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CFR	Code of Federal Regulations
FERC or Commission	Federal Energy Regulatory Commission
Project	Rush Creek Project
SCE	Southern California Edison Company

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4.0 EXISTING RESOURCE INFORMATION

4.1 INTRODUCTION

Section 4.0, Existing Resource Information was developed pursuant to Title 18 of the Code of Federal Regulations (CFR) Chapter I § 5.6(d)(3) and summarizes the existing environment relevant to the relicensing of Southern California Edison Company's (SCE) Rush Creek Project (Project). This section is organized to address specific content requirements outlined in the Federal Energy Regulatory Commission's (FERC or Commission) regulations, including: (1) a description of the existing environment; and (2) a summary of existing data or studies, including references to sources of information or studies.

This section is organized by resource area, as follows:

- 4.2 Rush Creek Basin Description
- 4.3 Water Use and Hydrology
- 4.4 Water Quality
- 4.5 Fish and Aquatic Resources
- 4.6 Botanical and Wildlife Resources
- 4.7 Geology and Soils
- 4.8 Geomorphology
- 4.9 Wetland, Riparian, and Littoral Habitats
- 4.10 Land Use
- 4.11 Recreation Resources
- 4.12 Aesthetics
- 4.13 Cultural Resources
- 4.14 Tribal Resources
- 4.15 Socioeconomics

In some cases, resource areas defined by FERC were split into separate sections to facilitate review by resource specialist. For example, required information on geology and soils was split into three resource sections: (1) 4.7, Geology and Soils, (2) 4.8, Geomorphology, and (3) 4.9, Wetlands, Riparian, and Littoral Habitats. In addition, when similar information was required in more than one section, it has only been provided in detail once (first reference) and then referred back to in subsequent sections, as appropriate. Table 4.1-1 provides the content requirements of 18 CFR Chapter I § 5.6(d)(3) and identifies the section where resource information is provided.

All associated tables, figures, maps, and appendices are included at the end of each resource section. In addition, acronyms and references are provided within each section to facilitate review.

The information included in each resource section is based on data and information collected from publicly-available sources supplemented with additional information received from resource agencies and other stakeholders in response to SCE's specific information requests and/or responses to the Project Information Questionnaire.

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Table 4.1-1. FERC Regulations at 18 CFR § 5.6(d)(3) and Associated Rush Creek PAD Section

18 CFR §	FERC Regulation Text	PAD Section
5.6	Pre-application document.	–
(3)	Description of existing environment and resource impacts.	Section 4.0 Existing Resource Information
(i)	***General requirements.*** A potential applicant must, based on the existing, relevant, and reasonably available information, include a discussion with respect to each resource that includes:	–
(A)	A description of the existing environment as required by paragraphs (d)(3)(ii)-(xiii) of this section;	Section 4.0 Existing Resource Information
(B)	Summaries (with references to sources of information or studies) of existing data or studies regarding the resource;	Section 4.0 Existing Resource Information
(C)	A description of any known or potential adverse impacts and issues associated with the construction, operation or maintenance of the proposed project, including continuing and cumulative impacts; and	Section 4.0 Existing Resource Information
(D)	A description of any existing or proposed project facilities or operations, and management activities undertaken for the purpose of protecting, mitigating impacts to, or enhancing resources affected by the project, including a statement of whether such measures are required by the project license, or were undertaken for other reasons. The type and amount of the information included in the discussion must be commensurate with the scope and level of resource impacts caused or potentially caused by the proposed project. Potential license applicants are encouraged to provide photographs or other visual aids, as appropriate, to supplement text, charts, and graphs included in the discussion.	Section 2.0 Existing Project Location, Facilities, and Operations and Section 4.0 Existing Resource Information
(ii)	***Geology and soils.*** Descriptions and maps showing the existing geology, topography, and soils of the proposed project and surrounding area. Components of the description must include:	4.7 Geology and Soils
(A)	A description of geological features, including bedrock lithology, stratigraphy, structural features, glacial features, unconsolidated deposits, and mineral resources at the project site;	4.7 Geology and Soils
(B)	A description of the soils, including the types, occurrence, physical and chemical characteristics, erodibility and potential for mass soil movement;	4.7 Geology and Soils
(C)	A description of reservoir shorelines and stream banks, including:	4.7 Geology and Soils

18 CFR §	FERC Regulation Text	PAD Section
(*1*)	Steepness, composition (bedrock and unconsolidated deposits), and vegetative cover; and	4.8 Geomorphology; 4.9 Wetland, Riparian, and Littoral Habitats
(*2*)	Existing erosion, mass soil movement, slumping, or other forms of instability, including identification of project facilities or operations that are known to or may cause these conditions.	4.7 Geomorphology
(iii)	***Water resources*. ** A description of the water resources of the proposed project and surrounding area. This must address the quantity and quality (chemical/physical parameters) of all waters affected by the project, including but not limited to the project reservoir(s) and tributaries thereto, bypassed reach, and tailrace. Components of the description must include:	4.2 Rush Creek River Basin; 4.3 Water Use and Hydrology; 4.4 Water Quality; 4.8 Geomorphology
(A)	Drainage area;	4.2 Rush Creek River Basin
(B)	The monthly minimum, mean, and maximum recorded flows in cubic feet per second of the stream or other body of water at the power plant intake or point of diversion, specifying any adjustments made for evaporation, leakage, minimum flow releases, or other reductions in available flow;	4.3 Water Use and Hydrology
(C)	A monthly flow duration curve indicating the period of record and the location of gauging station(s), including identification number(s), used in deriving the curve; and a specification of the critical streamflow used to determine the project's dependable capacity;	4.3 Water Use and Hydrology
(D)	Existing and proposed uses of project waters for irrigation, domestic water supply, industrial and other purposes, including any upstream or downstream requirements or constraints to accommodate those purposes;	4.3 Water Use and Hydrology
(E)	Existing instream flow uses of streams in the project area that would be affected by project construction and operation; information on existing water rights and water rights applications potentially affecting or affected by the project;	4.3 Water Use and Hydrology
(F)	Any federally-approved water quality standards applicable to project waters;	4.4 Water Quality
(G)	Seasonal variation of existing water quality data for any stream, lake, or reservoir that would be affected by the proposed project, including information on:	4.4 Water Quality
(*1*)	Water temperature and dissolved oxygen, including seasonal vertical profiles in the reservoir;	4.4 Water Quality

18 CFR §	FERC Regulation Text	PAD Section
(*2*)	Other physical and chemical parameters to include, as appropriate for the project; total dissolved gas, pH, total hardness, specific conductance, chlorophyll a, suspended sediment concentrations, total nitrogen (mg/L as N), total phosphorus (mg/L as P), and fecal coliform (E. Coli) concentrations;	4.4 Water Quality
(H)	The following data with respect to any existing or proposed lake or reservoir associated with the proposed project; surface area, volume, maximum depth, mean depth, flushing rate, shoreline length, substrate composition; and	4.2 Rush Creek River Basin; 4.3 Water Use and Hydrology; 4.7 Geology and Soils; 4.8 Geomorphology
(I)	Gradient for downstream reaches directly affected by the proposed project.	4.8 Geomorphology
(iv)	***Fish and aquatic resources.*** A description of the fish and other aquatic resources, including invasive species, in the project vicinity. This section must discuss the existing fish and macroinvertebrate communities, including the presence or absence of anadromous, catadromous, or migratory fish, and any known or potential upstream or downstream impacts of the project on the aquatic community. Components of the description must include:	4.5 Fish and Aquatics
(A)	Identification of existing fish and aquatic communities;	4.5 Fish and Aquatics
(B)	Identification of any essential fish habitat as defined under the Magnuson-Stevens Fishery Conservation and Management Act and established by the National Marine Fisheries Service; and	4.5 Fish and Aquatics
(C)	Temporal and spatial distribution of fish and aquatic communities and any associated trends with respect to:	4.5 Fish and Aquatics
(*1*)	Species and life stage composition;	4.5 Fish and Aquatics
(*2*)	Standing crop;	4.5 Fish and Aquatics
(*3*)	Age and growth data;	4.5 Fish and Aquatics
(*4*)	Spawning run timing; and	4.5 Fish and Aquatics
(*5*)	The extent and location of spawning, rearing, feeding, and wintering habitat.	4.5 Fish and Aquatics
(v)	***Wildlife and botanical resources*.** A description of the wildlife and botanical resources, including invasive species, in the project vicinity. Components of this description must include:	4.6 Botanical and Wildlife
(A)	Upland habitat(s) in the project vicinity, including the project's transmission line corridor or right-of-way and a listing of plant and animal species that use the habitat(s); and	4.6 Botanical and Wildlife

18 CFR §	FERC Regulation Text	PAD Section
(B)	Temporal or spatial distribution of species considered important because of their commercial, recreational, or cultural value.	4.6 Botanical and Wildlife
(vi)	***Wetlands, riparian, and littoral habitat.*** A description of the floodplain, wetlands, riparian habitats, and littoral in the project vicinity. Components of this description must include:	4.6 Botanical and Wildlife; 4.9 Wetland, Riparian, and Littoral Habitats
(A)	A list of plant and animal species, including invasive species, that use the wetland, littoral, and riparian habitat;	4.6 Botanical and Wildlife; 4.9 Wetland, Riparian, and Littoral Habitats
(B)	A map delineating the wetlands, riparian, and littoral habitat; and	4.9 Wetland, Riparian, and Littoral Habitats
(C)	Estimates of acreage for each type of wetland, riparian, or littoral habitat, including variability in such availability as a function of storage at a project that is not operated in run-of-river mode.	4.9 Wetland, Riparian, and Littoral Habitats
(vii)	***Rare, threatened and endangered species.*** A description of any listed rare, threatened and endangered, candidate, or special status species that may be present in the project vicinity. Components of this description must include:	4.5 Fish and Aquatics; 4.6 Botanical and Wildlife
(A)	A list of Federal- and state-listed, or proposed to be listed, threatened and endangered species known to be present in the project vicinity;	4.5 Fish and Aquatics; 4.6 Botanical and Wildlife
(B)	Identification of habitat requirements;	4.5 Fish and Aquatics; 4.6 Botanical and Wildlife
(C)	References to any known biological opinion, status reports, or recovery plan pertaining to a listed species;	4.5 Fish and Aquatics; 4.6 Botanical and Wildlife
(D)	Extent and location of any federally-designated critical habitat, or other habitat for listed species in the project area; and	4.5 Fish and Aquatics; 4.6 Botanical and Wildlife
(E)	Temporal and spatial distribution of the listed species within the project vicinity.	4.5 Fish and Aquatics; 4.6 Botanical and Wildlife
(viii)	***Recreation and land use.*** A description of the existing recreational and land uses and opportunities within the project boundary. The components of this description include:	4.10 Land Use; 4.11 Recreation
(A)	Text description illustrated by maps of existing recreational facilities, type of activity supported, location, capacity, ownership and management;	4.10 Land Use; 4.11 Recreation

18 CFR §	FERC Regulation Text	PAD Section
(B)	Current recreational use of project lands and waters compared to facility or resource capacity;	4.11 Recreation
(C)	Existing shoreline buffer zones within the project boundary;	4.11 Recreation
(D)	Current and future recreation needs identified in current State Comprehensive Outdoor Recreation Plans, other applicable plans on file with the Commission, or other relevant local, state, or regional conservation and recreation plans;	4.11 Recreation
(E)	If the potential applicant is an existing licensee, its current shoreline management plan or policy, if any, with regard to permitting development of piers, boat docks and landings, bulkheads, and other shoreline facilities on project lands and waters;	4.11 Recreation
(F)	A discussion of whether the project is located within or adjacent to a:	4.11 Recreation
(*1*)	River segment that is designated as part of, or under study for inclusion in, the National Wild and Scenic River System; or	4.11 Recreation
(*2*)	State-protected river segment;	4.11 Recreation
(G)	Whether any project lands are under study for inclusion in the National Trails System or designated as, or under study for inclusion as, a Wilderness Area.	4.11 Recreation
(H)	Any regionally or nationally important recreation areas in the project vicinity;	4.11 Recreation
(I)	Non-recreational land use and management within the project boundary; and	4.10 Land Use
(J)	Recreational and non-recreational land use and management adjacent to the project boundary.	4.10 Land Use; 4.11 Recreation
(ix)	***Aesthetic resources.*** A description of the visual characteristics of the lands and waters affected by the project. Components of this description include a description of the dam, natural water features, and other scenic attractions of the project and surrounding vicinity. Potential applicants are encouraged to supplement the text description with visual aids.	4.12 Aesthetics
(x)	***Cultural resources.*** A description of the known cultural or historical resources of the proposed project and surrounding area. Components of this description include:	4.13 Cultural; 4.14 Tribal
(A)	Identification of any historic or archaeological site in the proposed project vicinity, with particular emphasis on sites or properties either listed in, or recommended by the State Historic Preservation Officer or Tribal Historic Preservation Officer for inclusion in, the National Register of Historic Places;	4.13 Cultural

18 CFR §	FERC Regulation Text	PAD Section
(B)	Existing discovery measures, such as surveys, inventories, and limited subsurface testing work, for the purpose of locating, identifying, and assessing the significance of historic and archaeological resources that have been undertaken within or adjacent to the project boundary; and	4.13 Cultural
(C)	Identification of Indian tribes that may attach religious and cultural significance to historic properties within the project boundary or in the project vicinity; as well as available information on Indian traditional cultural and religious properties, whether on or off of any federally-recognized Indian reservation (A potential applicant must delete from any information made available under this section specific site or property locations, the disclosure of which would create a risk of harm, theft, or destruction of archaeological or Native American cultural resources or to the site at which the resources are located, or would violate any Federal law, including the Archaeological Resources Protection Act of 1979, 16 U.S.C. 470w-3, and the National Historic Preservation Act of 1966, 16 U.S.C. 470hh).	4.14 Tribal
(xi)	***Socio-economic resources.*** A general description of socio-economic conditions in the vicinity of the project. Components of this description include general land use patterns (*e.g.,* urban, agricultural, forested), population patterns, and sources of employment in the project vicinity.	4.15 Socioeconomics
(xii)	***Tribal resources.*** A description of Indian tribes, tribal lands, and interests that may be affected by the project Components of this description include:	4.14 Tribal
(A)	Identification of information on resources specified in paragraphs (d)(2)(ii)-(xi) of this section to the extent that existing project construction and operation affecting those resources may impact tribal cultural or economic interests, *e.g.,* impacts of project-induced soil erosion on tribal cultural sites; and	4.14 Tribal
(B)	Identification of impacts on Indian tribes of existing project construction and operation that may affect tribal interests not necessarily associated with resources specified in paragraphs (d)(3)(ii)-(xi) of this Section, *e.g.,* tribal fishing practices or agreements between the Indian tribe and other entities other than the potential applicant that have a connection to project construction and operation.	4.14 Tribal
(xiii)	***River basin description.*** A general description of the river basin or sub-basin, as appropriate, in which the proposed project is located, including information on:	4.2 Rush Creek River Basin
(A)	The area of the river basin or sub-basin and length of stream reaches therein;	4.2 Rush Creek River Basin
(B)	Major land and water uses in the project area;	4.2 Rush Creek River Basin

18 CFR §	FERC Regulation Text	PAD Section
(C)	All dams and diversion structures in the basin or sub-basin, regardless of function; and	4.2 Rush Creek River Basin
(D)	Tributary rivers and streams, the resources of which are or may be affected by project operations.	4.2 Rush Creek River Basin

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ac-ft	acre-feet
CRWQCB	California Regional Water Quality Control Board
DWR	California Department of Water Resources
FERC	Federal Energy Regulatory Commission
Forest Service	United States Forest Service
INF	Inyo National Forest
JLPUD	June Lake Public Utility District
LADWP	Los Angeles Department of Water and Power
MCLAFC	Mono County Local Agency Formation Committee
Project	Rush Creek Project
RM	River Mile
RV	recreational vehicle
SCE	Southern California Edison Company
SWRCB	California State Water Resources Control Board
USBR	United States Bureau of Reclamation
USCB	Unites States Census Bureau
USGS	United States Geological Survey
WY	water year

4.2 RUSH CREEK BASIN DESCRIPTION

This section describes the Rush Creek Basin, where Southern California Edison Company's (SCE) Rush Creek Project (Project) is located. The Rush Creek Basin is situated within the greater Mono Basin. The Federal Energy Regulatory Commission's (FERC) content requirements for this section are specified in Title 18 of the Code of Federal Regulations Chapter I § 5.6(d)(3)(xiii).

