preliminary issues or additional studies are necessary regarding rare, threatened and endangered species.

4.7 Recreation and Land Use

No preliminary issues have been identified regarding recreation or land use. No additional studies are needed for recreation or land use resources.

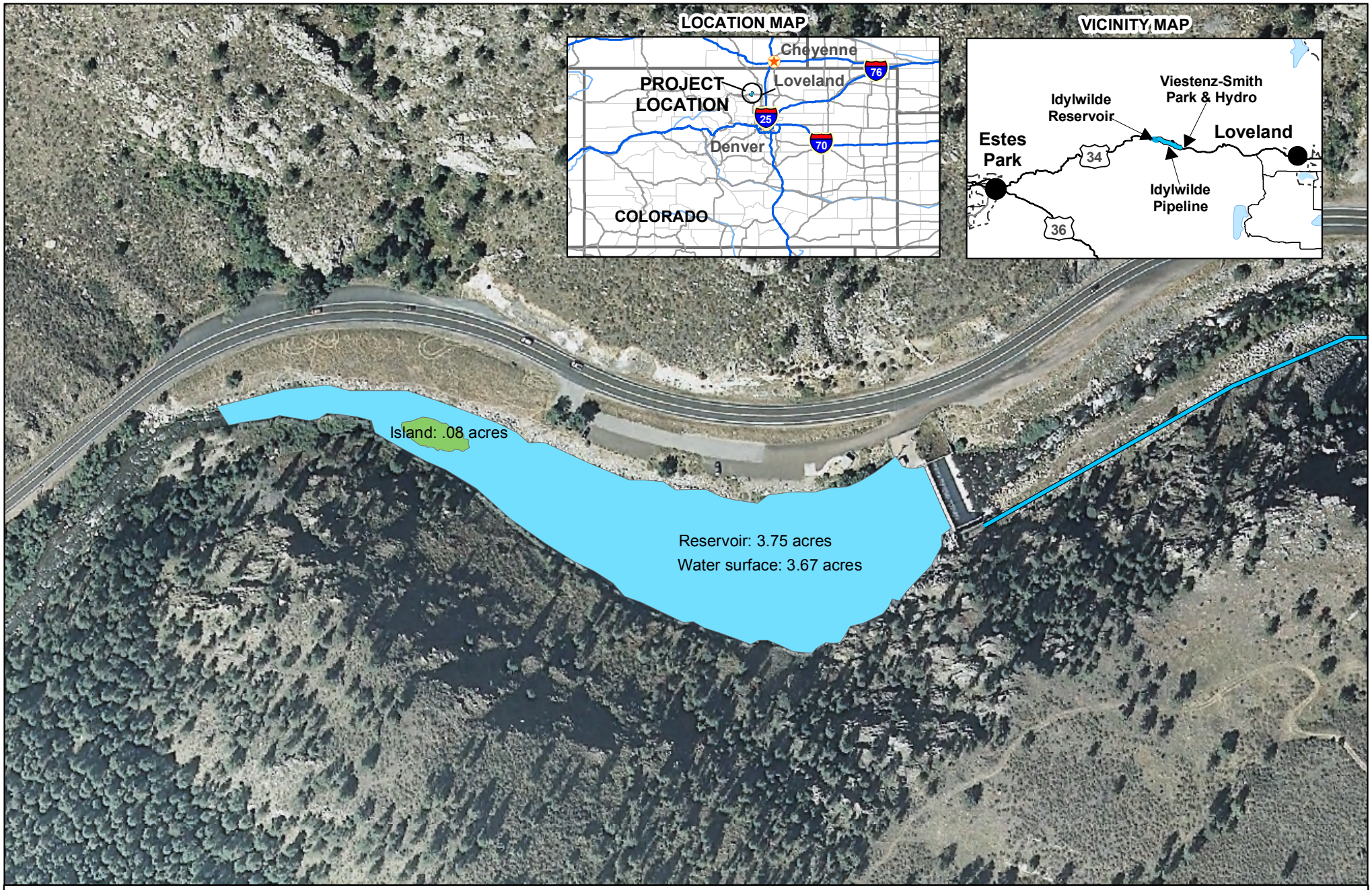
4.8 Cultural Resources

No preliminary issues have been identified for cultural resources. No further cultural resource studies are required in the absence of direct effects. If modifications to the pipeline or reservoir are planned in the future, formal documentation of historic properties is recommended.

4.9 Tribal Resources

No effects on or preliminary issues regarding tribal resources have been identified. No studies are recommended.