This section provides an overview of the Rush Creek Basin, including information on the overall basin area and sub-basin areas; length of stream reaches; waterbodies located within the basin including lakes and tributary streams; major land and water uses; and other dams and diversions in the basin.

4.2.1 Information Sources

This section was developed using existing information available in the following primary sources. Additional references are cited in the text, as appropriate.

- California Regional Water Quality Control Board (CRWQCB) Water Quality Control Plan for the Lahontan Region, North and South Basins (CRWQCB 2019);
- FERC's Rush Creek Project Environmental Assessment for Hydropower License, FERC Project No. 1389-001 (FERC 1992);
- Los Angeles Department of Water and Power (LADWP) Draft LADWP Urban Water Management Plan (LADWP 2020);
- California Department of Water Resources (DWR) California Interagency Watershed Map (Calwater 2.2.1) (DWR 2004); and
- United States Geological Survey (USGS), California DWR, SCE, LADWP, and United States Bureau of Reclamation (USBR) operated streamflow and snow gages.

4.2.2 General Overview

The 133-square mile Rush Creek Basin is the largest tributary/sub-basin within the greater Mono Basin, California (Map 4.2-1). The Rush Creek Basin is characterized by glacially formed, steep gradient (bedrock dominated), high elevation sub-basins (Rush Creek upstream of the confluence with Reversed Creek) and lower gradient, low elevation valley floor sub-basins (Rush Creek below the confluence with Reversed Creek). Reversed Creek, Alger Creek, Parker Creek, and Walker Creek are the major tributary/sub-basins to Rush Creek (Map 4.2-1 and Table 4.2-1).

Rush Creek originates in the vicinity of Marie Lakes at an elevation of approximately 11,000 feet and the creek ends approximately 26 miles downstream at Mono Lake (6,400 feet). Rush Creek passes through and/or is impounded by Waugh Lake (9,392 feet), Gem

Lake (9,028 feet), Agnew Lake (8,470 feet), Silver Lake (7,215 feet) and Grant Lake (7,131 feet).

The Rush Creek Project is located in the farthest upstream portion (18%) of the basin. The principal Rush Creek Project facilities are located at Waugh Lake, Gem Lake, Agnew Lake, and the Rush Creek Powerhouse. The Rush Creek Project facilities are located on Rush Creek upstream of Silver Lake and generally upstream of the Reversed Creek tributary confluence (the Rush Creek Powerhouse tailrace enters Rush Creek immediately below the Reversed Creek confluence). The Rush Creek Powerhouse is located on the valley floor 0.7 mile upstream of Silver Lake at an elevation of approximately 7,300 feet (the powerhouse tailrace enters Rush Creek 17.4 river miles upstream of Mono Lake).

The hydrology of the Rush Creek Basin is dominated by winter accumulation of snow in the upper elevations of the Sierra Nevada and subsequent snowmelt runoff (high flows) in the May–July period. The lowest base stream flows occur during September–February. Stream flow and precipitation (e.g., snowfall accumulation) are recorded in the vicinity of the Project through a network of monitoring and recording stations operated by the USGS, California DWR, SCE, and LADWP. Data from snow courses at the higher elevations of the river basin (Table 4.2-2) indicate that the average April 1 water storage is approximately 30 inches. Average annual precipitation at Gem Lake is 21.8 inches. The average annual runoff for Rush Creek below Agnew Lake, based on records between the water years (WY) 1990 and 2019, is approximately 27,100 acre-feet (ac-ft)/year (Figure 4.2-1). The median runoff for the same period is 25,700 ac-ft/year.

4.2.3 Drainage Area, Sub-basin Area, and Stream Reach Lengths

The Rush Creek drainage area and sub-basin areas are provided in Table 4.2-1 and Map 4.2-1. Rush Creek stream reaches and river miles are identified on Map 4.2-2. The Rush Creek stream reach lengths, types (Project-affected, non-Project), and characteristics are provided in Table 4.2-3.

4.2.4 Major Land and Water Uses in the Project Area

4.2.4.1 Land Uses

The majority of the Project facilities are located on federal lands within the Inyo National Forest (INF), which is under the jurisdiction of the United States Forest Service (Forest Service). The Rush Creek Powerhouse is located on a parcel of SCE-owned lands. Waugh and Gem lakes are located within the Ansel Adams Wilderness and Agnew Lake is located on INF land. Land jurisdiction in the vicinity of the Project facilities is shown on Map 4.2-3.

The Rush Creek sub-basins upstream of the powerhouse are very steep and mountainous with no road access; therefore, land uses are limited to the Project and dispersed recreation. Project-related land uses include the three dams and associated reservoirs – Agnew Dam (Agnew Lake), Gem Dam (Gem Lake), and Rush Meadows Dam (Waugh Lake); a water conveyance system; the Rush Creek Powerhouse; and ancillary facilities. Dispersed recreation land use includes several high-county backpacking trails and hiking/camping/fishing in the vicinity of the Project reservoirs. These trails lead to several popular areas, such as Thousand-Island Lake, Garnet Lake, and the Ansel Adams Wilderness Area. The trails also connect with the John Muir Trail / Pacific Crest Trail. There is a horse pack outfitter, Frontier Pack Train, which has a Forest Service leased camp station approximately 0.25 mile from Rush Meadows Dam. Refer to Section 4.10, Land Use and 4.11, Recreation for additional information.

The primary residential/commercial community within the Rush Creek Basin is June Lake. The community is located on the Reversed Creek tributary along a 5-mile stretch of California State Route 158 (June Lake Loop Road). According to the 2019 American Community Survey 5-year estimate, the population of the June Lake Census Designated Place was 390 (USCB 2019). In the summer that can grow by several thousand visitors: fishermen, campers, tourists, backpackers, and other outdoor enthusiasts (MCLAFC 2009). The June Lake area is popular for both summer and winter recreation. There are several public campgrounds in the area, a small ski resort (June Mountain), and numerous recreational vehicle (RV) parks, motels, and lodges; cafes and restaurants; grocery and fishing tackle stores; and ski rental shops. There is also a small economic contribution from logging and cattle ranching.

Private property is limited outside of the June Lake community and there is limited private property in the vicinity of the Project or Project-affected streams. Private property does abut SCE-owned land along a portion of South Rush Creek, which is a Project-affected tributary of Rush Creek in the vicinity of the Rush Creek Powerhouse (Map 4.2-3). Both Dream Mountain Estates housing development and the Double Eagle Ranch are located on South Rush Creek adjacent to SCE land on the low elevation valley floor upstream of Silver Lake near the powerhouse.

There are a few residential and recreational developments (non-Project facilities) along the Silver Lake shoreline (non-Project lake). Approximately 27 homes are located on long-term Forest Service leases situated along the east shore of Silver Lake (typically each has a boat dock on Silver Lake or Rush Creek entering Silver Lake). On the northwest corner of the lake, Silver Lake Resort (including RV trailer court, space for approximately 100 trailers) is situated on long-term Forest Service lease land. There is also a boat ramp and Forest Service campground, Silver Lake Campground, at the northwest end of the lake and a small picnic area on the southwest edge of the lake. Fishing is popular on Silver Lake.

In the basin downstream of Silver Lake, there is a Forest Service campground (Aerie Crag RV Campground) along Rush Creek and a marina and campground at Grant Lake that is located on Forest Service land (non-Project recreational facilities). Much of the land from downstream of Grant Lake to Mono Lake is owned by the City of Los Angeles. Grant Lake is a LADWP reservoir.

4.2.4.2 Water Uses

Beneficial uses that apply to surface waters within the basin are identified in the Water Quality Control Plan for the Lahontan Region (Basin Plan) (CRWQCB 2019). Beneficial uses identified in the Basin Plan that pertain to upper Rush Creek, above Grant Lake, include: (1) municipal and domestic supply; (2) freshwater replenishment; (3) hydropower generation; (4) water contact recreation; (5) noncontact water recreation; (6) commercial and sport fishing; (7) cold freshwater habitat; (8) wildlife habitat; and (9) spawning, reproduction, and development. The Basin Plan also identifies beneficial uses that pertain to Rush Creek below Grant Lake which include: all benefits listed previously for upper Rush Creek except for (3) hydropower generation; and includes (10) agricultural supply; and (11) groundwater recharge.

SCE operates the Project for hydroelectric generation. There are no consumptive uses of water from Rush Creek upstream of the powerhouse. The small amount of Rush Creek Powerhouse consumptive use is supplied by the June Lake Public Utility District (JLPUD) from the Reversed Creek / June Lakes sub-basin. JLPUD has approximately 660 customers for both water and sewer services and its boundaries include an area of approximately 1,720 acres of unincorporated residential, commercial, and undeveloped land. Water for the JLPUD is provided from a diversion dam at Snow Creek and the intake facility in June Lake (JLPUD 2021).

From Silver Lake downstream, there is a small amount of consumptive water use from the homes and recreation facilities along the lake shoreline (JLPUD), but the major consumer of water in the Rush Creek Basin is the City of Los Angeles, which diverts water out of the Mono Basin at Grant Lake, Parker Creek, and Walker Creek via the Los Angeles Aqueduct for domestic uses. The water diversions are regulated by Water Board Decision D1631 (limits water exports from Mono Basin) to establish fisheries protection flows for streams tributary to Mono Lake and to protect public trust resources at Mono Lake and in the Mono Basin (LADWP 2020). Refer to Section 2.0, Project Location, Facilities, and Operations; and Section 4.3, Water Use and Hydrology for more detailed information on Project operations.

4.2.5 Dams and Diversions

Project reservoirs – Waugh Lake, Gem Lake, and Agnew Lake – are dammed for hydropower water storage by Rush Meadows Dam, Gem Dam, and Agnew Dam, respectively. Waugh Lake regulates the flow in upper Rush Creek, filling in May and storing water until Gem Lake storage is reduced. The transfer of all stored water from Waugh Lake to Gem Lake is typically completed by November 1 of each year. Natural flows then pass through the Waugh Lake low-level outlet (as a stream) during the winter. Historically, water from Gem Lake and Agnew Lake was transported through flowlines/penstocks to the Rush Creek Powerhouse. Currently, only water from Gem Lake is transported to the powerhouse (see seismic restriction discussion below). Water exiting the powerhouse enters a short tailrace and is returned to Rush Creek immediately downstream of the Reversed Creek confluence and approximately 0.7 mile upstream of Silver Lake. New reservoir operations were initiated in 2012 and formalized in 2016

(FERC 2016) that implemented seismic restrictions on reservoir elevations (maintain Waugh Lake <9,392.1 feet; Gem Lake <9,027.5 feet; and Agnew Lake – completely drained) and significantly reduced the combined storage capacity of Waugh, Gem, and Agnew lakes from approximately 23,000 ac-ft to 12,300 ac-ft with post-2016 specifications (see Section 2.4.1, Seismic Restrictions). A detailed description of the Project facilities and operations is presented in Section 2.0, Project Location, Facilities, and Operation.

Several of the other large non-Project lakes in the Rush Creek Basin – Silver, Gull, and June lakes – are natural glacial lakes without dams or significant diversions. June Lake has a JLPUD water supply intake. Silver Lake has a number of large boulders placed in the natural outlet that slightly modifies the lake elevation, depending on the outflow volume.

Aside from the JLPUD diversion on Snow Creek the only other water diversions or dams in the river basin are located in the lower portion of the basin and owned and operated by LADWP. These include diversions on Parker and Walker creeks and Grant Lake. Grant Lake Dam was constructed in 1940 and has a storage capacity of 47,171 ac-ft at the spillway elevation of 7,130 feet (SWRCB 2010).

4.2.6 Tributary Rivers and Streams Affected by the Project

The Project only directly affects Rush Creek upstream of the powerhouse (i.e., reservoir storage and release) and indirectly affects Rush Creek below the Rush Creek Powerhouse tailrace to Grant Lake (stream flow pattern). No other tributary rivers or streams in the basin, including Reversed Creek, Alger Creek, Parker Creek, and Walker Creek, are affected by the Project.

4.2.7 References

CRWQCB (California Regional Water Quality Control Board) Lahontan Region. 2019. Water Quality Control Plan for the Lahontan Region, North and South Basins (Basin Plan). Revised October 2019. Available at: https://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/references.html.

DWR (California Department of Water Resources). 2004. California Interagency Watershed Map (Calwater 2.2.1), California, 2004, California Interagency Watershed Mapping Committee.

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LADWP (Los Angeles Department of Water and Power). 2020. Draft LADWP Urban Water Management Plan. http://ladwp.com/UWMP.

MCLAFC (Mono County Local Agency Formation Commission). 2009. Municipal Service Review and Sphere of Influence Recommendation - June Lake Public Utility District Mono County, California. Available at: https://www.monocounty.ca.gov/sites/default/files/fileattachments/local_agency_formation_commission_lafco/page/3562/junelakepublicutilitydistrict_02.2009.pdf

SWRCB (California State Water Resources Control Board). 2010. Mono Basin Stream Restoration and Monitoring Program. Synthesis of Instream Flow Recommendations to the SWRCB and the LADWP. Final Report. Available at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/mono_lake/docs/monolake_synthesis_rpt.pdf.

USCB (United States Census Bureau). 2019. American Community Survey Estimates Data Profile, June Lake CDP. Table DP05. Available at: https://data.census.gov/cedsci/table?q=June%20Lake%20CDP&tid=ACSDP5Y2019.DP05.