5.0 Figures



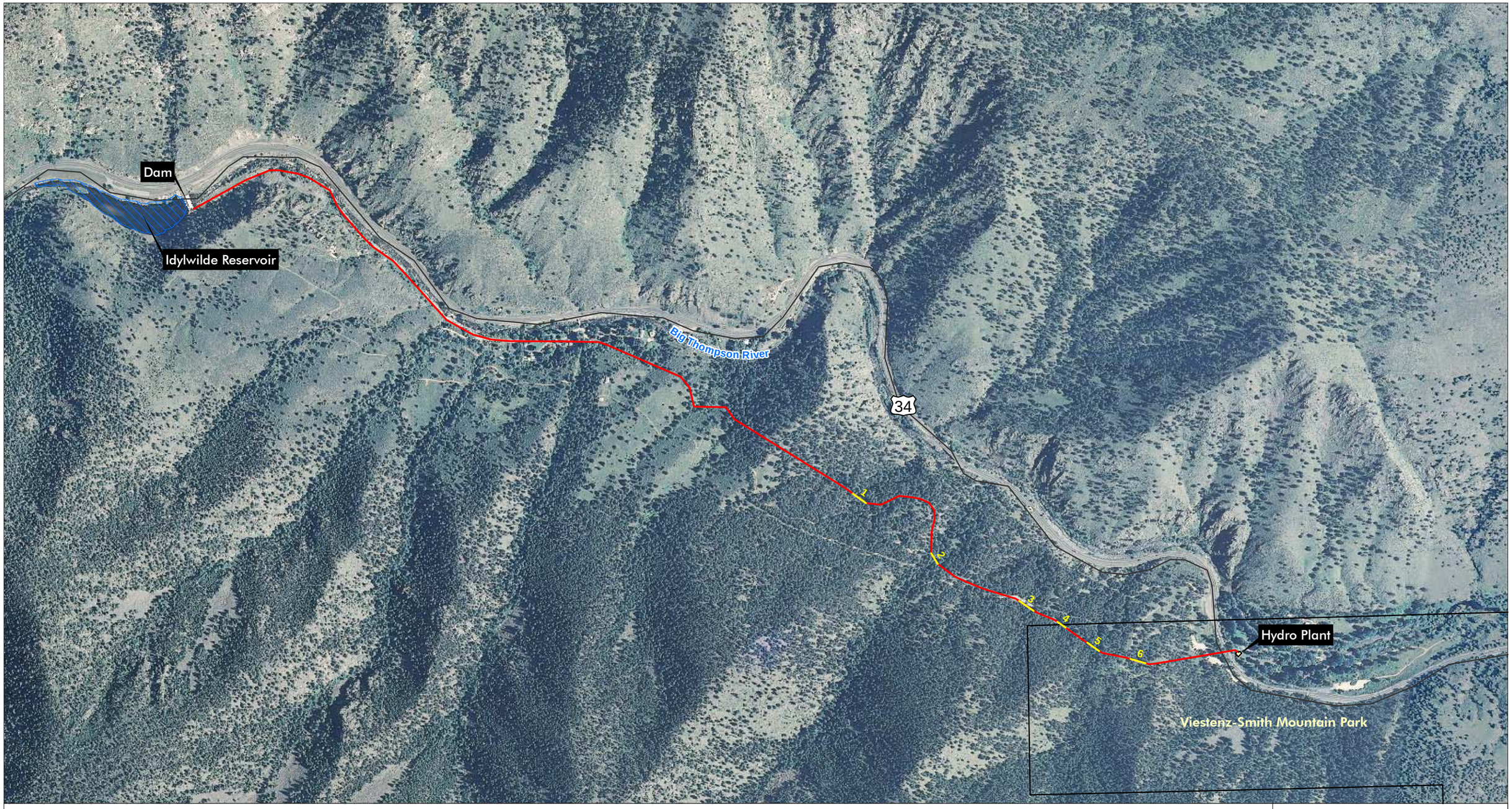
City of Loveland

Figure 1-1. Idylwilde Project Location Map

N

0 100 200
Feet

Aerial: 2009
Prepared: Feb. 2, 2011



Idylwilde Hydroelectric Project

- Idylwilde Pipeline
- Trestles
- Hydro Plant
- Reservoir

Image Source: USDA NAIP, 2009
Data Source: City of Loveland

0 350 700 feet

N

Figure 1-2
Project Features

Prepared for: Water Consult
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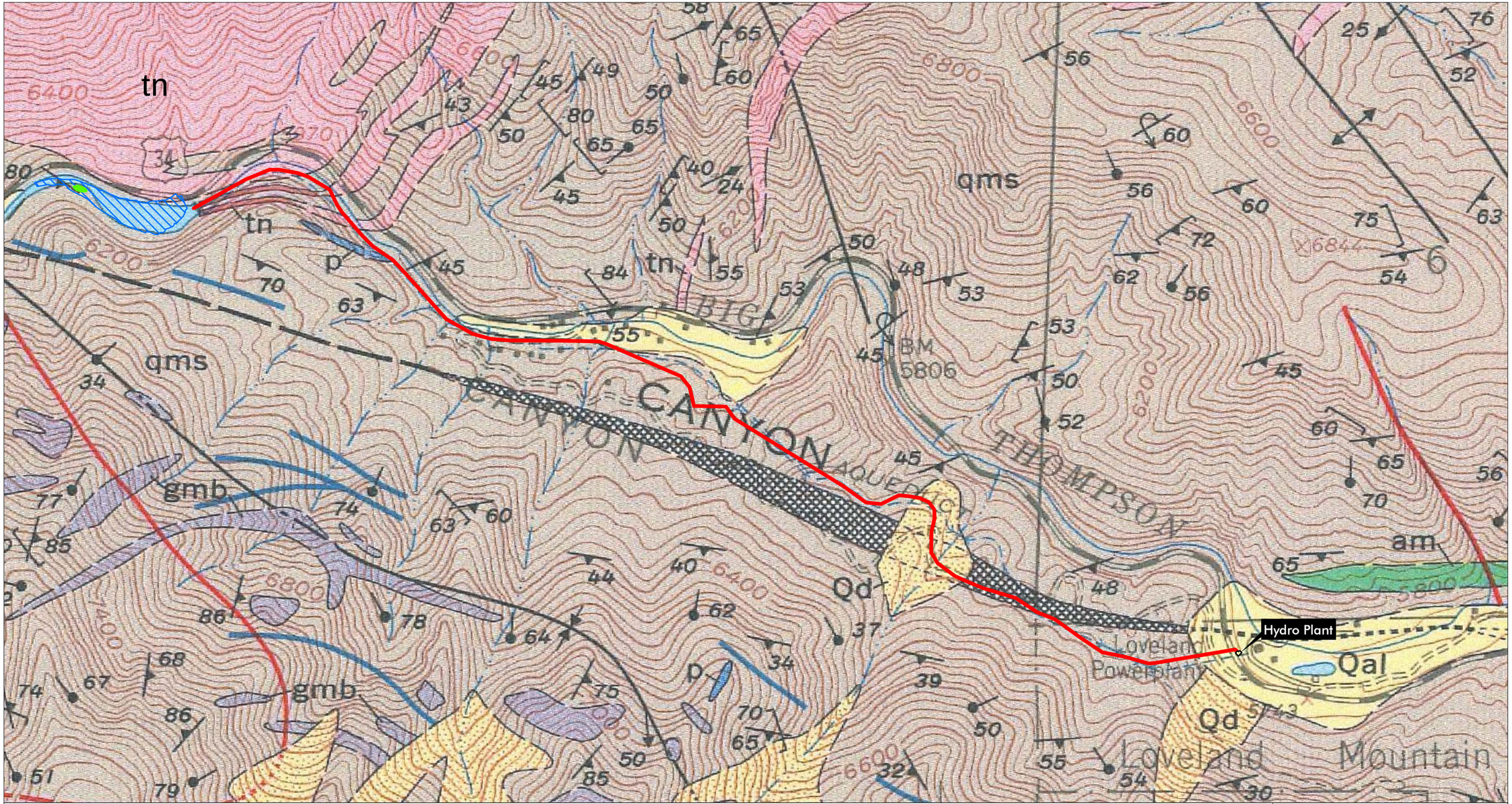
February 2011

ERO Resources Corp.



Idylwilde Hydroelectric Project

- Idylwilde Pipeline
- Hydro Plant
- Island
- Reservoir

Qd — Undivided deposits
Includes alluvial fan deposits, talus, and solifluction debris

Qal — Alluvium

Qg — Terrace gravel

Tb — Boulder deposits
Consists of large boulders of pegmatite and biotite. The body in the southeast corner of the quadrangle also contains boulders derived from the Lyons Sandstone (Permian) and Fountain Formation

p — Pegmatite
In irregularly d… veined. Most p… biotite-muscov… the Boulder Cree…

tn — Trondhjemite
Light-gray, coarse, from medium grained and equigranular to very fine grained and porphyritic; typically nonfoliated; may be discordant or concordant

tam — Mixed tonalite and metamorphic rock
Consists of breccia produced by magmatic stoping, of the hills in metamorphic rock showing little effect of reaction, or of migmatite in which there has been much reaction

bcg — Boulder Creek Granodiorite
Light- to dark-gray medium-grained granodiorite commonly forming foliated roof-pendant bodies

am — Amphibolite
Dark-gray to black well to poorly foliated rock composed of hornblende, quartz, and plagioclase

gmb — Biotite-muscovite granite
Gray or pink fine-grained granite that is typically discordant

pgb — Mixed biotite-muscovite granite and pegmatite

Fault or fracture zone, showing dip
Arrow where approximately located or inferred; dotted where concealed

qms, mks, bsc — Metasedimentary rocks
Mineralogy varies with metamorphic grade; muscovite, quartz, plagioclase, and biotite are ubiquitous; chlorite, tourmaline, garnet, staurolite, andalusite, and sillimanite may be present
qms, interbedded quartzofeldspathic schist and gneiss and mica schist and gneiss. Contains thin beds of knotted mica schist and granule to pebble metaconglomerate
mks, knotted mica schist characterized by porphyroblasts of staurolite and/or andalusite or by knots of sillimanite. May contain thin beds of granule to pebble metaconglomerate and quartzofeldspathic schist
bsc, porphyroblastic biotite schist characterized by abundant porphyroblasts of coarse biotite

Data Source: Braddock et al., 1970

0 350 700 feet

N

Figure 3.1-1
Idylwilde Project Geology

Prepared for: Water Consult
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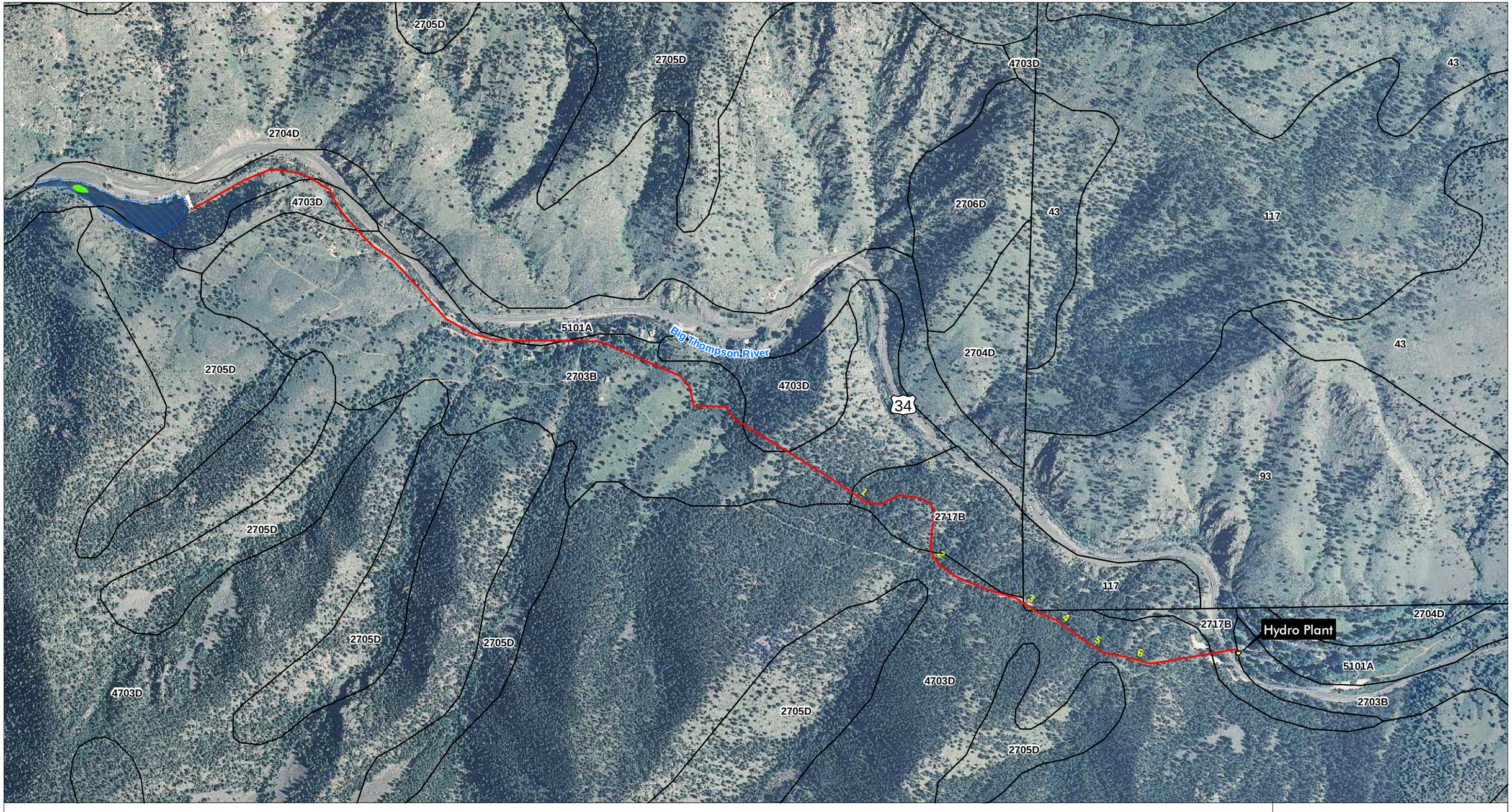
February 2011

ERO Resources Corp.