TABLES

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Table 4.2-1. Information on Drainage Area of the Rush Creek Basin and Sub-basins (see Map 4.2-1)

Rush Creek Basin & Sub-basins	Sub-basin Areas (miles²)	Cumulative Basin Area (miles²)	Length of Rush Creek Associated with each Sub-basin (miles)	Rush Creek Project Facilities Present (Yes / No)	Elevation at the Sub-basin Downstream and Upstream Junction with Rush Creek	
					Downstream Junction (feet)	Upstream Junction (feet)
Marie Lakes (Waugh Lake) Sub-basin	15.00	15.00	4.12 (RM 22.24–26.36)	Yes	9,376	10,858
Crest Creek Sub-basin						
• Gem Dam Sub-basin	6.91	21.91	2.76 (RM 19.48–22.24)	Yes	9,008	9,376
• Agnew Dam Sub-basin	1.26	23.17	0.88 (RM 18.6–19.48)	Yes	8,460	9,008
• Below Dams and Above Reversed Creek Sub-basin	1.36	24.53	1.1 (RM 17.5–18.6)	Yes	7,221	8,460
June Lakes (Reversed Creek) Sub-basin	15.10	39.63	Tributary Enters at RM 17.5	No	7,221	—
Alger Creek (Silver Lake) Sub-basin	7.50	47.13	1.61 (RM 15.89–17.5)	No	7,215	7,221
Grant Lakes Sub-basin	11.4	58.53	6.59 (RM 9.30–15.89)	No	7,131	7,215
Parker Creek Sub-basin	21.0	79.53	4.13 (RM 5.17–9.30)	No	6,665	7,131
Walker Creek Sub-basin	13.8	93.33	0.57 (RM 4.60–5.17)	No	6,612	6,665
East Craters Sand Flat Sub-basin	29.3	122.63	Enters at Approx. RM 4.0	No	6,558	6,612
Lower Rush Creek Sub-basin	10.7	133.33	4.60 (RM 0.0–4.60)	No	6,372	6,558
Total	**--**	**133.33**	**26.36**	**—**	**—**	**—**

Notes: RM = River Mile

Table 4.2-2. Snow Courses and Meteorological Stations Located in the Vicinity of the Rush Creek Project

Name	Agency/Operator	Elevation (feet)	Location	
			Latitude	Longitude
Snow Courses				
Gem Pass	DWR/DFM-Hydro-SMN	10,750	37.78000	-119.17000
Gem Lake	SCE, Bishop	9,150	37.75200	-119.16200
Agnew Pass	USBR	9,450	37.72663	-119.14173
Meteorological Stations				
Gem Pass	DWR/DFM-Hydro-SMN	10,750	37.78000	-119.17000
Agnew Pass	USBR	9,450	37.72663	-119.14173

Notes: DWR = California Department of Water Resources
SCE = Southern California Edison Company
USBR = United States Bureau of Reclamation

Table 4.2-3. Stream Reaches

Reach Name	Reach Length (miles) / River Mile (RM)	Elevation Range (feet) (% gradient)	Type of Stream Reach	Description
Rush Creek				
Waugh Lake	1.51 (RM 22.24–23.75)	9,392[1]	—	Project Reservoir
Rush Creek Below Rush Meadow Dam	1.83 (RM 20.41–22.24)	9,036–9,371.6 (3.47%)	Project-affected Stream Reach	Moderate Gradient Mountain Stream
Gem Lake	0.93 (RM 19.48–20.41)	9,027.5[1]	—	Project Reservoir
Rush Creek Below Gem Dam	0.30 (RM 19.18–19.48)	8,539.2–9,008 (29.60%)	Project-affected Stream Reach	Steep Mountain Stream
Agnew Lake	0.58 (RM 18.60–19.18)	8,470[1]	—	Project Reservoir
Rush Creek Below Agnew Dam	0.40 (RM 18.2–18.60)	8,214–8,460 (11.65%)	Project-affected Stream Reach	Steep Mountain Stream
Rush Creek Horsetail Falls	0.54 (RM 17.66–18.2)	7,306.8–8,214 (31.82%)	Project-affected Stream Reach	Steep Mountain Stream
Rush Creek Above Silver Lake	0.94 (RM 16.72–17.66)	7,216.2–7,306.8 (1.83%)	Project-affected Stream Reach	Low-Gradient Meadow Stream[3]
Silver Lake	0.83 (RM 15.89–16.72)	7,215[2]	—	Natural Lake
Rush Creek Below Silver Lake	2.69 (RM 13.20–15.89)	7,131–7,214.7 (0.59%)	Project-affected Stream Reach	Low-Gradient Stream
Grant Lake	3.88 (RM 9.32–13.20)	7,131[2]	—	Non-Project Reservoir; LADWP Controlled
Rush Creek Below Grant Lake	9.32 (RM 0.0–9.32)	6,327–7,080 (1.44%)	Non-Project Stream Reach; LADWP Controlled	Low-Gradient Stream

Reach Name	Reach Length (miles) / River Mile (RM)	Elevation Range (feet) (% gradient)	Type of Stream Reach	Description
South Rush Creek				
South Rush Creek	0.46 (RM 0.0–0.46)	7,221–7,551.7 (13.62%)	Project-affected Stream Reach	Steep Mountain Stream[3]

Notes: LADWP = Los Angeles Department of Water and Power
RM = River Mile

[1] Maximum seismic restriction elevation

[2] Approximate ordinary high water mark

[3] This stream reach has some very low gradient and some steeper gradient sections

FIGURES

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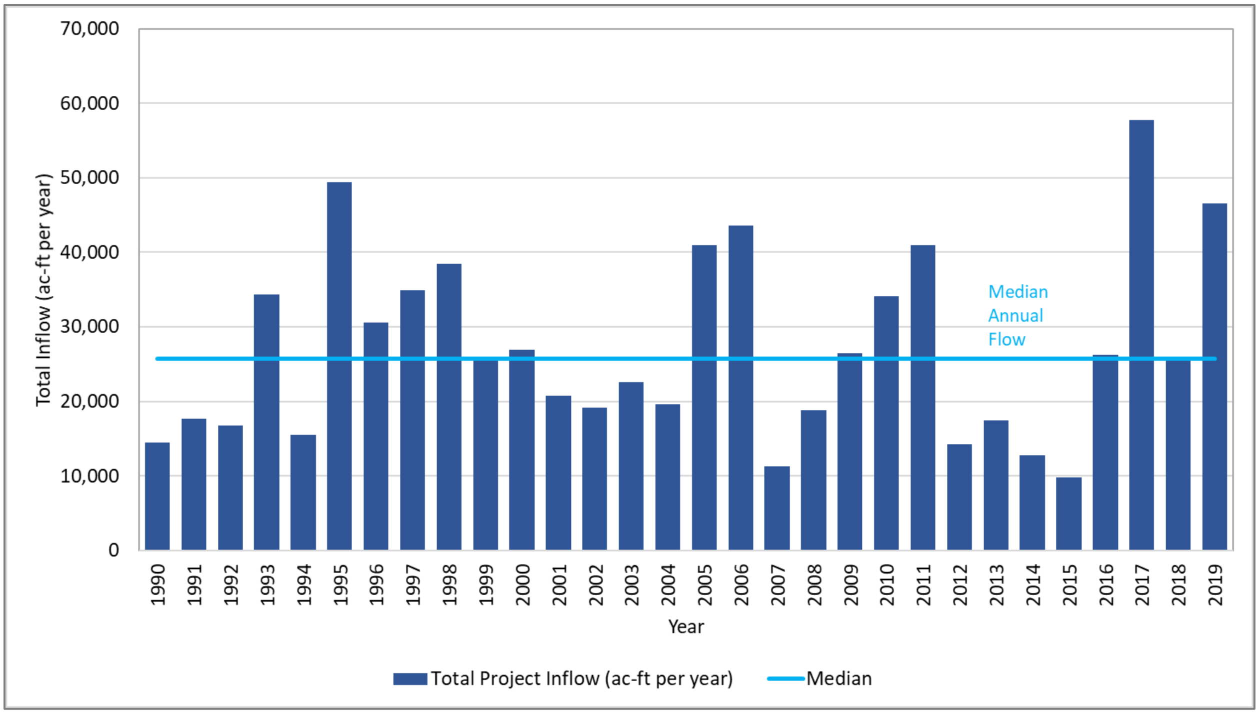

Data Source: USGS 10287300 and USGS 10287289 – Combined Rush Creek below Agnew

Figure 4.2-1. Annual Inflow to the Rush Creek Project (WY 1990–2019)

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MAPS

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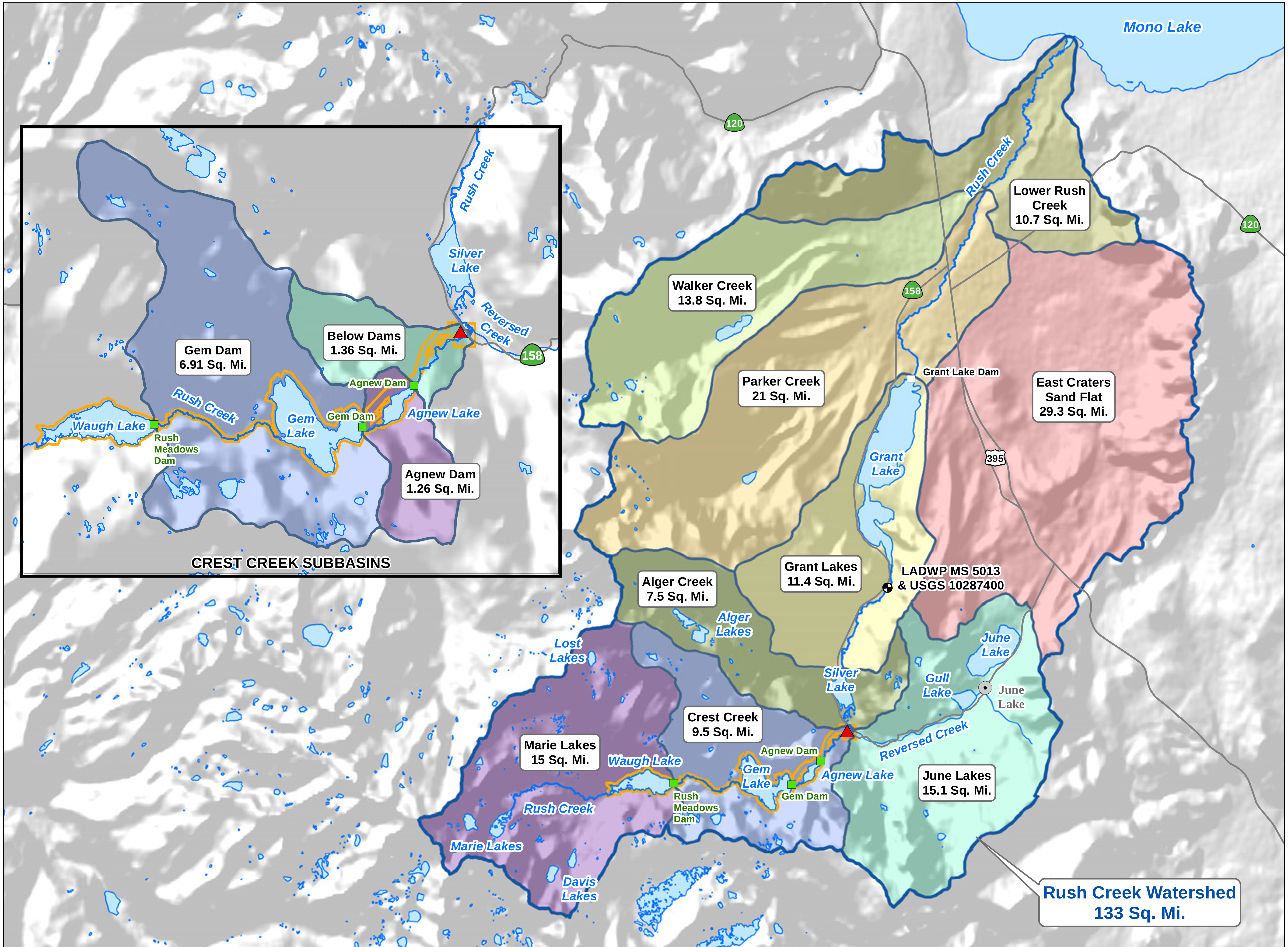

SCE Facilities
- Dam
- Powerhouse
- FERC Boundary

Other Features
- Other Dam
- City/Town
- Highway
- River/Stream
- Lake

Watershed / Subbasin Boundaries*
- Alger Creek
- Crest Creek
- East Craters Sand Flat
- Grant Lakes
- June Lakes
- Lower Rush Creek
- Marie Lakes
- Parker Creek
- Walker Creek

* DATA SOURCE: Calwater, 2.21
Some minor modifications made based on high-resolution aerial imagery

Operations Modeling
- Model Node (Gage used to scale unimpaired inflows to the upper reservoirs)

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Rush Creek Project (FERC 1389)

Map 4.2-1

Rush Creek Basin and Sub-basins

N W E S

0 0.5 1 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 4/27/2021

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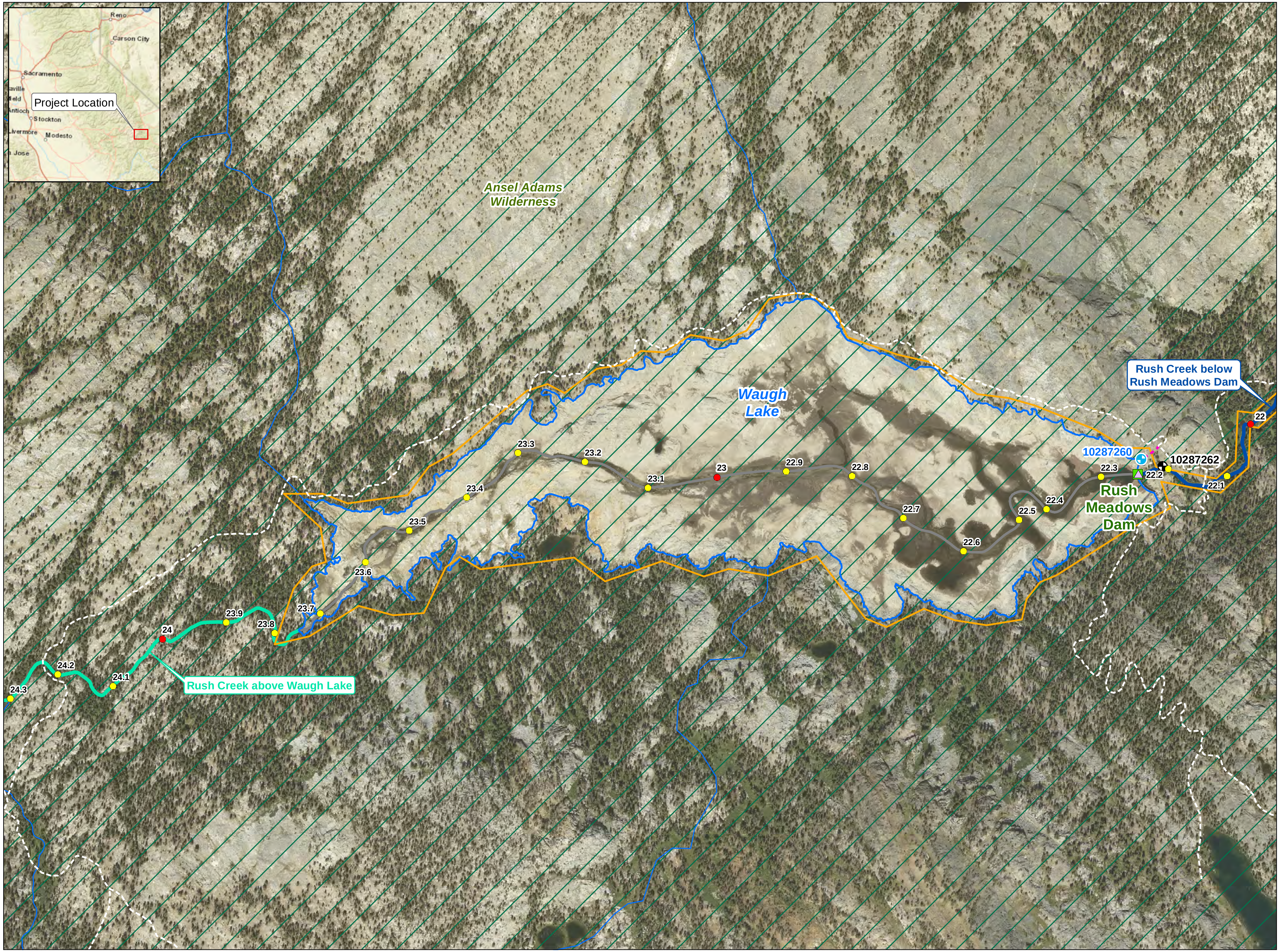

SCE Facilities

- Powerhouse
- Dam
- Stream Gage
- Reservoir Gage
- Ancillary Facility
- Helicopter Landing Site
- Water Conveyance Feature
- Tailrace
- Penstock
- Power or Communication Line
- Tramway
- Project Road
- Project Trail
- FERC Project Boundary