Idylwilde Hydroelectric Project

Larimer County Area
- 43 - Haploborolls-Rock outcrop complex, steep
- 93 - Rock outcrop
- 117 - Wetmore-Boyle-Rock outcrop complex, 5 to 60 percent slopes

Arapahoe-Roosevelt National Forest Area
- 2703B - Cypher-Ratake families complex, 5 to 40 percent slopes
- 2704D - Typic Haplustolls-Cathedral family-Rock outcrop complex, 40 to 150 percent slopes
- 2705D - Ratake-Cathedral families-Rock outcrop complex, 40 to 150 percent slopes
- 2706D - Cypher family-Rock outcrop complex, 40 to 150 percent slopes
- 2717B - Cypher-Wetmore-Ratake families complex, 5 to 40 percent slopes
- 4703D - Bullwark-Catamount families-Rock outcrop complex, 40 to 150 percent slopes
- 5101A - Pachic Argiustolls-Aquic Argiudolls complex, 0 to 15 percent slopes

- Idylwilde Pipeline
- Trestles
- Hydro Plant
- Island
- Reservoir

Image Source: USDA NAIP, 2009
Data Source: NRCS

0 350 700 feet

N

Figure 3.1-2
Idylwilde Project Soils

Prepared for: Water Consult
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February 2011

ERO Resources Corp.

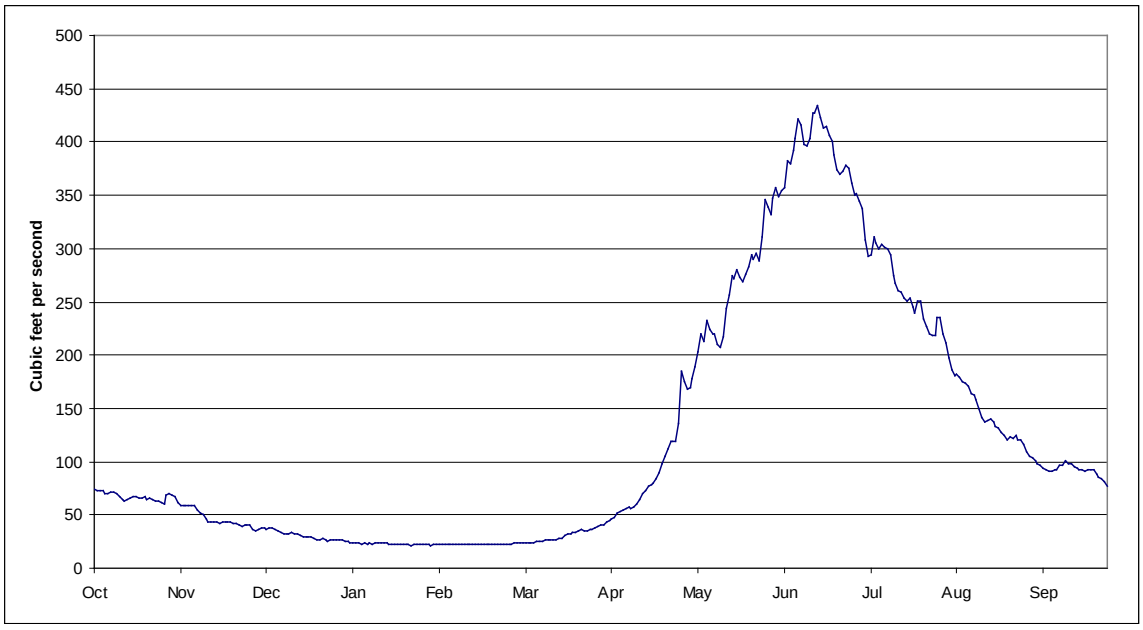


Figure 3.2-1. Average daily flow of Big Thompson River at Idylwilde Hydroelectric Project reservoir, 1957-2009.

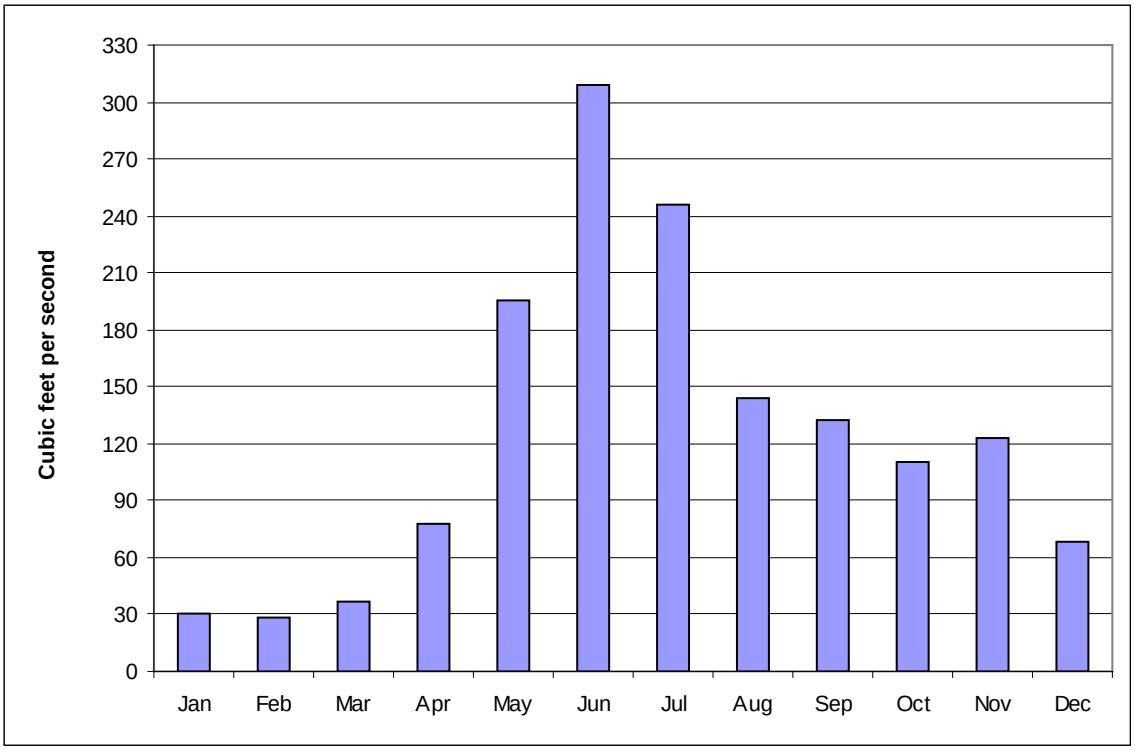


Figure 3.2-2. Average monthly reservoir flows at Idylwilde Reservoir, 2006 to 2009.

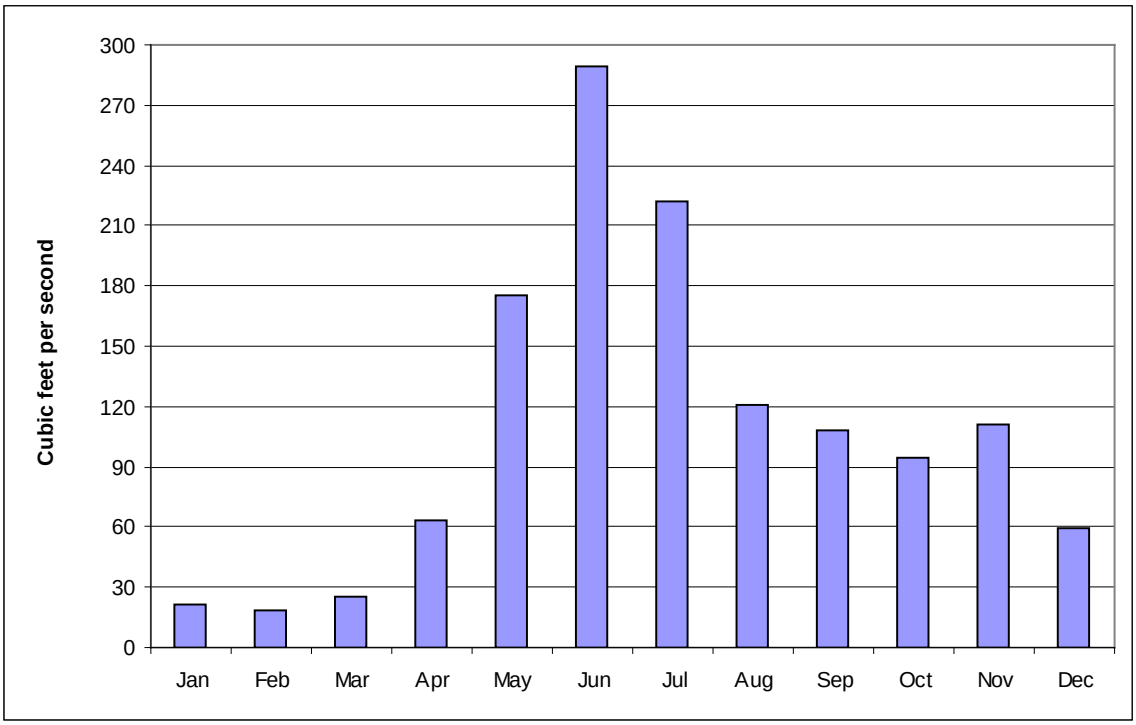


Figure 3.2-3. Average monthly bypass flows at Idylwilde Reservoir, 2006 to 2009.