Other Features

- Watercourse
- Lake
- River Mile / 10th Mile with Elevation

Land Management

National Wilderness Area**

- Ansel Adams Wilderness
- Owens River Headwaters Wilderness

**NOTE: Ansel Adams Wilderness and Owens River Headwaters Wilderness are located on USFS Lands

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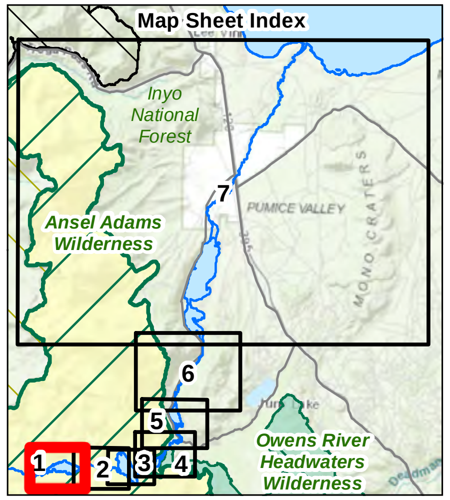

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Rush Creek Project (FERC 1389)

Map 4.2-2 (1 of 7)

Rush Creek
Stream Reaches and River Miles

0 250 500 Feet

Date: 5/19/2021

Projection: UTM Zone 11
Datum: NAD 83

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SCE Facilities

- Powerhouse
- Dam
- Stream Gage
- Reservoir Gage
- Ancillary Facility
- Helicopter Landing Site
- Water Conveyance Feature
- Tailrace
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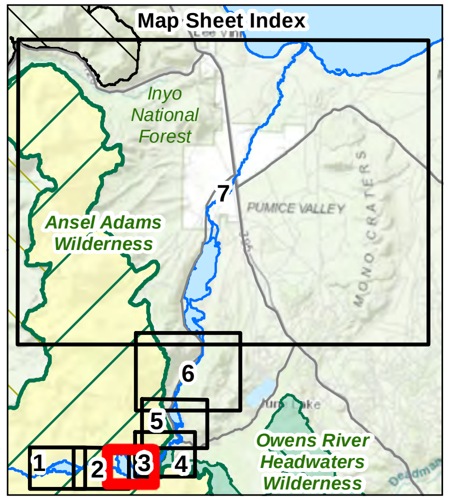

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Rush Creek Project (FERC 1389)

Map 4.2-2 (3 of 7)

Rush Creek
Stream Reaches and River Miles

0 250 500 Feet

Date: 6/17/2021

Projection: UTM Zone 11
Datum: NAD 83

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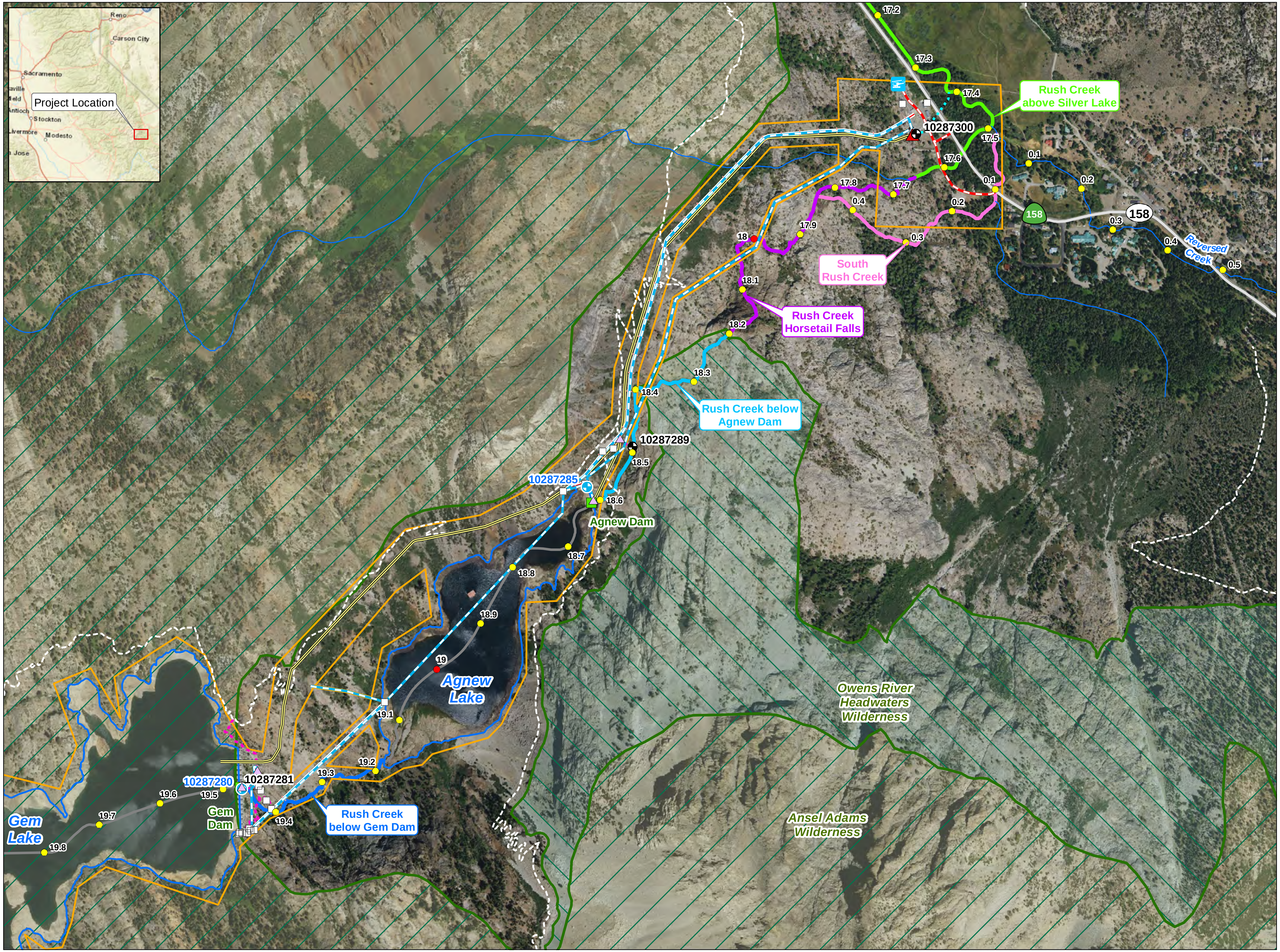

SCE Facilities

- Powerhouse
- Dam
- Stream Gage
- Reservoir Gage
- Ancillary Facility
- Helicopter Landing Site
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- Tailrace
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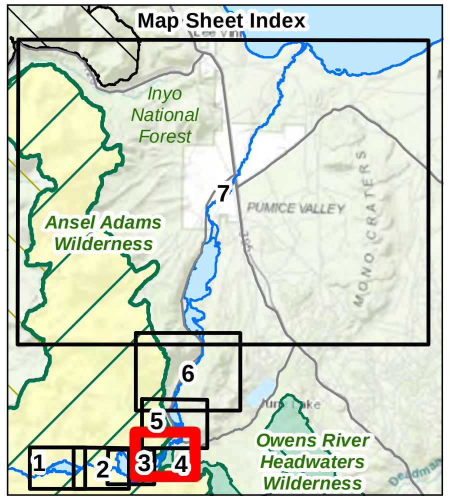

Rush Creek Project (FERC 1389)

Map 4.2-2 (4 of 7)

Rush Creek
Stream Reaches and River Miles

Date: 6/17/2021

0 250 500 Feet

Projection: UTM Zone 11
Datum: NAD 83

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SCE Facilities

- Powerhouse
- Dam
- Stream Gage
- Reservoir Gage
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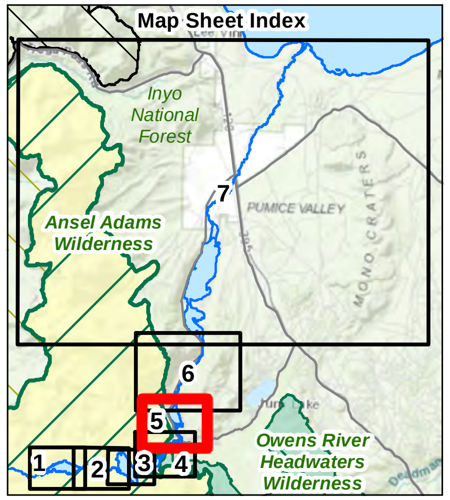

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Rush Creek Project (FERC 1389)

Map 4.2-2 (5 of 7)

Rush Creek
Stream Reaches and River Miles

0 250 500 Feet

Date: 5/19/2021

Projection: UTM Zone 11
Datum: NAD 83

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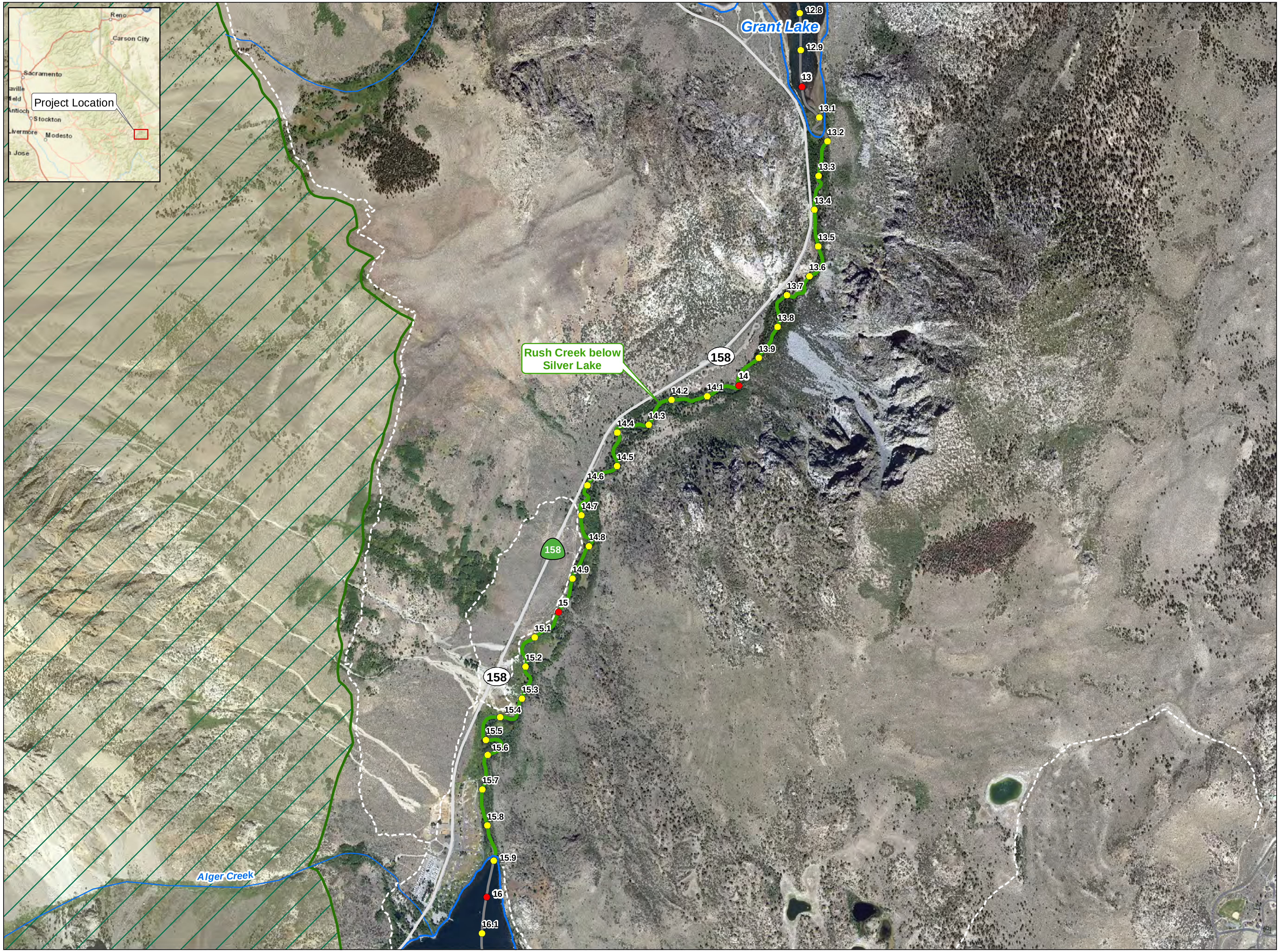

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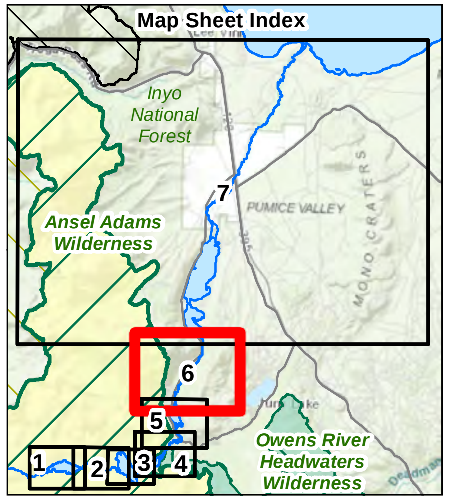

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Rush Creek Project (FERC 1389)

Map 4.2-2 (6 of 7)

Rush Creek
Stream Reaches and River Miles

0 250 500 Feet

Date: 5/19/2021

Projection: UTM Zone 11
Datum: NAD 83

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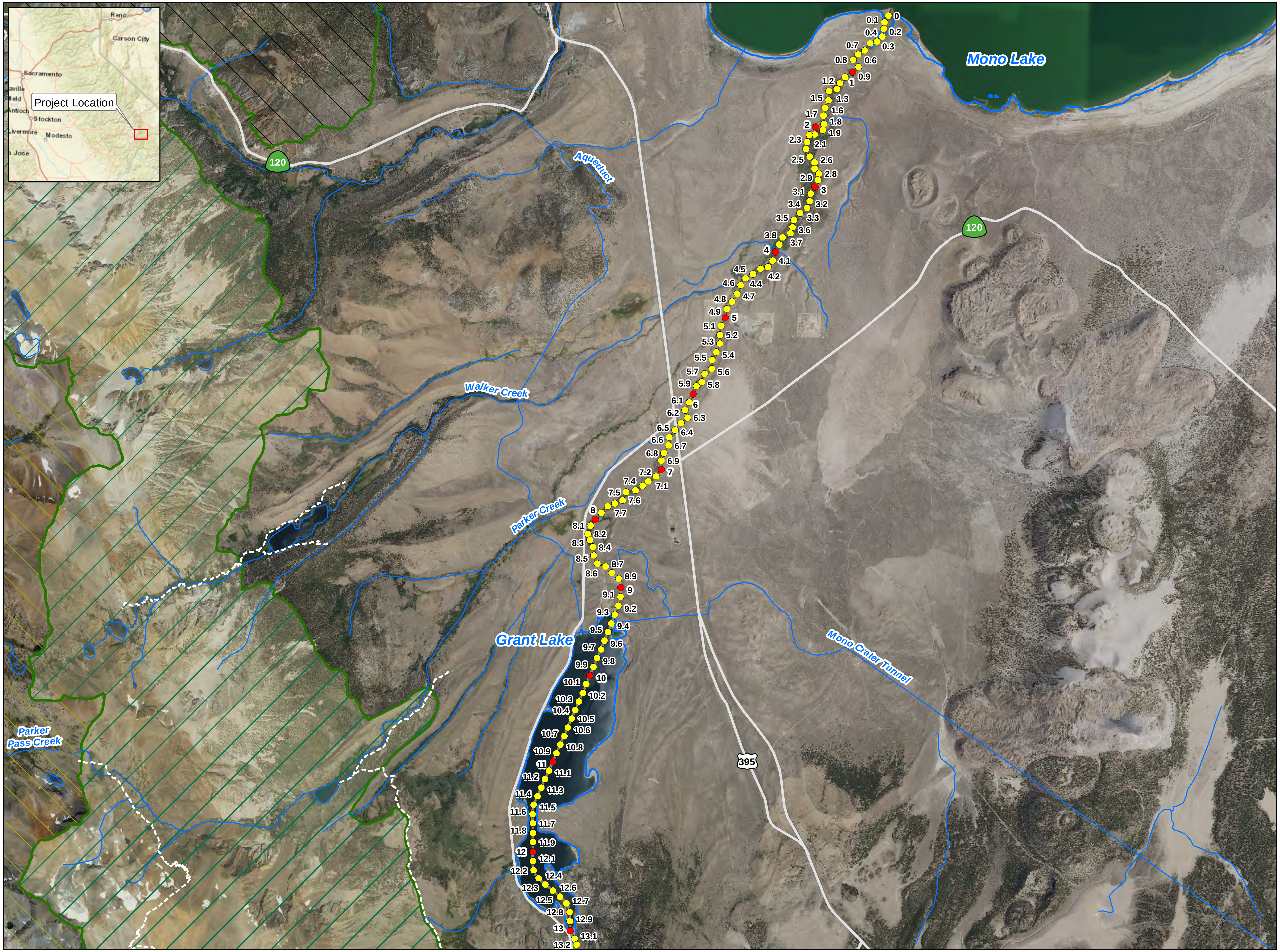