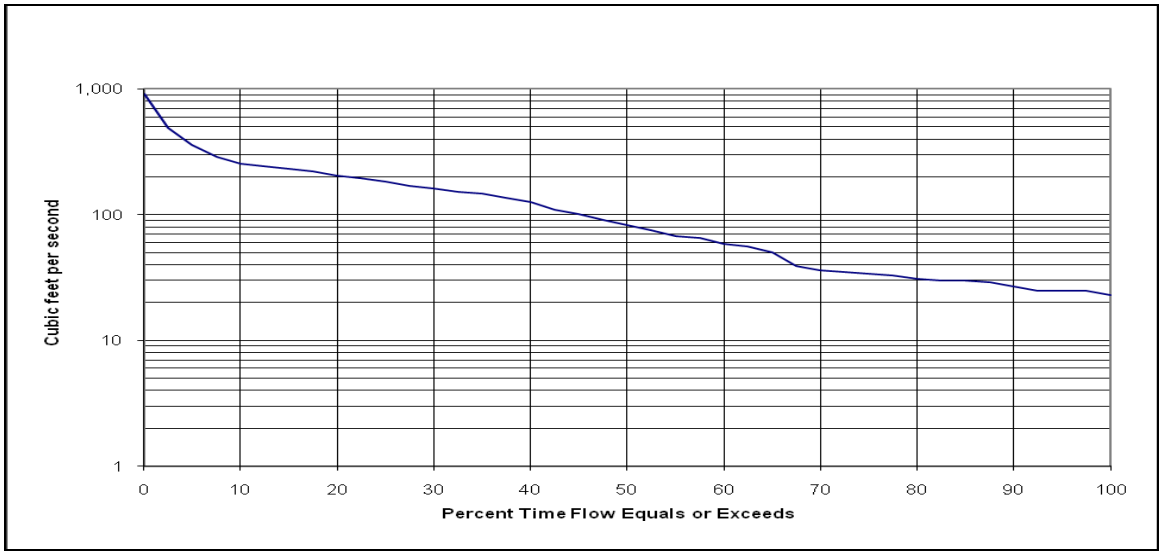


Figure 3.2-4. Idylwilde Flow Duration Curve for Reservoir Inflows, 2006-2009.

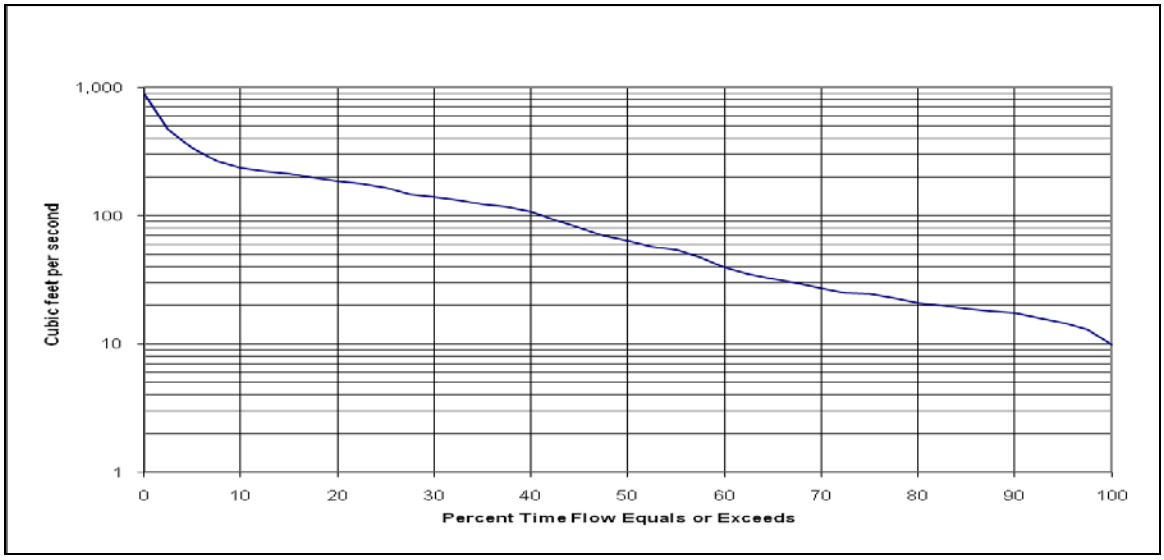


Figure 3.2-5. Idylwilde Flow Duration Curve for Bypass Flows, 2006-2009.

Figure 3.3-1. Fish population collection sites in the Big Thompson River from Lake Estes downstream to the mouth of the canyon.

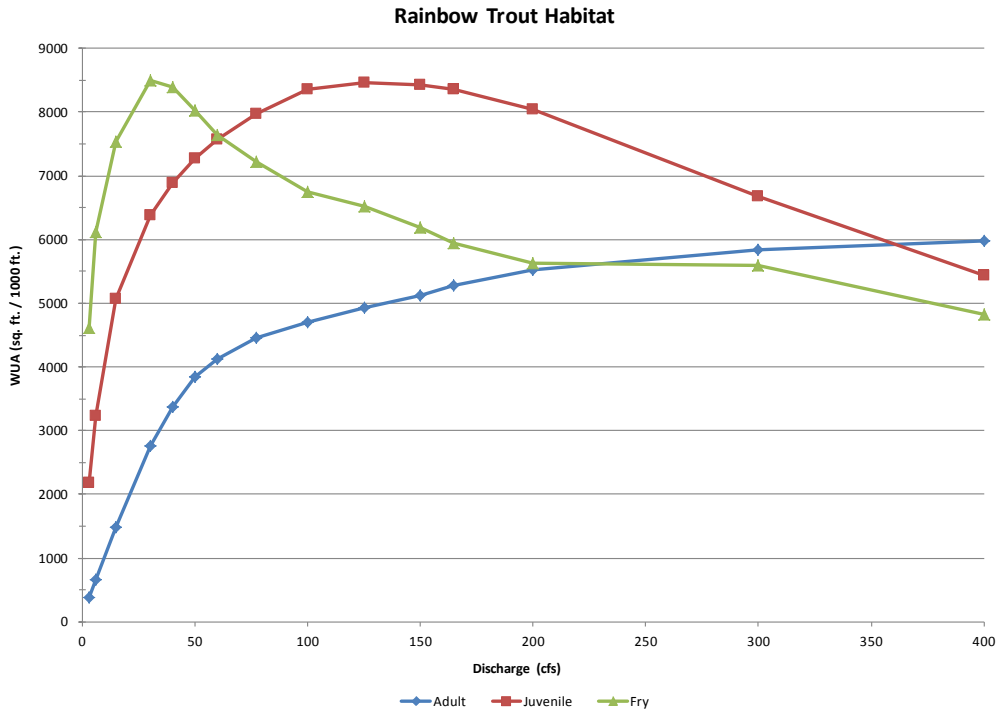


Figure 3.3-2. Weighted usable area versus discharge for rainbow trout.

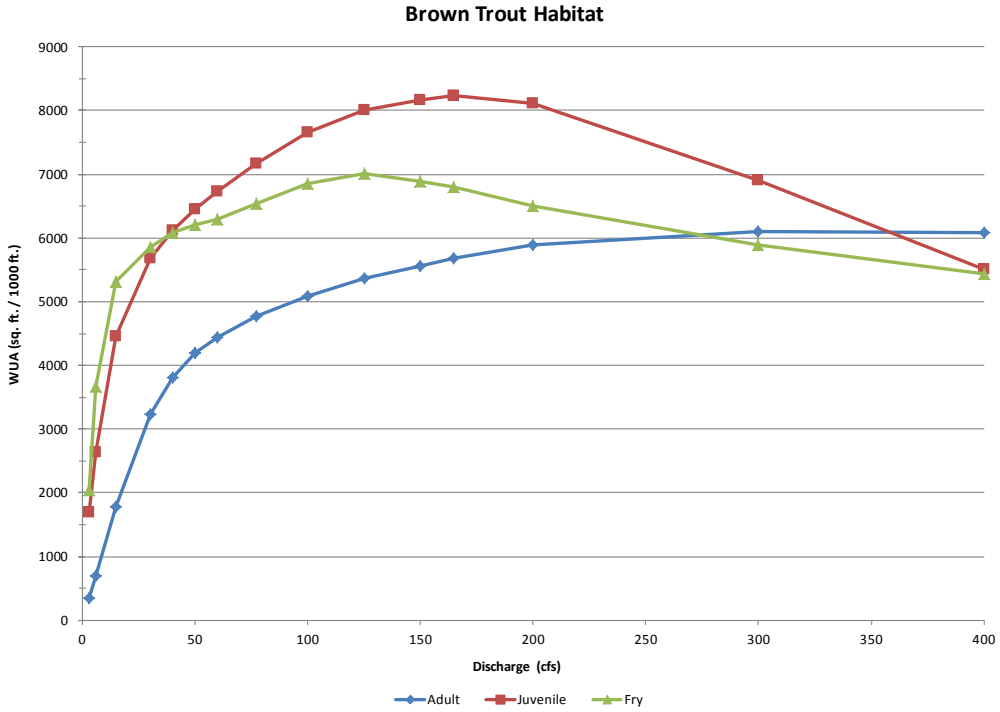


Figure 3.3-3. Weighted usable area versus discharge for brown trout.

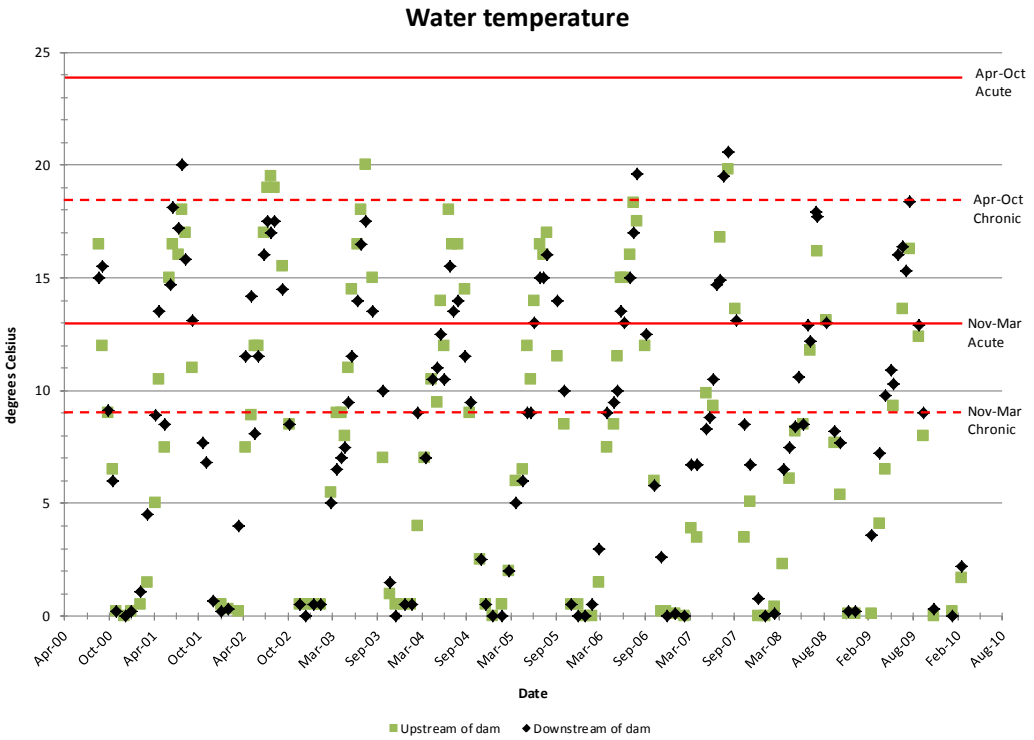


Figure 3.3-4. Water temperature measured at USGS gages upstream and downstream of Idylwilde Dam. Acute and chronic levels are from CDPHE (2010).

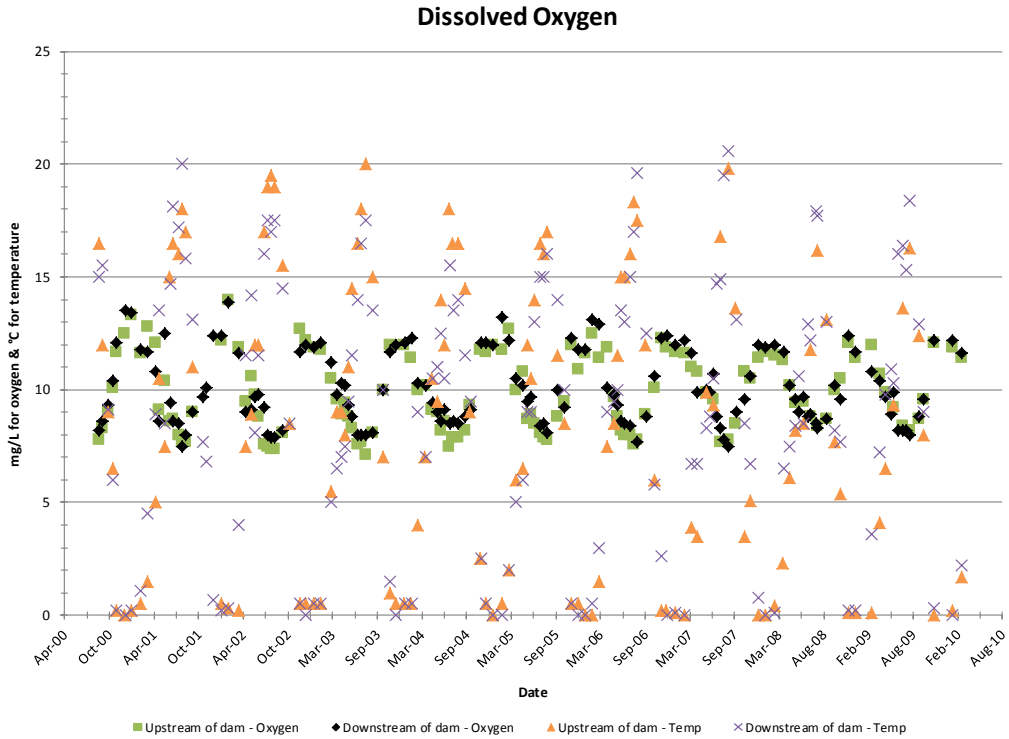
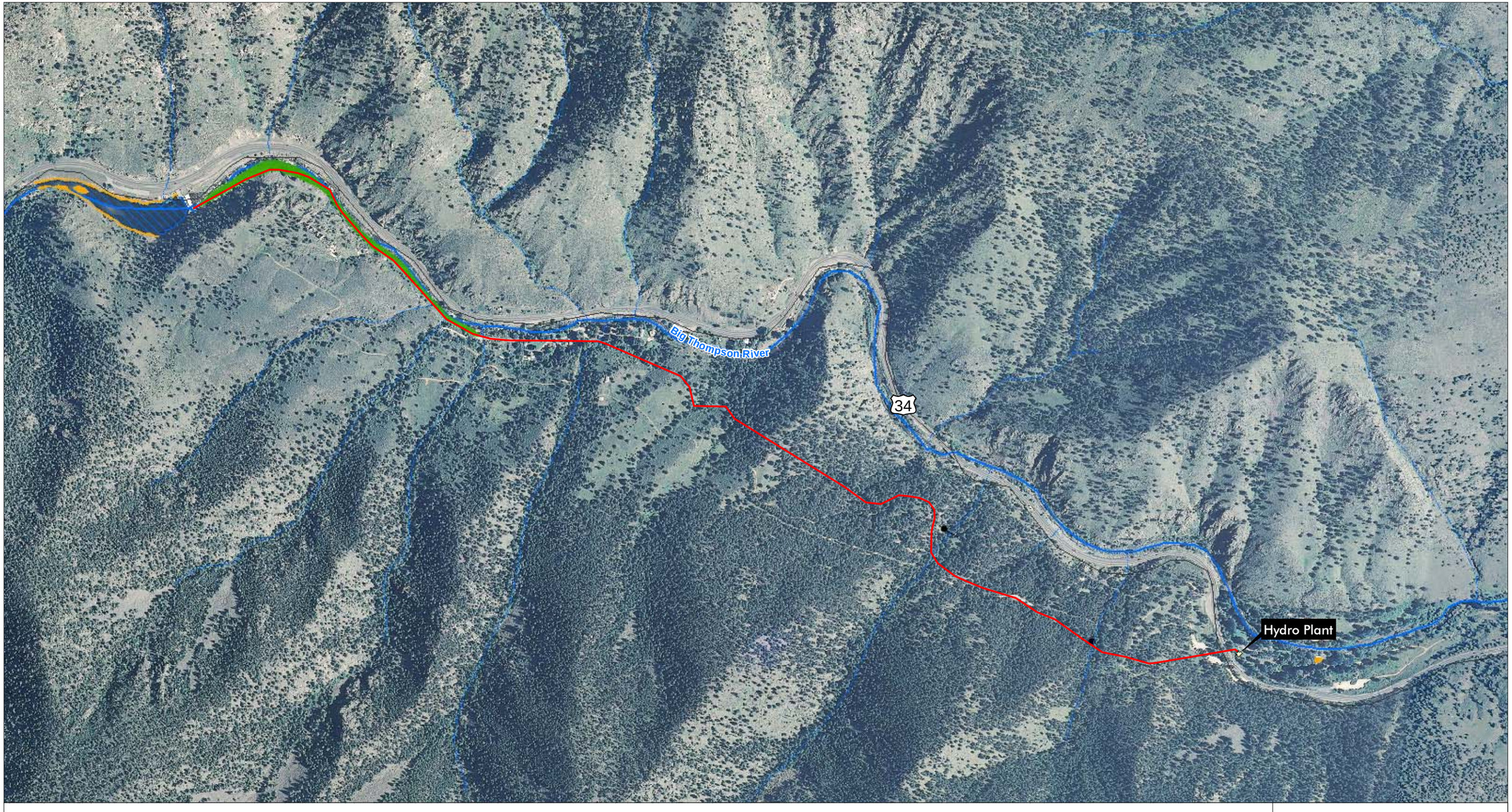