SCE Facilities

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- Reservoir Gage
- Ancillary Facility
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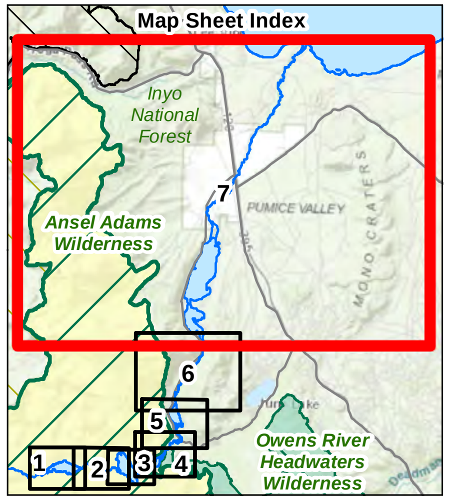
Map Sheet Index



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Rush Creek Project (FERC 1389)

Map 4.2-2 (7 of 7)

Rush Creek
Stream Reaches and River Miles

Date: 5/19/2021

0 2,500 5,000 Feet

Projection: UTM Zone 11
Datum: NAD 83

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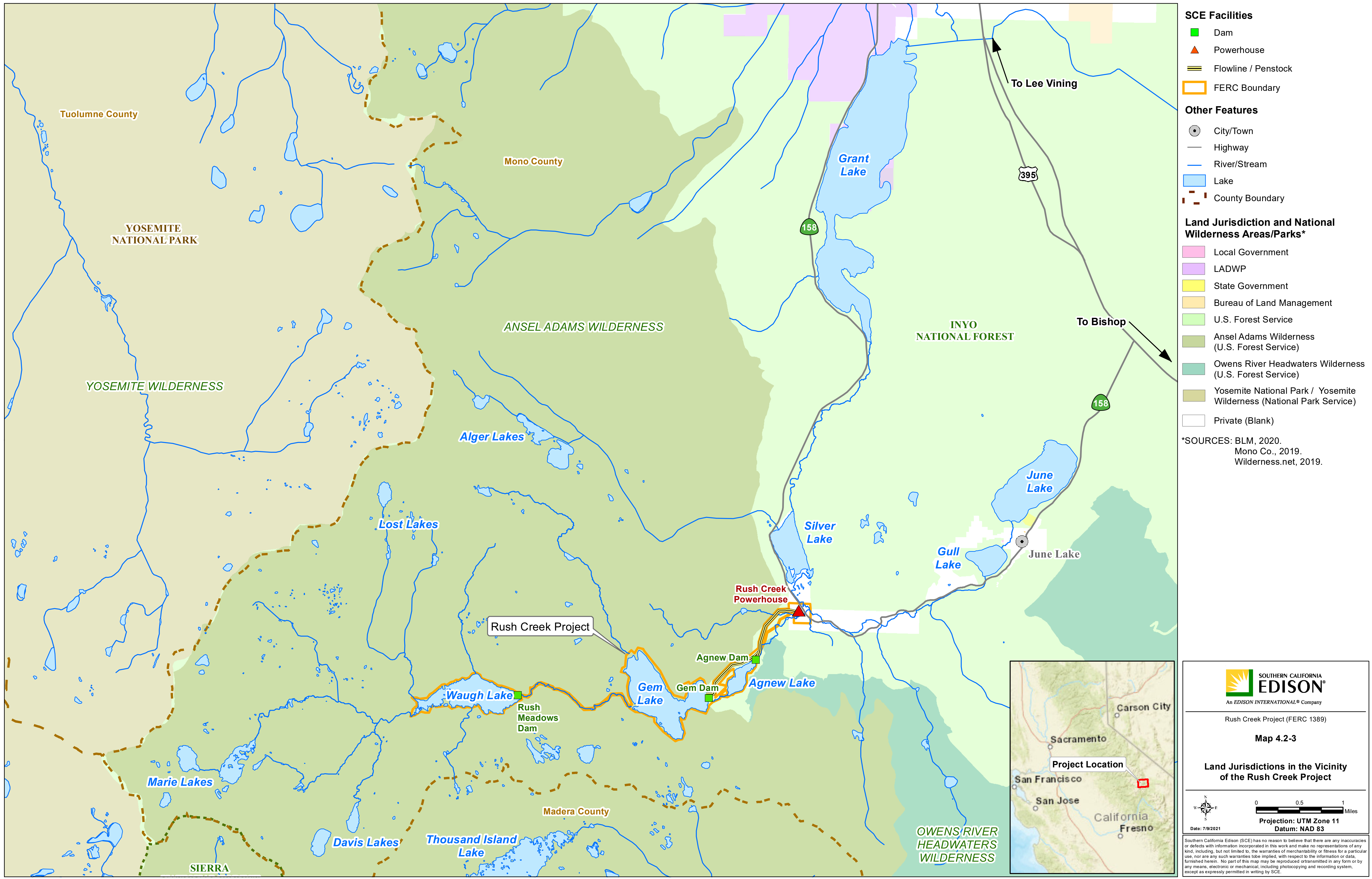

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LIST OF ACRONYMS

ac-ft	acre-feet
cfs	cubic feet per second
CRWQCB	California Regional Water Quality Control Board
FERC	Federal Energy Regulatory Commission
JLPUD	June Lake Public Utility District
kW	kilowatt
LADWP	Los Angeles Department of Water and Power
MW	megawatt
Project	Rush Creek Project
SCE	Southern California Edison Company
USGS	United States Geological Survey

4.3 WATER USE AND HYDROLOGY

This section describes water use and hydrology in Rush Creek, as they relate to Southern California Edison Company's (SCE) Rush Creek Project (Project). The Federal Energy Regulatory Commission's (FERC) content requirements for this section are specified in Title 18 of the Code of Federal Regulations Chapter I § 5.6(d)(3)(iii).

The FERC regulations require information on both water quantity (water use and hydrology) and water quality (chemical/physical parameters) for waters affected by the Project. This section presents information on water quantity. Information on water quality is addressed in Section 4.4, Water Quality.

4.3.1 Information Sources

This section was developed using existing information available in the following primary sources. Additional references are cited in the text, as appropriate.

- California Regional Water Quality Control Board (CRWQCB) Water Quality Control Plan for the Lahontan Region, North and South Basins (CRWQCB 2019)
- Gaging data from United States Geological Survey (USGS), SCE, and Los Angeles Department of Water and Power (LADWP)
- Storage Capacity, Detention Time, and Selected Sediment Deposition Characteristics for Gull and Silver Lakes, Mono County, California (USGS 1995)

4.3.2 Description of the Project and Surrounding Area

Rush Creek, in the vicinity of the Project, is located primarily in a high elevation basin in the eastern slope of the Sierra Nevada Mountains in Mono County. The headwaters of Rush Creek originate in the Marie Lakes Basin and the slopes of a series of high elevation mountain peaks (Donohue Peak, Mount Lyell, Rodgers Peak, Mount Davis, and Blacktop Peak) in the Ansel Adams Wilderness (Map 4.2-1). The upper Rush Creek Basin (upstream of the Reversed Creek confluence) is predominantly comprised of undeveloped high elevation mountainous country. The lower Rush Creek Basin (Reversed Creek confluence and downstream) is comprised of a lower elevation valley with limited residential development. Rush Creek flows through the Ansel Adams Wilderness, a small portion of the Owens River Headwaters Wilderness, and the Inyo National Forest (Map 4.2-2).

The Project facilities include three dams and associated reservoirs – Rush Meadows Dam (Waugh Lake), Gem Dam (Gem Lake), and Agnew Dam (Agnew Lake); a water conveyance system; the Rush Creek Powerhouse; and ancillary facilities as described in Section 2.0, Project Location, Facilities, and Operations. An overview of the Project facilities and surrounding area is provided in Maps 2-1 through 2-4. The Rush Creek Powerhouse is located approximately 0.7 mile upstream of Silver Lake at an elevation of approximately 7,300 feet and is powered by water diverted from Gem Dam and Agnew Dam that is conveyed through penstocks. After passing through Rush Creek

Powerhouse, the water reenters Rush Creek upstream of Silver Lake. Sources and locations of gaged flow data are shown in Table 4.3-1 and Map 4.3-1.

4.3.3 Drainage Area

The Rush Creek Basin drainage area is 133 square miles; however, the Rush Creek Project is located in the farthest upstream portion of the basin encompassing only 23.17 square miles (18% of total basin area) (Map 4.2-1 and Table 4.2-1). The drainage area upstream of the powerhouse is subdivided into 15.0 square miles upstream of Rush Meadows Dam, 6.91 square miles upstream of Gem Lake Dam, and 1.26 square miles upstream of Agnew Lake Dam.

4.3.4 Reservoir, Powerhouse, and Stream Data/Flow Statistics

4.3.4.1 Reservoirs

The Project reservoir elevation requirements in the current FERC license are provided in Table 4.3-2. Due to the recent discovery of an earthquake fault line in the vicinity of the Project, reservoir storage was restricted/reduced in all Project reservoirs starting in 2012. Table 4.3-3 shows physical data for reservoirs under the pre-2012 and post-2012 restrictions, including surface area, volume/capacity, maximum depth, mean depth, flushing rate, shoreline length, and substrate composition. The seismic restrictions on reservoir elevations were formalized in 2016 (FERC 2016) (maintain Waugh Lake ≤9,392.1 feet; Gem Lake ≤9,027.5 feet; and Agnew Lake completely drained) and significantly reduced the total storage capacity of Waugh, Gem, and Agnew lakes from approximately 23,000 acre-feet (ac-ft) to 12,300 ac-ft (refer to full description in Section 2.4.1, Seismic Restrictions). Figure 4.3-1 shows the daily storage values for each of the project reservoirs (Waugh, Gem, and Agnew) between water years 1990 and 2019. Downstream of the Project, Rush Creek flows through Silver Lake (non-project), Grant Lake (non-project), and eventually enters into Mono Lake.

4.3.4.2 Powerhouse

The mean and maximum average daily flows through the Rush Creek Powerhouse (USGS 10287300) are summarized in Table 4.3-4. Flows through the powerhouse are variable depending on the time of year and the amount of water available (Figure 4.3-2). The post-2012 seismic restrictions imposed on the storage/elevation of the Project reservoirs reduced the generating capacity of Rush Creek Powerhouse during some months, particularly September through February (i.e., less stored water available to release during the low-flow season). This pattern can be seen in Figure 4.3-3, which shows the average historical pre-seismic (1989–2011) and average post-seismic restriction (2012–2019) monthly flow and percent of annual flow through Rush Creek Powerhouse.

4.3.4.3 Streams

Rush Creek and sub-reaches of the creek, including river miles, are shown on Map 4.2-2 and in Table 4.2-3. Project-affected stream reaches from upstream to downstream include: (1) Rush Creek below Rush Meadows Dam; (2) Rush Creek below Gem Dam; (3) Rush Creek below Agnew Dam; (4) Rush Creek Horsetail Falls; (5) South Rush Creek; (6) Rush Creek above Silver Lake; and (7) Rush Creek below Silver Lake. The gradient of the Project-affected reaches ranges from 0.58% on the lower elevation valley flow to 31.82% in the steeper mountainous terrain. Figure 4.3-4 plots the elevation of each stream reach by river mile. Hydrologic data for the stream reaches (1) below Project dams that have minimum instream flow requirements; and (2) at two other downstream locations are provided below.

Stream Locations with Minimum Instream Flow Requirements

FERC minimum instream flow requirements included in the existing license for the Rush Creek Project are listed in Table 4.3-5. Three locations on Rush Creek (Below Rush Meadows Dam, Below Gem Dam, and Below Agnew Dam) have minimum instream flow requirements. The flow gages at these locations are generally rated to record minimum flow requirements and they record higher flows to varying degrees of accuracy depending on the gage. The gage below Rush Meadows Dam (USGS 10287262) is generally rated accurately up to approximately 30 cubic feet per second (cfs) and higher flows are less accurate. The gage below Gem Dam (USGS 10287281) only records the minimum flow release pipe and spills from the reservoir are not recorded (note: in 2018 and 2019 flows from another release pipe from the dam were recorded). The gage below Agnew Dam (USGS 10287289) is a flume that is rated for the full range of flows, including spills.

The historical measured minimum flow recordings and associated upstream reservoir storages, which can affect the minimum instream flow requirements/amounts (Table 4.3-5), are shown in Figure 4.3-5, Figure 4.3-6 and Figure 4.3-7 for the below Rush Meadows Dam, Gem Dam, and Agnew Dam sites, respectively. Note that when there is storage in the reservoirs the specified minimum flow release is required (Table 4.3-5), but when the reservoirs are drained, only the natural flow is required (if it is less). Existing and unimpaired flows are shown in Figure 4.3-8, Figure 4.3-9, and Figure 4.3-10 for each of the sites (below Rush Meadows Dam, Gem Dam, and Agnew Dam, respectively). Refer to Appendix 4.3-A for a description of how unimpaired flows were calculated.

Table 4.3-6 and Table 4.3-7 show the monthly flow statistics for the Below Gem Dam, and Below Agnew Dam sites, respectively, for the pre-seismic (1989–2011) and post-seismic (2012–2019) restriction time periods. The other gage (Below Rush Meadows Dam) has a relatively sporadic record (see Figure 4.3-5), and a summary statistics table was not created.

Other Stream Locations

Historical measured and calculated unimpaired flows at two locations: (1) Combined Powerhouse and Rush Creek below Agnew Dam; and (2) Rush Creek below Silver Lake – illustrate the effect of the Project on flows in Rush Creek. An average daily time series for the two locations (Figure 4.3-11 and Figure 4.3-12) shows that peak daily flows have historically been slightly reduced by the Project compared to unimpaired flows and that the low flows have typically been augmented by the Project. A mean annual flow time series (Figure 4.3-13 and Figure 4.3-14) shows that the Project operations did not significantly impact the mean annual flow in the system for most years. One exception to this is the 2007/2008 period, when unique Gem Lake operations (geomembrane liner dam repair) resulted in a multi-year redistribution of water (Figure 4.3-13).

Table 4.3-8 and Table 4.3-9 provide monthly flow statistics for the two locations (Combined Powerhouse and Rush Creek below Agnew Dam; Rush Creek below Silver Lake) for both the pre-seismic restriction (1989–2011) and post-seismic restriction (2012–2019) time periods. A monthly flow pattern shift in seasonal flows can be seen at the two flow locations from the historic operation period (1989–2011) to the current operations with seismic restrictions (2012–2019) (Figures 4.3-15 and Figure 4.3-16) as was observed in the powerhouse flow (Section 4.3.4.2). Under post-seismic restrictions, less flow occurs downstream of the powerhouse in September–February due to the reduced reservoir storage (seismic restrictions) and subsequent reduced storage release during the low-flow season.