Figure 3.3-5. Levels of dissolved oxygen measured at USGS gages upstream and downstream of Idylwilde Dam. Temperature data are also provided for comparison.



Idylwilde Hydroelectric Project

- Potential Wetland
- Riparian Habitat
- Idylwilde Pipeline
- Hydro Plant
- Reservoir

NHD Flowline

- Canal Ditch: Aqueduct
- Stream/River: Intermittent
- Stream/River: Perennial

Image Source: USDA NAIP, 2009
Data Source: NHD

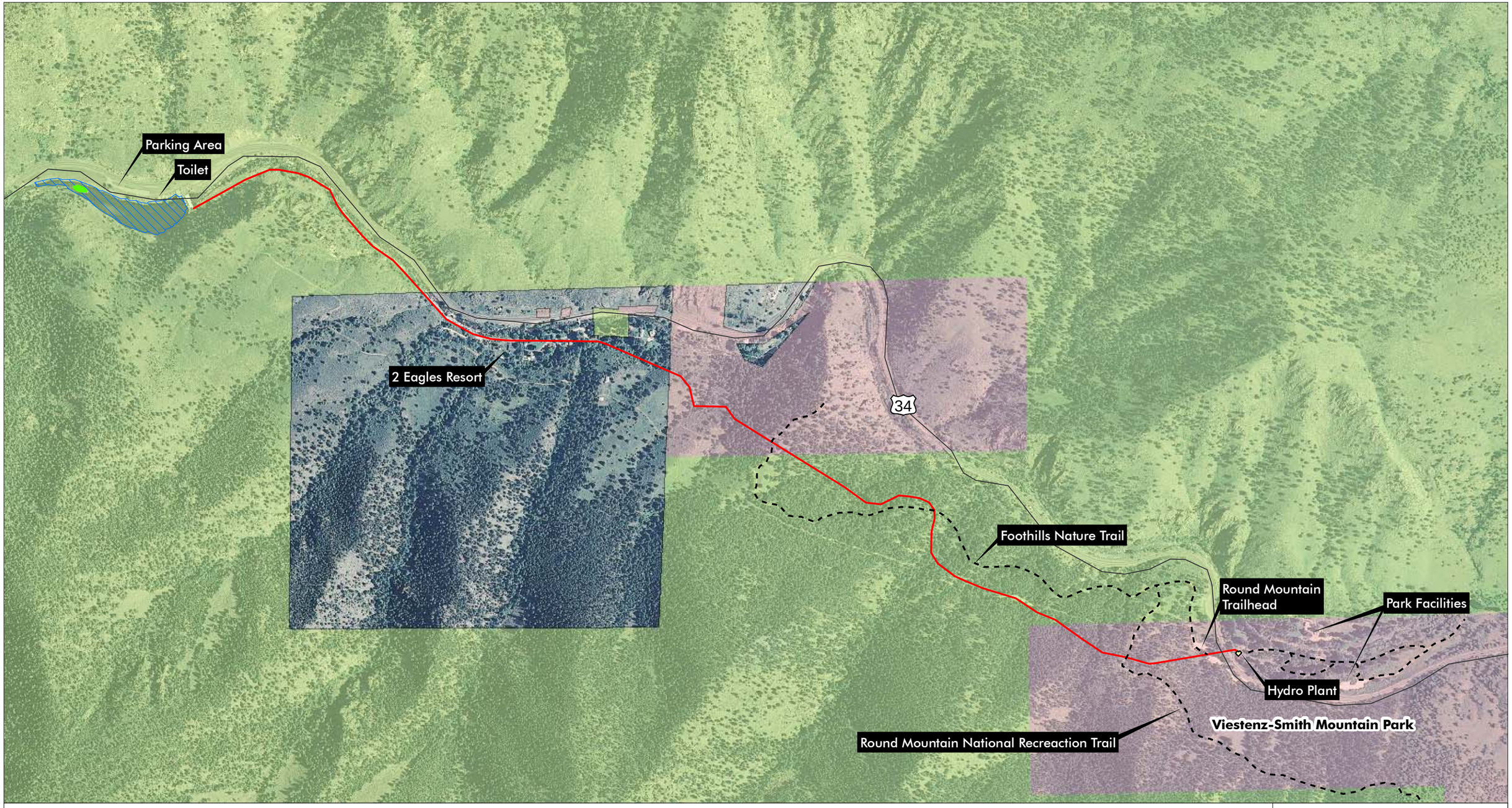
0 350 700 feet

N

Figure 3.5-1
Wetland and Riparian Vegetation

Prepared for: Water Consult
File: 4872 - fig 3_5-1 wet and rip veg.mxd (WH)
February 2011

ERO Resources Corp.



Idylwilde Hydroelectric Project

- Trails
- U.S. Forest Service
- City of Loveland
- Private
- Idylwilde Pipeline
- Hydro Plant
- Island
- Reservoir

Image Source: USDA NAIP, 2009
Data Source: COMAP

0 350 700 feet

N

Figure 3.7-1
Recreation and Land Use

Prepared for: Water Consult
File: 4872 - fig 3_7-1 rec and land use.mxd (WH)
February 2011

ERO Resources Corp.

6.0 Agency Contacts and Mailing List

6.1 Agency Contacts

The City of Loveland conducted an extensive effort to contact federal, state, and local agencies, special interest groups, area homeowners in the vicinity of the pipeline, and ditch companies that might have an interest in relicensing of the Idylwilde Project in the fall, 2010. Six of the agencies requested meetings, and those meetings were conducted in 2010. City staff also met with two area homeowners in the vicinity of the Project. Several agencies and interest groups indicated no need for a meeting or did not respond. Documentation of agency, interest group, and homeowner contacts is provided in Table 6.1-A.

6.2 Mailing List

The City compiled an extensive mailing list for the Idylwilde Project FERC relicensing process. The Notice of Intent and the letter requesting to use the Traditional License Process were provided to every party on the mailing list via email or U.S. mail. The mailing list includes all federal, state, and local agencies and interest groups contacted during the initial phase of the Project and tribes that may have an interest in the Project. Counties, municipalities, water and wastewater districts, ditch and reservoir companies within 15 miles of the Project, are on the list. Statewide, national, and local interest groups are included. The list includes homeowners in the vicinity of the Project. The mailing list is provided in Table 6.2-A.

Table 6.1-A Agency Contacts

Entity	POC & Mailing Address	PHONE / FAX	Date Response Yes/Meeting	Date Response No/Meeting	Date Meeting is Done	NOTES
FERC	James Fargo Federal Energy Regulatory Commission 888 First Street, NE Washington, DC 20426	202-502-6211			3/5/2010	
Big Thompson Watershed Forum	Zach Shelley 800 S. Taft Avenue Loveland, CO 80537	613-6163	10/20/10		11/2/10	
Colorado Department of Public Health and Environment	John Hranac Surface Water Specialist WQ Control Division WQDC-WSP-EDU-B1 4300 Cherry Creek Drive South Denver, CO 80246-1530	303-692-3586 -P 303-782-0390 -F	10/13/10		11/3/10	
Colorado Department of Transportation	Gloria Hice-Idler CDOT Division Four 1420 2nd Street Greeley, CO 80631	350-2148		10/20/10	n/a	Myron Hora gave me contact information
Colorado Division of Wildlife	Larry Rogstad 4207 W. Couthy Road 16E Loveland, CO 80537	303-302-7394	10/26/10		11/8/10	Response message on 10-26 from Mark Uppendahl.
Colorado State Engineers Office	John Batka 810 9th Street #200 Greeley, CO 80631	352-8712 x 1251		10/7/10	n/a	
Colorado State Historic Preservation Officer	Edward Nichols Civic Center Plaza 1560 Broadway #400 Denver, CO 80202	303-866-3392		Not right now	n/a	SHPO will review report before scheduling meeting.