4.3.5 Monthly Flow Duration Curves and Project Dependable Capacity

Existing and unimpaired monthly mean daily flow duration curves (1989–2019) for Below Agnew Dam (USGS 10287289), Rush Creek Powerhouse (USGS 10287300), Combined Powerhouse and Rush Creek below Agnew Dam (USGS 10287289 and USGS 10287300 combined), and Rush Creek below Silver Lake (USGS 10287400) and are shown in Appendix 4.3-B. Figures 4.3-17 through 4.3-20 show summary monthly exceedances for existing and unimpaired flows at each of the sites. Historical monthly flow duration curves for 1971–1985 are shown in Appendix 4.3-C (Lund 1988).

The Rush Creek Powerhouse dependable capacity is 11.7 megawatts (MW). The powerhouse has an installed capacity of 13.01 MW. During a period of high energy demand (July/August of a low water year) the powerhouse could operate at a plant capacity factor of approximately 0.9 (90%) for a period of days or weeks.

4.3.6 Existing and Proposed Water Uses

Beneficial uses that apply to surface waters within the river basin are identified in the Water Quality Control Plan for the Lahontan Region (Basin Plan) (CRWQCB 2019). Beneficial uses that pertain to upper Rush Creek, above Grant Lake, include: (1) municipal and domestic supply; (2) freshwater replenishment; (3) hydropower generation; (4) water contact recreation; (5) noncontact water recreation; (6) commercial and sport fishing; (7) cold freshwater habitat; (8) wildlife habitat; and (9) spawning, reproduction, and development. The Basin Plan also identifies beneficial uses that pertain to Rush Creek below Grant Lake which include: all benefits listed previously for upper Rush Creek except for (3) hydropower generation; and includes (10) agricultural supply; and (11) groundwater recharge.

4.3.6.1 Hydropower Uses

SCE operates the Rush Creek Project for hydroelectric generation. There are no other hydropower uses in the Rush Creek Basin. The Rush Creek Powerhouse has a total installed capacity of 13.01 MW with two generating units (Unit No. 1 – General Electric, 5,850 kilowatt [kW]; Unit No. 2 – Allis Chalmers, 7,161 kW). The units have a combined maximum hydraulic capacity of 110 cfs and minimum capacity of 6 cfs; however, historic maximum flow through the powerhouse is typically 100–105 cfs. The power plant has penstocks with intakes from Gem Dam and Agnew Dam. The water travels through closed penstocks to the Agnew Valve House. Two penstocks then transport the water from Agnew Valve House (elevation 4,280 feet) to Rush Creek Powerhouse. Under normal conditions, the power plant is run at full capacity during high-flow runoff events and, at other times, the flow is regulated at lower flows depending on the amount of water available (see Figure 4.3-2).

4.3.6.2 Domestic, Municipal, and Agricultural Uses

There are no consumptive uses of water from Rush Creek upstream of the powerhouse. A minor amount of consumptive use occurs at the Rush Creek Powerhouse, which is supplied by the June Lake Public Utility District (JLPUD) from the Reversed Creek/June Lakes sub-basin. JLPUD has approximately 660 customers for both water and sewer services and its boundaries include an area of approximately 1,720 acres of unincorporated residential, commercial, and undeveloped land primarily in the June Lakes/Reversed Creek sub-basin. Water for the JLPUD is provided from a diversion dam at Snow Creek, an intake facility in June Lake, and diversions from Fern and Yost creeks (JLPUD 2021).

From Silver Lake downstream, there is a small amount of consumptive water use from the homes and recreational facilities along the Silver Lake shoreline (JLPUD, wells, springs, Alger Creek), but the major consumer of water in the Rush Creek river basin is the City of Los Angeles, which diverts water out of the lower Rush Creek river basin (and the larger Mono Basin) from Grant Lake, Parker Creek, and Walker Creek via the Los Angeles Aqueduct for domestic uses. The water diversions are regulated by Water Board Decision D1631 (limits water exports from Mono Basin) to establish fisheries protection flows for streams tributary to Mono Lake and to protect public trust resources at Mono Lake and in the Mono Basin (LADWP 2020).

4.3.6.3 Recreation

In the vicinity of the Project (Rush Creek near the powerhouse and upstream), recreational uses identified in the Basin Plan, which are water contact and noncontact recreation and sport fishing (CRWQCB 2019). Dispersed recreation (camping and fishing) occur at Agnew Lake, Gem Lake, Waugh Lake and along Rush Creek. There are no roads in the vicinity of the Project (above the valley floor) and recreation is accessed only by hiking or horseback. Downstream of the powerhouse (including the June Lakes/Reversed Creek drainage) there is easier access (roads) and the non-Project lakes (June, Gull, Silver, Grant) and Rush Creek are popular for contact/noncontact recreation and sport fishing (see Section 4.11, Recreation).

4.3.6.4 Aquatic and Wildlife Habitats

In the vicinity of the Project (Rush Creek near the powerhouse and upstream) beneficial uses identified in the Basin Plan (CRWQCB 2019) include cold freshwater habitat, wildlife habitat, spawning, reproduction, and development, which are all applicable to Waugh Lake, Gem Lake, Agnew Lake, and Rush Creek. Downstream of the powerhouse (including the June Lakes/Reversed Creek drainage), Rush Creek, tributary streams, and non-Project lakes (June, Gull, Silver, Grant) provide aquatic and wildlife habitats (see Section 4.4, Fish and Aquatic Resources and Section 4.5, Botanical and Wildlife Resources).

4.3.7 Existing Instream Water Uses and Water Rights

4.3.7.1 Instream Uses Affected by the Project

In the vicinity of the Project, instream water uses other than the Project are primarily aquatic habitat and recreation, there no other stream water users. Instream flow water uses are affected, or potentially affected, in seven reaches of Rush Creek or South Rush Creek (a small distributary of Rush Creek) (Table 4.2-3 and Map 4.2-2). This does not include the reservoir inundated or seasonally reservoir inundated reaches. Four of the seven stream reaches are bypass reaches (flow is diverted around the reach by the Project) and three of the stream reaches are flow-affected reaches (flow timing in the reach is altered by the Project). Three of the reaches (Rush Creek below Gem Dam, Rush Creek below Agnew Dam, and Rush Creek Horsetail Falls) are very steep gradient, between 11.7% - 31.8% (Figure 4.3-17), and consist of falls with some plunge pools, bedrock/coarse substrate, and limited aquatic habitat (non-adjustable channels in relation to flow modification). The other reaches are low to moderate gradient and provide better aquatic habitat and portions of their channels have finer substrate and are adjustable in relation to flow modifications. Both existing and unimpaired flow time series plots (1989–2019) are provided in Section 4.3.4.3 for each of the reaches, except for South Rush Creek, which was lumped in with the Rush Creek below Agnew Dam reach flow gaging (i.e., limited information is available to separate South Creek flows out for the reach).

4.3.7.2 Water Rights

SCE currently has three water rights permits and three licenses issued by the State Water Board related to the Rush Creek Project. These appropriative water rights permits, and licenses allow for the diversion and storage of water for power production at Agnew, Gem, and Rush Meadows dams. One permit allows for the diversion of water from Gem Dam for domestic use. Table 4.3-10 summarizes SCE's water rights permits and licenses for the Project.

4.3.8 References

CRWQCB (California Regional Water Quality Control Board) Lahontan Region. 2019. Water Quality Control Plan for the Lahontan Region, North and South Basins (Basin Plan). Revised October 2019. Available at: https://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/references.html.

FERC (Federal Energy Regulatory Commission). 2016. Plan and Schedule for the Seismic Retrofit of the Rush Creek Project. FERC Accession No. 20161108-0178. October 27.

JLPUD (June Lake Public Utility District). 2021. Available at: https://www.junelakepud.com/about-us.

LADWP (Los Angeles Department of Water and Power). 2020. Draft LADWP Urban Water Management Plan. Available at: http://ladwp.com/UWMP

Lund, L. 1988. Water Quality of Bishop Creek and Selected Eastern Sierra Nevada Lakes. Report of Research for 1986 to 1988. SCE.

USGS (United States Geologic Survey). 1995. Storage Capacity, Detention Time and Selected Sediment Deposition Characteristics for Gull and Silver Lakes, Mono County, California. Available at: https://pubs.usgs.gov/of/1995/0702/report.pdf.

USGS Flow Data (A complete list of sites used for this analysis is provided in Table 4.3-1) Available at: https://waterdata.usgs.gov/nwis.

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TABLES

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Table 4.3-1. Hydrology Data Sources

Location	Entity and Station No.	Data Type	Period of Record	Notes	Data Use	Location (NAD27)	Drainage Area (Square Miles)	Elevation (Feet above NGVD29)
Waugh Lake								
Waugh Lk near June Lk CA	SCE 359 & USGS 10287260	Daily Storage	10/01/1989–09/30/2019	Full Record Available	Unimpaired Calculation	Latitude 37°45'04", Longitude 119°10'52"	15.3	9,370
Rush Creek below Rush Meadows Dam (Rush Creek below Waugh Lake)								
Rush C controlled release below Waugh Lk near June Lake CA	SCE 359 R & USGS 10287262	Daily Flow	08/11/1999–09/30/2019	Spotty data — no flows recorded above 30 cfs	Comparison Only	Latitude 37°45'04", Longitude 119°10'50"	15.3	9,375
Gem Lake								
Gem Lake	SCE 352 & USGS 10287280/CDEC GLK	Daily Storage	10/01/1989–09/30/2019	Full Record Available	Unimpaired Calculation	Latitude 37°45'07", Longitude 119°08'25"	21.9	8,970
Rush Creek below Gem Dam (Rush Creek below Gem Lake)								
Rush C controlled release below Gem Lake near June Lake, CA	SCE 352 R & USGS 10287281	Daily Flow	10/19/1999–09/30/2019	Full Record Available	Comparison Only	Latitude 37°45'05", Longitude 119°08'26"	21.9	9,000
Agnew Lake								
Agnew Lake near June Lake, CA	SCE 351 & USGS 10287285	Daily Storage	10/01/1989–09/30/2019	Full Record Available	Unimpaired Calculation	Latitude 37°45'30", Longitude 119°07'52"	23.2	8,470
Rush Creek below Agnew Dam (Rush Creek at Flume below Agnew)								
Rush Creek at Flume below Agnew Lake near June Lake, CA	SCE 357 & USGS 10287289	Daily Flow	10/01/1988–09/30/2019	Full Record Available	Unimpaired Calculation	Latitude 37°45'33", Longitude 119°07'47"	23.2	8,440

Location	Entity and Station No.	Data Type	Period of Record	Notes	Data Use	Location (NAD27)	Drainage Area (Square Miles)	Elevation (Feet above NGVD29)
Rush Creek Powerhouse (Rush Creek PP tailrace)								
Rush Creek PP tailrace near June Lake, CA	SCE 367 & USGS 10287300	Daily Flow	10/01/1986–09/30/2019	Full Record Available	Unimpaired Calculation	Latitude 37°45'59", Longitude 119°07'17"	23.2	7,230
Rush Creek below Silver Lake (Rush Creek above Grant Lake)								
Rush Creek ab Grant Lake near June Lake, CA	LADWP MS 5013 & USGS 10287400	Daily Flow	10/01/1986–09/30/2019	Pre-1990 Monthly Data	Unimpaired Calculation	Latitude 37°48'23", Longitude 119°06'29"	51.3	7,200
Grant Lake								
Grant Lake	CDEC GNT	Monthly Storage	01/01/1956–09/30/2019	Monthly Data, CDEC	Comparison Only	Latitude 37°51'43.2", Longitude 119°6'7.2"	58.5	7,140
Walker River								
Walker River	USGS 10296000	Daily Flow	04/01/1938–09/30/2019	Full Record Available	Comparison and Gap Filling	Latitude 38°22'47", Longitude 119°26'57"	181	6,591

Notes: CDEC GNT = California Data Exchange Center Grant Lake Station (GNT)
LADWP MS 5013 = Los Angeles Department of Water and Power Measuring Station 5013
NAD27 = North American Datum of 1927
NGVD29 = National Geodetic Vertical Datum of 1929
PP = Powerplant
SCE = Southern California Edison Company
USGS = U.S. Geological Survey

Table 4.3-2. FERC Elevation Requirements for Waugh, Gem, and Agnew Lakes, Including Current Seismic Restrictions

<table>
<tr><th>Reservoir</th><th>Current License Elevation Requirement
(but Superseded by Current Seismic Restrictions)</th><th>Seismic Restrictions
(Maximum Elevation, Feet)</th></tr>
<tr><td colspan="3">Waugh Lake</td></tr>
<tr><td>Regular Water Years</td><td>Within 2 feet of spillway elevation (9,416 feet) July 1 to the Tuesday following Labor Day weekend[1]</td><td rowspan="2">9,392.1 feet</td></tr>
<tr><td>Low Water Years (<75% of the April 1 snow water equivalent for the Mono Basin)</td><td>Within 3 feet of spillway elevation (9,416 feet) July 1 to the Tuesday following Labor Day weekend[2]</td></tr>
<tr><td colspan="3">Gem Lake</td></tr>
<tr><td>Regular Water Years</td><td>Within 2 feet of spillway elevation (9,052 feet) July 1 to the Tuesday following Labor Day weekend[1]</td><td rowspan="2">9,027.5 feet</td></tr>
<tr><td>Low Water Years (<75% of the April 1 snow water equivalent for the Mono Basin)</td><td>Within 6 feet elevation (9,052 feet) July 1 to the Tuesday following Labor Day weekend[2]</td></tr>
<tr><td colspan="3">Agnew Lake</td></tr>
<tr><td>All Water Years</td><td>Within 15 feet of spillway elevation (8,496 feet) July 1 to the Tuesday following Labor Day weekend</td><td>Completely Drained (8,470.0 feet)</td></tr>
</table>

Notes:

[1] Licensee may maintain reduced lake levels when necessary to avoid the spill of water from Gem Lake at potentially damaging volumes. In such event, Licensee shall cause the water level in Waugh and Gem Lakes to reach 2 feet below the spillway elevations as soon as practicable after July 1.

[2] To the extent sufficient water is available to meet (i) minimum stream flow requirements required in Condition No. 5, and (ii) a target 14 cfs release from the project powerhouse, based on plant operational minimums.

Table 4.3-3. Reservoir/Lake Physical Data

Reservoir/Lake	Surface Area (acres)	Gross Storage Volume (ac-ft)	Max Operating Water Surface Elevation/ High Water Mark (ft)	Max Depth (ft)	Mean Depth (ft)	Flushing Rate (days)	Shoreline Length (miles)	Substrate Composition
Waugh Lake								
Pre-2012 Specifications	185	5,277	9,416	47	28.5	72	4.57	Silt, Sand, Rock, Bedrock
Post-2012 Specifications	130	1,555	9,392	23.5	12.0	21	4.40	Silt, Sand, Rock, Bedrock
Gem Lake								
Pre-2012 Specifications	282	17,228	9,052	78	61.1	150	4.53	Silt, Sand, Rock, Bedrock
Post-2012 Specifications	256	10,752	9,027.5	54	42	94	4.63*	Silt, Sand, Rock, Bedrock
Agnew Lake								
Pre-2012 Specifications	40	1,379	8,496	unknown	34.5	55	1.39	Silt, Sand, Rock, Bedrock
Post-2012 Specifications**	23	569	8,470	unknown	24.7	23	1.24	Silt, Sand, Rock, Bedrock

Note:

* Greater shoreline length at lower capacity due to less uniform shoreline with additional appearance of islands.

** Under the seismic restrictions Agnew Lake is a natural lake with no usable storage.

Table 4.3-4. Monthly Mean and Maximum Flows (cfs) through Rush Creek Powerhouse (SCE 367 / USGS 10287300)

Month	Rush Creek Power Plant Flows (cfs)			
	Historic Operations 1989–2011		Operations with Seismic Restrictions 2012–2019	
	Mean	Max	Mean	Max
October	52.9	104.0	26.0	66.0
November	41.8	102.0	27.4	100.0
December	34.7	79.0	27.7	102.0
January	36.9	96.0	17.5	81.0
February	39.6	102.0	22.7	101.0
March	45.3	102.0	37.7	104.0
April	36.0	101.0	31.2	107.0
May	53.8	106.0	41.7	106.0
June	61.4	104.0	65.9	113.0
July	62.5	106.0	58.2	103.0
August	41.9	106.0	33.3	100.0
September	49.1	103.0	18.7	70.0

Table 4.3-5. FERC Instream Flow Requirements for the Rush Creek Project included in the Existing License

Rush Creek Location	Instream Flow Requirement (cfs)	Measurement Gage
Below Rush Meadows (Waugh Lake) Dam	10 cfs or natural flow into Waugh Lake, whichever is less	SCE 359 R and USGS 10287262
Below Gem Dam	1 cfs or natural flow if the reservoir falls below the face of the dam	SCE 352 R and USGS 10287281
Below Agnew Dam	1 cfs or natural flow if the reservoir falls below the face of the dam	SCE 357 and USGS 10287289

Notes: cfs = cubic foot/feet per second
SCE = Southern California Edison Company
USGS = U.S. Geological Survey

Table 4.3-6. Monthly Mean, Minimum, and Maximum Rush Creek Flows (cfs) below Gem Dam (flow gage records minimum flows only), for the Pre-seismic (2000–2011) and Post-seismic (2012–2019) Restriction Time Periods (SCE 352 R/USGS 10287281)

Month	Flow below Gem Dam (cfs)					
	Historic Operations 2000*–2011			Operations with Seismic Restrictions 2012–2019		
	Mean	Min	Max	Mean	Min	Max
October	1.7	1.0	6.7	1.3	1.1	1.9
November	1.2	1.0	1.4	1.7	1.1	6.3
December	1.3	1.0	1.5	1.8	1.1	6.0
January	1.2	1.0	1.5	1.4	1.0	5.5
February	1.3	1.0	2.0	1.3	1.1	1.7
March	1.3	1.1	2.0	1.4	1.0	4.4
April	1.3	0.0[1]	2.6	5.2	1.0	128.0
May	2.0	1.0	5.8	22.3	1.0	148.0
June	2.7	1.2	7.1	22.9	1.0	155.0
July	2.3	1.2	7.0	8.9	1.0	133.0
August	1.5	1.0	7.0	1.5	1.0	5.2
September	1.9	1.2	6.9	1.4	1.0	2.0

Notes:

* Facilities to release new minimum flow requirements were completed at end of calendar year 1999.

[1] A two-week period of 0.0 cfs was recorded in April of 2000 when Gem Lake storage was zero – low level minimum flow pipe was likely not functional at this storage level. Flows in the stream may have occurred during this period that were not recorded by the minimum flow gage.

Table 4.3-7. Monthly Mean, Minimum, and Maximum Rush Creek Flows (cfs) below Agnew Dam Flume for the Pre-seismic (2000–2011) and Post-seismic (2012–2019) Restriction Time Periods (SCE 357/USGS 10287289)

Month	Flume below Agnew Dam (cfs)					
	Historic Operations 2000*–2011			Operations with Seismic Restrictions 2012–2019		
	Mean	Min	Max	Mean	Min	Max
October	11.6	0.0[1]	178.0	2.0	0.7	8.5
November	5.3	0.2[2]	57.0	2.1	1.0	6.7
December	6.7	1.3	57.0	2.1	0.9	11.0
January	2.3	1.4	4.5	4.3	0.9	51.0
February	2.3	1.4	7.0	3.1	0.8	23.0
March	2.5	1.6	4.1	3.4	1.0	34.0
April	2.9	1.2	8.2	16.0	1.6	172.0
May	4.9	1.3	49.0	55.0	1.9	218.0
June	55.9	1.5	223.0	81.5	1.7	440.0
July	48.8	1.4	348.0	52.7	1.2	407.0
August	7.3	1.4	254.0	2.6	1.2	39.0
September	4.6	1.4	52.0	2.2	0.8	25.0

* Facilities to release new minimum flow requirements were completed at end of calendar year 1999.

[1] Zero flow recorded in flume below Agnew on 10/22/2007 – Agnew Lake was NOT at dead pool.

[2] 0.2 cfs was recorded in flume below Agnew in November, 2006 which coincides with Agnew Lake at dead pool.

Table 4.3-8. Existing and Unimpaired Monthly Mean, Minimum, and Maximum Flows (cfs) for the Combined Rush Creek below Agnew Dam and Rush Creek Powerhouse (Top Table: Historical Operations [2000–2011], Bottom Table: Operations with Seismic Restrictions [2012–2019]) (USGS 10287289 and USGS 10287300)

Month	Combined Rush Creek below Agnew Dam and Rush Creek Powerhouse Historical Operations (2000–2011)					
	Existing Flows (cfs)			Unimpaired Flows (cfs)		
	Mean	Min	Max	Mean	Min	Max
October	61.9	7.2	279.0	8.6	1.0	273.2
November	49.2	4.7	104.9	7.7	1.0	40.9
December	39.1	4.8	81.0	7.4	1.0	37.0
January	35.6	4.8	54.5	8.5	1.0	31.4
February	41.1	2.8	104.7	9.0	1.0	31.5
March	49.7	2.8	104.8	14.2	1.0	58.4
April	36.7	2.5	103.7	49.0	7.9	218.9
May	53.4	5.0	152.0	204.3	18.7	599.6
June	115.2	13.8	327.0	238.6	24.6	826.9
July	107.8	1.5	435.0	119.2	4.7	553.6
August	35.3	6.1	308.0	25.7	1.5	227.6
September	46.2	5.1	106.5	8.0	1.0	47.9

Month	Combined Rush Creek below Agnew Dam and Rush Creek Powerhouse Operations with Seismic Restrictions (2012–2019)					
	Existing Flows (cfs)			Unimpaired Flows (cfs)		
	Mean	Min	Max	Mean	Min	Max
October	28.0	1.0	68.4	13.7	1.0	433.5
November	29.5	1.0	102.6	9.8	1.0	182.5
December	29.9	1.0	110.0	8.4	1.1	79.9
January	21.8	1.0	84.4	9.0	1.0	41.6
February	25.7	1.0	103.5	11.7	1.0	35.2
March	41.1	1.0	107.1	20.2	3.3	79.8
April	47.2	1.3	251.0	76.6	6.0	484.1
May	96.7	18.7	321.0	165.9	41.9	517.3
June	147.4	24.6	541.0	196.3	20.4	910.4
July	110.8	4.7	508.0	96.7	3.9	564.2
August	35.8	1.5	119.0	29.9	1.9	289.4
September	21.0	1.0	73.1	7.8	1.0	55.1

Table 4.3-9. Existing and Unimpaired Monthly Mean, Minimum, and Maximum Flows (cfs) in Rush Creek below Silver Lake (Top Table: Historical Operations [2000–2011], Bottom Table: Operations with Seismic Restrictions [2012–2019]) (LADWP MS 5013/USGS 10287400)

	Rush Creek below Silver Lake Historical Operations (2000–2011)					
	Existing Flows (cfs)			Unimpaired Flows (cfs)		
Month	Mean	Min	Max	Mean	Min	Max
October	71.6	13.6	265.0	16.3	2.5	234.8
November	60.5	8.9	131.0	17.1	3.1	57.8
December	51.1	9.2	121.0	18.5	3.9	114.6
January	48.3	10.4	92.0	20.7	6.5	88.1
February	54.1	11.0	120.1	21.6	9.2	101.7
March	67.9	17.9	138.0	32.1	11.1	96.2
April	65.1	21.0	137.0	75.2	20.7	240.0
May	117.7	32.7	328.0	267.9	37.0	745.7
June	187.0	22.6	483.0	313.9	33.6	1072.9
July	142.4	15.2	478.0	154.9	12.7	702.6
August	47.9	9.4	373.0	38.3	6.3	296.2
September	53.3	11.3	112.0	15.5	3.3	61.6

	Rush Creek below Silver Lake Historical Operations with Seismic Restrictions (2012–2019)					
	Existing Flows (cfs)			Unimpaired Flows (cfs)		
Month	Mean	Min	Max	Mean	Min	Max
October	31.6	9.0	93.0	19.6	4.9	441.5
November	35.0	8.8	99.6	16.5	2.8	190.5
December	34.8	11.1	138.0	15.5	3.9	87.9
January	30.5	11.4	125.0	17.6	3.5	126.2
February	38.3	10.5	199.0	25.2	7.8	186.6
March	53.9	15.8	115.4	34.4	13.3	102.9
April	71.1	14.1	277.1	99.8	20.9	552.8
May	138.4	21.4	487.5	208.4	57.2	668.8
June	200.3	11.1	721.7	251.0	33.6	1102.0
July	131.8	7.5	589.0	120.4	11.7	641.0
August	44.9	8.3	169.3	40.5	6.4	304.0
September	24.6	4.3	71.1	14.1	3.8	72.0

Table 4.3-10. Summary of Appropriative Water Rights

Permit/ License No.	Type of Use	Status	Location	Direct Diversion Rate		Diversion to Storage	
				Amount	Timing	Amount	Timing
000025	Power	Licensed	Gem Dam	40 cfs	Jan 1 – Dec 31	–	–
			Agnew Dam	40 cfs	Jan 1 – Dec 31	–	–
000061	Power	Licensed	Rush Meadows Dam	–	–	3,763 gpd	Jan 1 – Dec 31
000564	Power	Licensed	Rush Meadows Dam	10 cfs	Jan 1 – Dec 31	1,742 ac-ft	Jan 1 – Dec 31
020895[a]	Power	Permitted	Agnew Dam	45 cfs	Jan 1 – Dec 31	1,678 ac-ft	Jan 1 – Dec 31
020896[b]	Domestic	Permitted	Gem Dam	–	–	1,611 gpd	Jan 1 – Dec 31
020897[c]	Power	Permitted	Gem Dam	60 cfs	Jan 1 – Dec 31	19,687 ac-ft	Jan 1 – Dec 31

Notes: ac-ft = acre-feet
cfs = cubic feet per second
gpd = gallons per day

a. Total amount of water to be taken from the source shall not exceed 3,358 ac-ft per water year of October 1 to September 30.

b. The maximum amount diverted under this permit shall not exceed 1.7 ac-ft per year.

c. The total amount of water to be taken from the source shall not exceed 63,125 ac-ft per water year of October 1 to September 30.

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FIGURES

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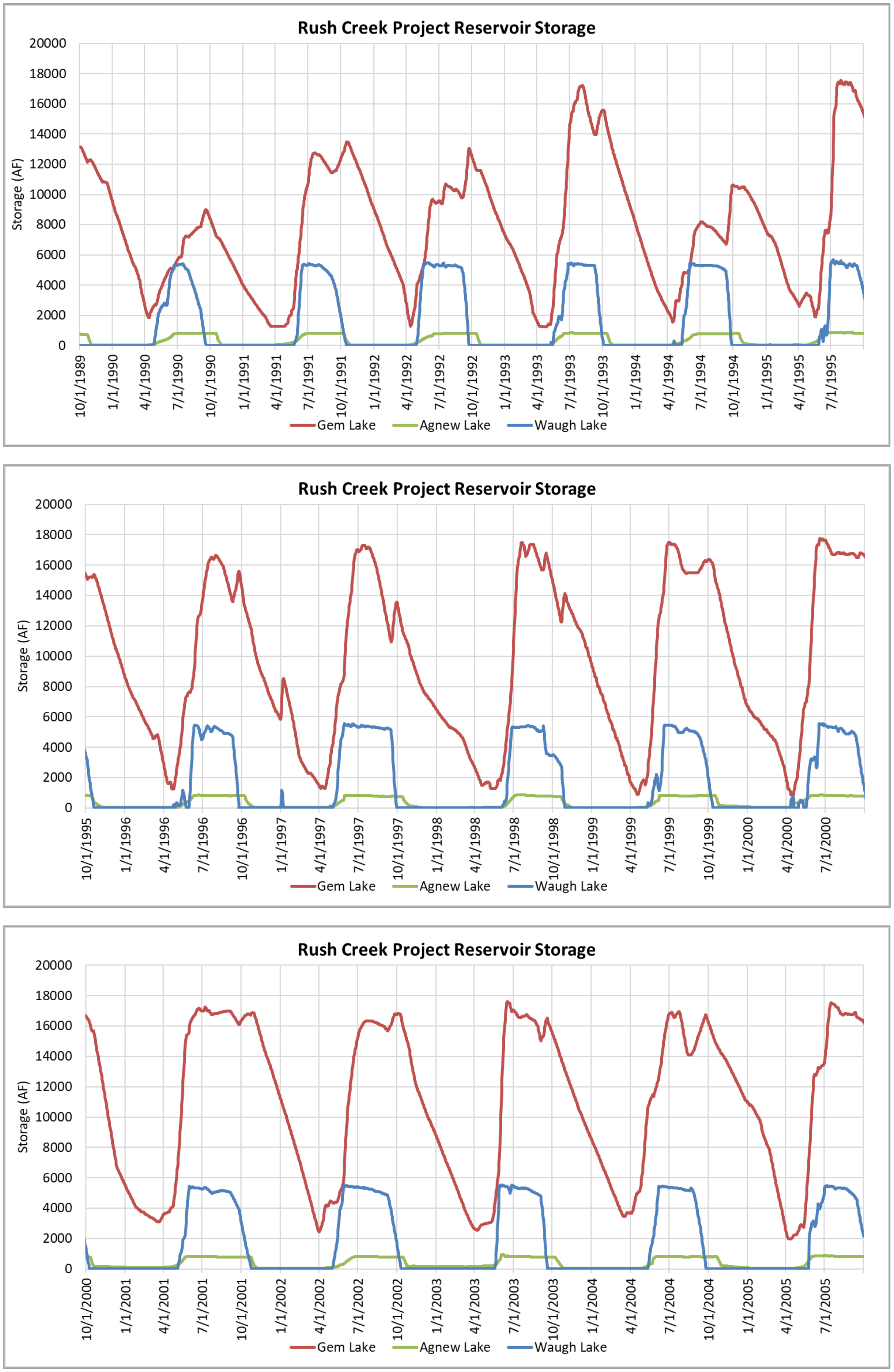


Figure 4.3-1. Rush Creek Project Reservoir Storage (WY 1990–2019)