Table 6.1-A Agency Contacts

Larimer County - Natural Resources	Gary Buffington 1800 S. County Road 31 Loveland, CO 80537	679-4570	No response	No response	n/a	Dale Miller from Road and Bridge said Gary has a lot of knowledge, so sent him a letter. Received no response.
Larimer County - Planning	Rob Helmick 200 W. Oak Street Fort Collins, CO	498-7682	Voicemail 10/15/2010		10/27/10	
Larimer County - Road and Bridge	Dale Miller2643 Midpoint DriveFort Collins, CO 80524	498-5653	No response	No response	n/a	Also left vm message 10-29-10. Received no response.
Northern Colorado Water Conservancy District	Eric Wilkinson 220 Water Avenue Berthoud, CO 80513	532-7700		10/19/10	n/a	
US Bureau of Land Management	Edward Rumbold 2850 Youngfield Street Lakewood, CO 80215	303-239-3600		10/22/10	n/a	
US Bureau of Reclamation	Andrew Gilmore 11056 W. County Road 18E Loveland, CO 80537	962-4362		10/20/10	n/a	Alt. Carlie Ronca, cronca@usbr.gov, 962-4350. Liaison: Kara Lamb klamb@usbr.gov
US Environmental Protection Agency	Melanie Wasco NEPA Compliance and Review Program 1595 Wynkoop Street Denver, CO 80202-1129	303-312-6540	X		11/5/10	Was appointed by her supervisor Suzanne Bohan
US Fish and Wildlife	Sandy Vana-Miller USFWS, ES, Colorado Field Office P.O. Box 25486 DFC (MS 65412) Denver, Colorado 80225-0486	303-236-4748		10/21/10	n/a	Wrote Susan Linner for contact information, 10-8. Response by Sandy Vana-Miller.
US Forest Service	Sue Greenley Canyon Lakes Ranger District 2150 Centre Avenue, Buidling E Fort Collins, CO 80526	295-6735 (P) 295-6795 (F)	X		3/18/10	

Table 6.1-A Agency Contacts

SPECIAL INTERESTS					
●Palisade Area Home Owners	Jerry Dauth	493-2503			Responses from and meetings with 2 different residents.
	Joe Wright	663-2517			
●Trout Unlimited	Colorado Trout Unlimited 1320 Pearl Street #320 Boulder, CO 80302	303-440-2937			Wrote to President Colorado chapter 10-20 Sent same msg on 10-26, added David Nickum and John Gerstle
●Ditch Companies	n/a	n/a			Letters sent October 21via US mail to each ditchcompany president.Asked for a response by Nov. 1if they'd like a meeting.
Hillsborough	Abraham Sauer 6491 County Road 50 Johnstown, CO 80534	587-2324			
Seven Lakes	Vern Kamerzell 12614 Highway 60 Milliken, CO 80543	587-2108			
Farmers	Jim Croissant 26442 Weld County Rd. 15 Johnstown, CO 80534	669-4976			
Home Supply	Minera Lee 220 Water Avenue Berthoud, CO 80513	622-2212			
Buckingham	Henry Hetzel 1931 S. County Rd. 19 Loveland, CO 80537	667-9821			
Big T	Dick Coulson 3609 N. County Rd. 13 Loveland, CO 80538	667-2178		X	Dick called 10-25 to say that the ditch company has no problem with us relicensing.
Louden	Dale Leach 4009 E. County Rd. 30 Fort Collins, CO 80528	226-1322			

Table 6.1-A Agency Contacts

GLIC	Dave Bernhardt 23809 WCR 25 Milliken, CO 80543	587-2222			
South Side	Gale Bernhardt 2633 Logan Drive Loveland, CO 80538	667-9821 VP Henry Hetzel			
Ryan Gulch	Bill Beierwaltes 1907 Gail Court Loveland, CO 80537	667-3255			
Handy Ditch	Brad Johnson 1132 E. Highway 56 Berthoud, CO 80513	532-9991		X	Brad called 10-25 to say Handy Ditch has no reservations, questions or concerns.
TRIBES					FERC sent letter to Tribes; no responses
Southern Ute Indian Tribe of the Southern Ute Reservation	Matthew Box, ChairmanP.O. Box 737Ignacio, CO 81137	n/a			
Northern Cheyenne Tribe	Leroy Spang, President P.O. Box 128 Lame Deer, MT 59043	n/a			
Cheyenne and Arapaho Tribes of Oklahoma	Janice Boswell, Governor P.O. Box 38 Concho, OK 73022	n/a			
Northern Arapaho Business Council Wind River Indian Reservation	Harvey Spponhunter, Chairman P.O. Box 396 Ft. Washakie, WY 82514	n/a			
Ute Mountain Tribe of the Ute Mountain Reservation	Earnest House, Chairman P.O. Box 448 Towaoc, CO 81334	n/a			
Ute Indian Tribe of the Uintah and Ouray Reservation	Curtis Cesspooch, Chairman P.O. Box 190 Fort Duchesne, UT 84026	n/a			

Table 6.2-A Idylwilde Project Mailing List

Entity	POC & Mailing Address
Big Thompson Watershed Forum	Zach Shelley 800 S. Taft Avenue Loveland, CO 80537
Colorado Department of Public Health and Environment	John Hranac Surface Water Specialist WQ Control Division WQDC-WSP-EDU-B1 4300 Cherry Creek Drive South Denver, CO 80246-1530
Colorado Division of Transpiration	Gloria Hice-Idler CDOT Division Four 1420 2nd Street Greeley, CO 80631
Colorado Division of Wildlife	Larry Rogstad 4207 W. County Road 16E Loveland, CO 80537
Colorado State Engineers Office	John Batka 810 9th Street #200 Greeley, CO 80631
Colorado State Historic Preservation Officer	Edward Nichols Civic Center Plaza 1560 Broadway #400 Denver, CO 80202
Larimer County - Natural Resources	Gary Buffington 1800 S. County Road 31 Loveland, CO 80537
Larimer County - Planning	Rob Helmick 200 W. Oak Street Fort Collins, CO
Larimer County - Road and Bridge	Dale Miller 2643 Midpoint Drive Fort Collins, CO 80524
Northern Colorado Water Conservancy District	Eric Wilkinson 220 Water Avenue Berthoud, CO 80513
US Bureau of Land Management	Edward Rumbold 2850 Youngfield Street Lakewood, CO 80215
US Bureau of Reclamation	Andrew Gilmore 11056 W. County Road 18E Loveland, CO 80537
US Environmental Protection Agency	Melanie Wasco NEPA Compliance and Review Program 1595 Wynkoop Street Denver, CO 80202-1129

Table 6.2-A Idylwilde Project Mailing List

US Fish and Wildlife	Sandy Vana-Miller USFWS, ES, Colorado Field Office P.O. Box 25486 DFC (MS 65412) Denver, Colorado 80225-0486
US Corps of Engineers	Franklin Scott 9307 S. Wadsworth Boulevard Littleton, CO 80128
US Forest Service	Sue Greenley Canyon Lakes Ranger District 2150 Centre Avenue, Bldg. E Fort Collins, CO 80526
TRIBES	
Southern Ute Indian Tribe of the Southern Ute Reservation	Matthew Box, Chairman P.O. Box 737 Ignacio, CO 81137
Northern Cheyenne Tribe	Leroy Spang, President P.O. Box 128 Lame Deer, MT 59043
Cheyenne and Arapaho Tribes of Oklahoma	Janice Boswell, Governor P.O. Box 38 Concho, OK 73022
Northern Arapaho Business Council Wind River Indian Reservation	Harvey Spponhunter, Chairman P.O. Box 396 Ft. Washakie, WY 82514
Ute Mountain Tribe of the Ute Mountain Reservation	Earnest House, Chairman P.O. Box 448 Towaoc, CO 81334
Ute Indian Tribe of the Uintah and Ouray Reservation	Curtis Cesspooch, Chairman P.O. Box 190 Fort Duchesne, UT 84026
COUNTIES	
Boulder County	1325 Pearl Street Boulder, CO 80302
Larimer County	200 W. Oak Street Fort Collins, CO 80521
Weld County	915 10th Street Greeley, CO 80631
MUNICIPALITIES	
Berthoud, Town of	328 Massachusetts Avenue Berthoud, CO 80513
Estes Park, Town of	170 MacGregor Avenue Estes Park, CO 80517

Table 6.2-A Idylwilde Project Mailing List

Fort Collins, City of	300 LaPorte Avenue Fort Collins, CO 80521
Johnstown, Town of	450 S. Parish Avenue Johnstown, CO 80534
Lyons, Town of	432 5th Avenue Lyons, CO 80540
Mead, Town of	441 3rd Street Mead, CO 80542
Timnath, Town of	4800 Goodman Street Timnath, CO 80547
Windsor, Town of	301 Walnut Street Windsor, CO 80550
W/WW ENTITIES	
Elco Water District	232 S. Link Lane Fort Collins, CO 80524
Boxelder Sanitation District	3201 E. Mulberry #Q Fort Collins, CO 80524
Fort Collins Loveland Water District	5150 Snead Drive Fort Collins, CO 80525
South Fort Collins Sanitation District	2560 E. CR 32 Fort Collins, CO 80528
Little Thompson Water District	835 E. Highway 56 Berthoud, CO 80513
DITCH/ RESERVOIR COMPANIES	
Hillsborough	Abraham Sauer 6491 County Road 50 Johnstown, CO 80534
Seven Lakes	Vern Kamerzell 12614 Highway 60 Milliken, CO 80543
Farmers	Jim Croissant 26442 Weld County Rd. 15 Johnstown, CO 80534
Home Supply	Minera Lee 220 Water Avenue Berthoud, CO 80513
Buckingham	Henry Hetzel 1931 S. County Rd. 19 Loveland, CO 80537
Big T	Dick Coulson 3609 N. County Rd. 13 Loveland, CO 80538

Table 6.2-A Idylwilde Project Mailing List

Louden	Dale Leach 4009 E. County Rd. 30 Fort Collins, CO 80528
GLIC	Dave Bernhardt 23809 WCR 25 Milliken, CO 80543
South Side	Gale Bernhardt 2633 Logan Drive Loveland, CO 80538
Ryan Gulch	Bill Beierwaltes 1907 Gail Court Loveland, CO 80537
Handy Ditch	Brad Johnson 1132 E. Highway 56 Berthoud, CO 80513
ENVIRONMENTAL GROUPS/ SPECIAL INTREST GROUPS	
Agricultural Water Conservation Clearinghouse	Reagan Waskom E118 Engineering Bldg Campus Delivery Fort Collins, CO 80523
Agrium (Caring for our watersheds)	Debbie Tschillard Suite 1700, 4582 South Ulster St Denver, CO 80237
American Rivers	1101 14th Street NW Suite 1400 Washington, DC 20005
American Water Resource Association-Colorado Section	PO BOX 9382 Denver, CO 80209
Big Thompson Conservation District	Lisa Butler P.O. BOX 441 Berthoud, CO 80513
Central Colorado Water Conservation District	Christopher Schall 3209 West 28th Street Greeley, CO 80634
Clean Water Action	1630 S. College Ave, Unit C-1 Fort Collins, CO 80525
Colorado Association of Conservation Districts	PO BOX 4138 Woodland Park, CO 80866
Colorado Department of Agriculture	700 Kipling Street Suite 4000 Lakewood, CO 80215
Colorado Division of Water Resources	Jason Smith 1313 Sherman St. Rm 818 Denver, CO 80203
Colorado Environmental Coalition	Becky Long 1536 Wynkoop St, #5C Denver, CO 80202

Table 6.2-A Idylwilde Project Mailing List

Colorado Foundation for Water Education	1580 Logan St, Suite 410 Denver, CO 80203
Colorado State University Water Institute	E102 Engineering 1033 Campus Delivery Fort Collins, CO 80523
Colorado Trout Hunters	Tad Howard 4398 South Youngsfield St. Morrison, CO 80465
Colorado Water Congress	1580 Logan St, Suite 700 Denver, CO 80203
Colorado Water Conservation Board	1313 Sherman St,. Room 721 Denver, CO 80203
Colorado Water Protection Project	1410 Grant Street, Suite B204 Denver, CO 80203
Colorado Water Wise Council	Paul Lander PO BOX 40202 Denver, CO 80204
Colorado Watershed Assembly	PO BOX 580 Carbondale, CO 81623
Colorado Women Flyfishers	PO BOX 101137 Denver, CO 80250
Colorado Youth Outdoors	Bob Hewson 209 East 4th Street Loveland, CO 80537
Defenders of Wildlife	1425 Market Street #225 Denver, CO 80505
Environment Colorado	Matt Garrington 1536 Wynkoop St. First Floor, Suite 100 Denver, CO 80202
Friends of the Poudre	PO Box 129 La Porte, CO 80535
Fort Collins Audubon Society	Phil Cafaro PO BOX 271968 Fort Collins, CO 80527
High Plains Environmental	Jim Tolstrop 1854 Piney River Drive Loveland, CO 80538
Larimer County Department of Health and Environment	Ed Schemm 1525 Blue Spruce Dr. Fort Collins, CO 80524
Loveland Fishing Club	George Kral
Loveland Historical Society	503 N. Lincoln Avenue Loveland, CO 80537
Loveland SERTOMA Club	Loveland SERTOMA Club #10754 200 E. 7th Street, Suite 120 Loveland, CO 80537
National Wildlife Federation	Rocky Mountain Regional Center 2260 Baseline Road Suite 100 Boulder, CO 80302

Table 6.2-A Idylwilde Project Mailing List

Natural Resources Conservation	Denver Federal Center PO Box 25426 Denver, CO 80225
Northern Plains & Mountains	Reagan Waskom E118 Engineering Bldg Campus Delivery Fort Collins, CO 80523
Pouder Learning Center	Ray Tschillard Pouder Learning Center 8313 W F Street Greeley, CO 80631
Pouder Paddlers	Mike Koliha PO BOX 1565 Fort Collins, CO 80522
River Watch	PO BOX 211729 Denver, CO 80221
Rocky Mountain Fly Casters	Greg Evans 5065 Westridge Drive Fort Collins, CO 80526
Rocky Mountain Region Partnership	US Forest Service Rocky Mountain Region 740 Simms Street Golden, CO 80401
Save the Poudre	PO Box 20 Fort Collins, CO 80522
Sierra Club	Mark Easter 123 North College Avenue Fort Collins, CO 80524
Trees Water People	633 Remington St. Ft. Collins, CO 80524
Trout Unlimited	Colorado Trout Unlimited 1320 Pearl Street #320 Boulder, CO 80302
The Water Information Program	Denise Rue-Pastin 841 East Second Avenue Durango, CO 81301
Western Resource Advocates	Stacy Tellinghuisen 2260 Baseline Road, Suite 200 Boulder, CO 80302
Western States Water Council	5296 Commerce Drive, Suite 202 Murray, UT 84107
IDEWILD LANE/ PALISADE AREA	
CARMEN, HOWARD N/LENA R	1346 W HIGHWAY 34 Loveland, CO 80537
CARMEN, HOWARD N/LENA R	1348 W HIGHWAY 34 Loveland, CO 80537
STEES, C KEVIN	1337 W HIGHWAY 34 Loveland, CO 80537

Table 6.2-A Idylwilde Project Mailing List

LUCERO, NATALIE	215 IDLEWILD LN Loveland, CO 80537
KOBOBEL, DIANA J	502 IDLEWILD LN Loveland, CO 80537
TILLMAN, WILLIAM H/SHARON T	3 IDLEWILD LN Loveland, CO 80537
GALASSO, FRANCIS	21 IDLEWILD LN Loveland, CO 80537
24 IDLEWILD LLC	24 IDLEWILD LN Loveland, CO 80537
24 IDLEWILD LLC	24 IDLEWILD LN Loveland, CO 80537
CURRY, ROY F, JR/FRANCES L	156 IDLEWILD LN Loveland, CO 80537
BANKS, JERRY L	128 IDLEWILD LN Loveland, CO 80537
SHARP, RHONDA K	80 IDLEWILD LN Loveland, CO 80537
NELSON, RICHARD J	80 IDLEWILD LN Loveland, CO 80537
WATERS, RONALD J	80 IDLEWILD LN Loveland, CO 80537
WRIGHT, JOSEPH C	32 IDLEWILD LN Loveland, CO 80537
DAUTH FAMILY TRUST, TRUST A (.50)	7 IDLEWILD LN Loveland, CO 80537
THOMPSON, LESLIE L	28 IDLEWILD LN 1 Loveland, CO 80537
WATERS, RONALD J	60 IDLEWILD LN Loveland, CO 80537
WATERS, RONALD J/THONDA K	50 IDLEWILD LN Loveland, CO 80537
TILLMAN, WILLIAM H/SHARON T	3 IDLEWILD LN Loveland, CO 80537
DAUTH FAMILY TRUST, TRUST A (.50)	1925 SERRAMONTE DR Fort Collins, CO 80524
JOHNSON, RUBY M	860 BONNIE BRAE BLVD Denver, CO 80209
JOHNSON, MARY EVELYN	319 MEADOWLARK DR Alpine, UT 84004
FULGENZI, DENNIS A	954 DURUM CT WINDSOR, CO 80550
MONSMA, DWIGHT W	204 4th ST SE Altoona, IA 50009