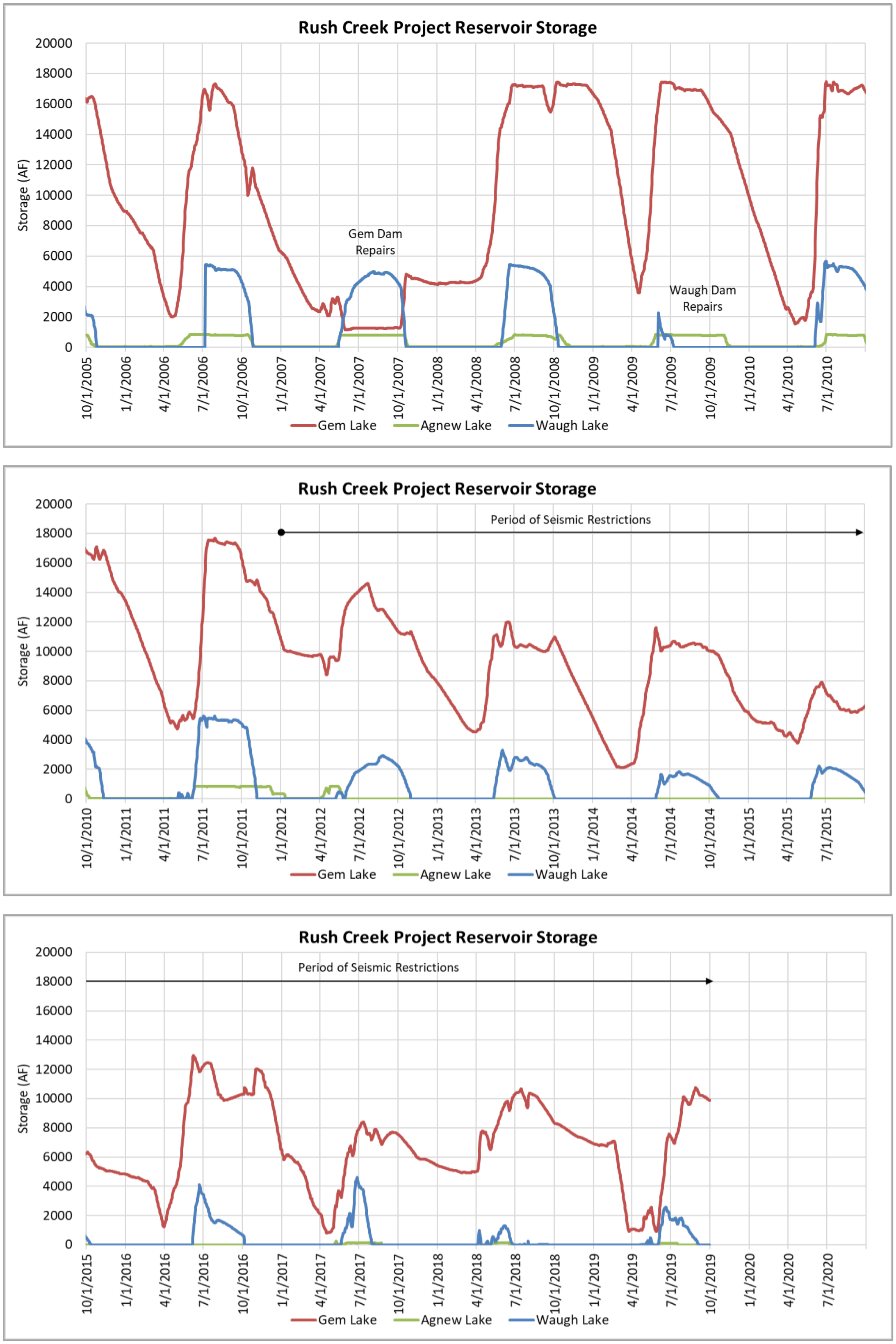


Figure 4.3-1 (continued). Rush Creek Project Reservoir Storage (WY 1990–2019).

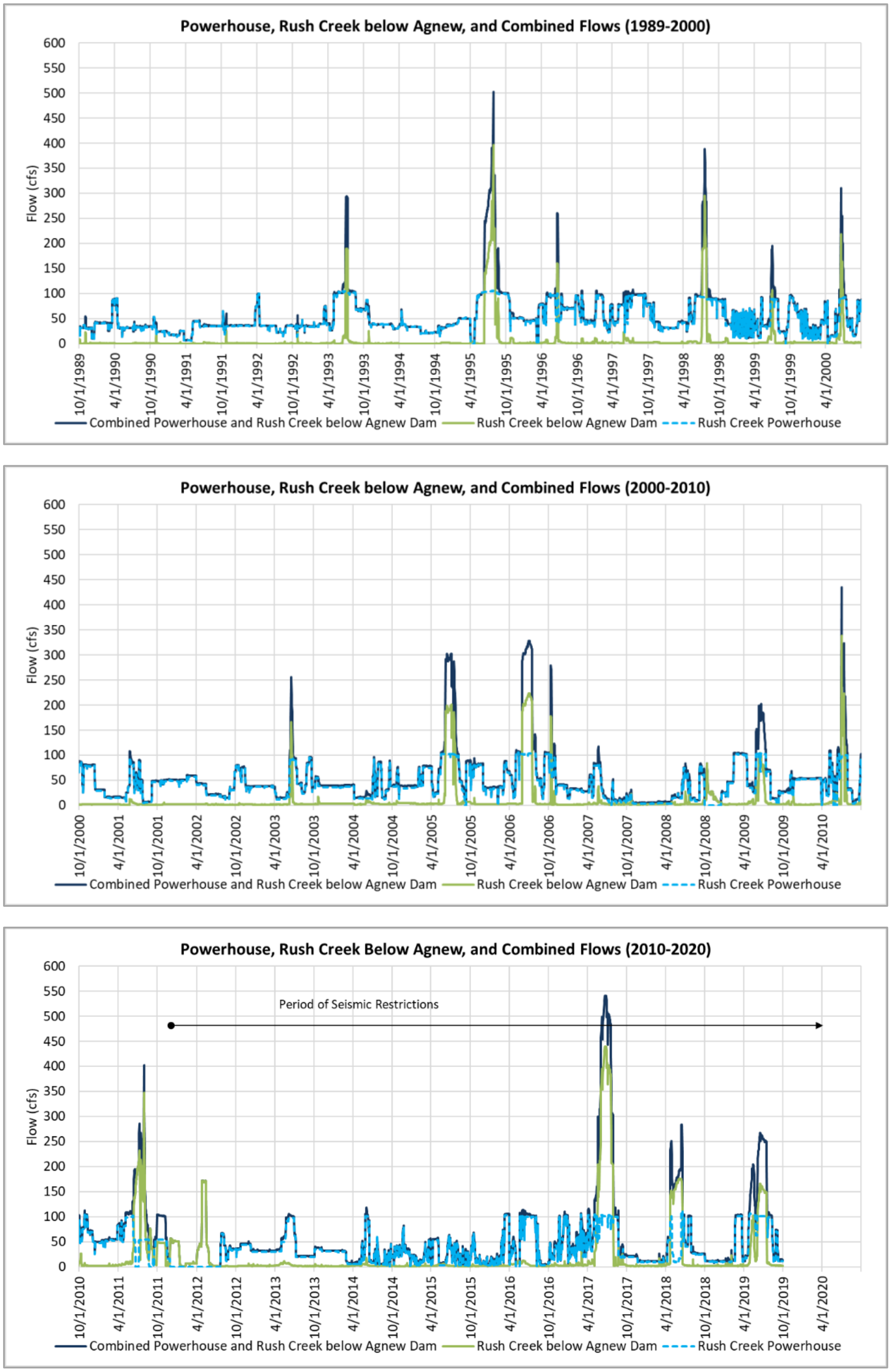
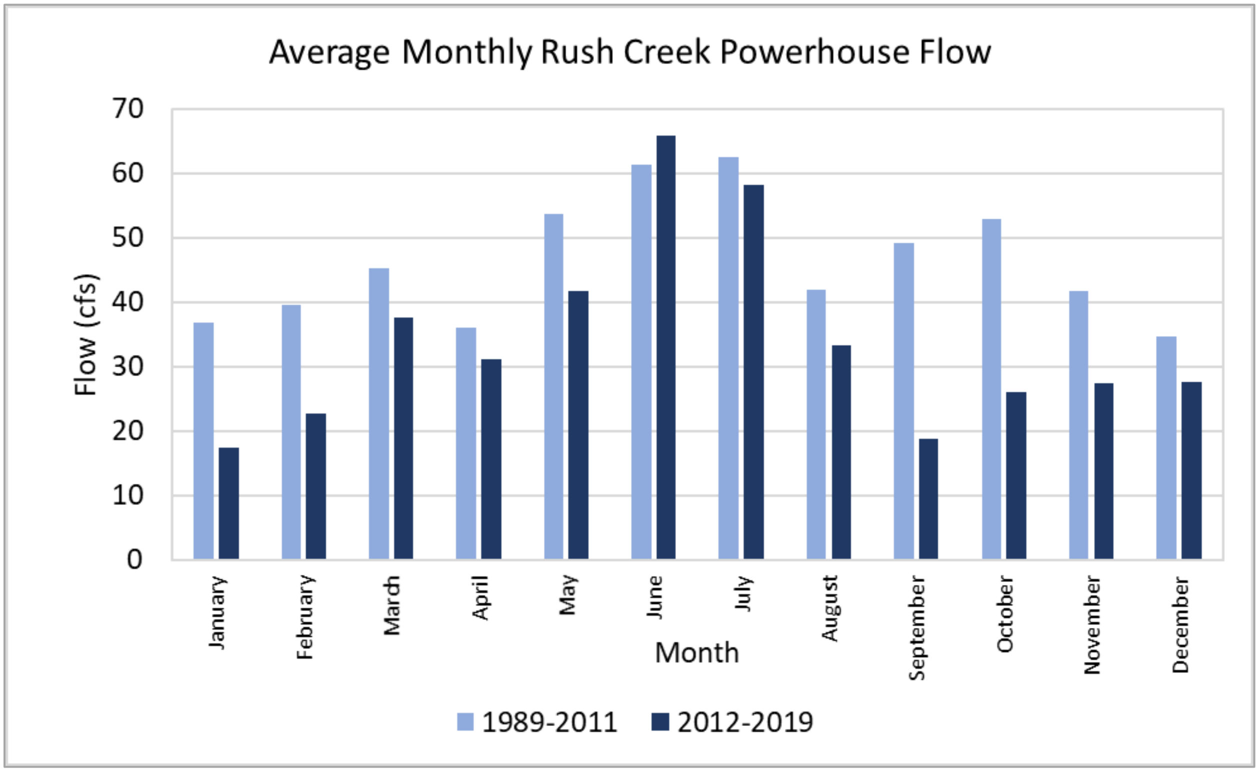


Figure 4.3-2. Daily Mean Flow (1990 to 2019 WY) at the Rush Creek Powerhouse (SCE 367/USGS 10287300), Rush Creek below Agnew Dam (SCE 357/USGS 10287289), and the Locations Combined (Combined Powerhouse and Rush Creek below Agnew Dam).



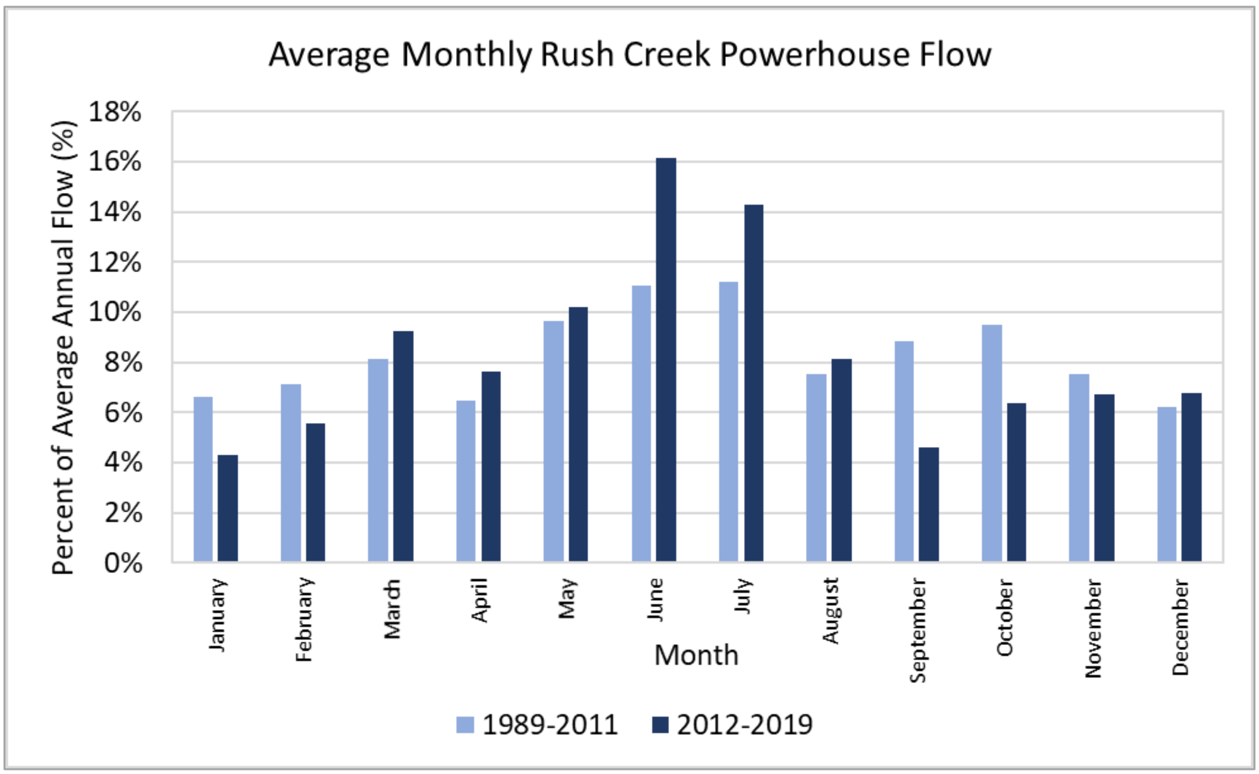


Figure 4.3-3. Average Monthly Powerhouse Flows [Top Graph: Flow in cubic feet per second (cfs); Bottom Graph: Percentage of Average Annual Flow] (SCE 367/USGS 10287300).

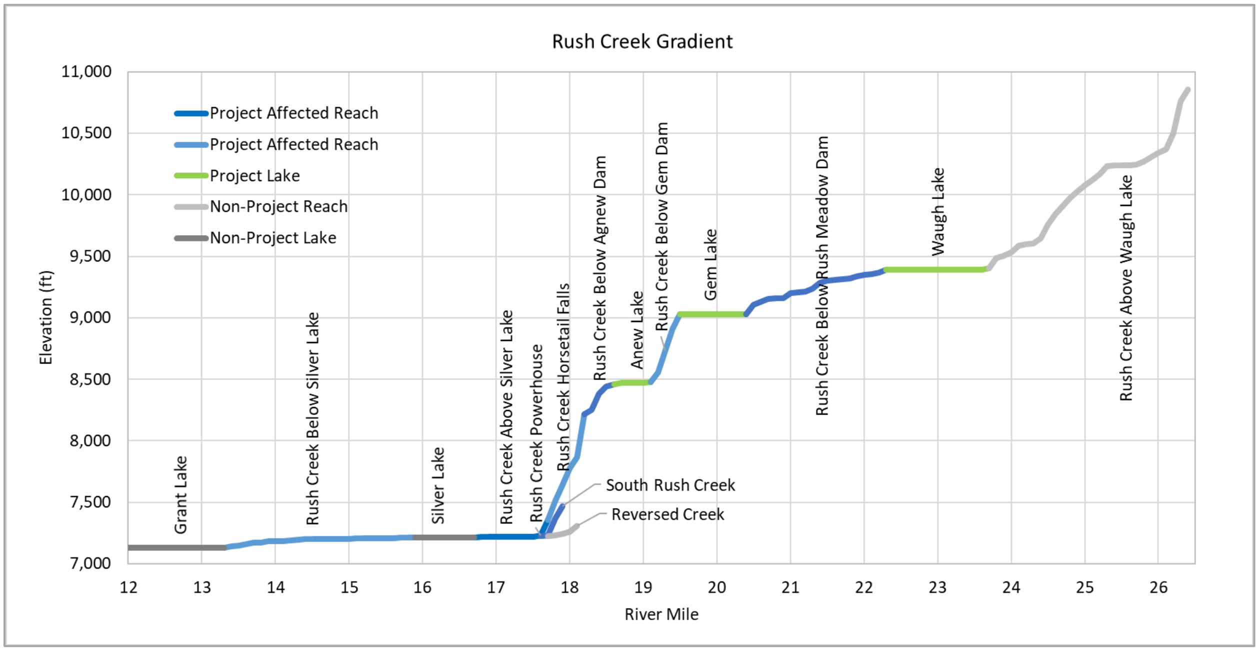


Figure 4.3-4. Gradient for Project-affected and Non-Project Affected Stream Reaches/Lakes in the vicinity of Rush Creek Project.

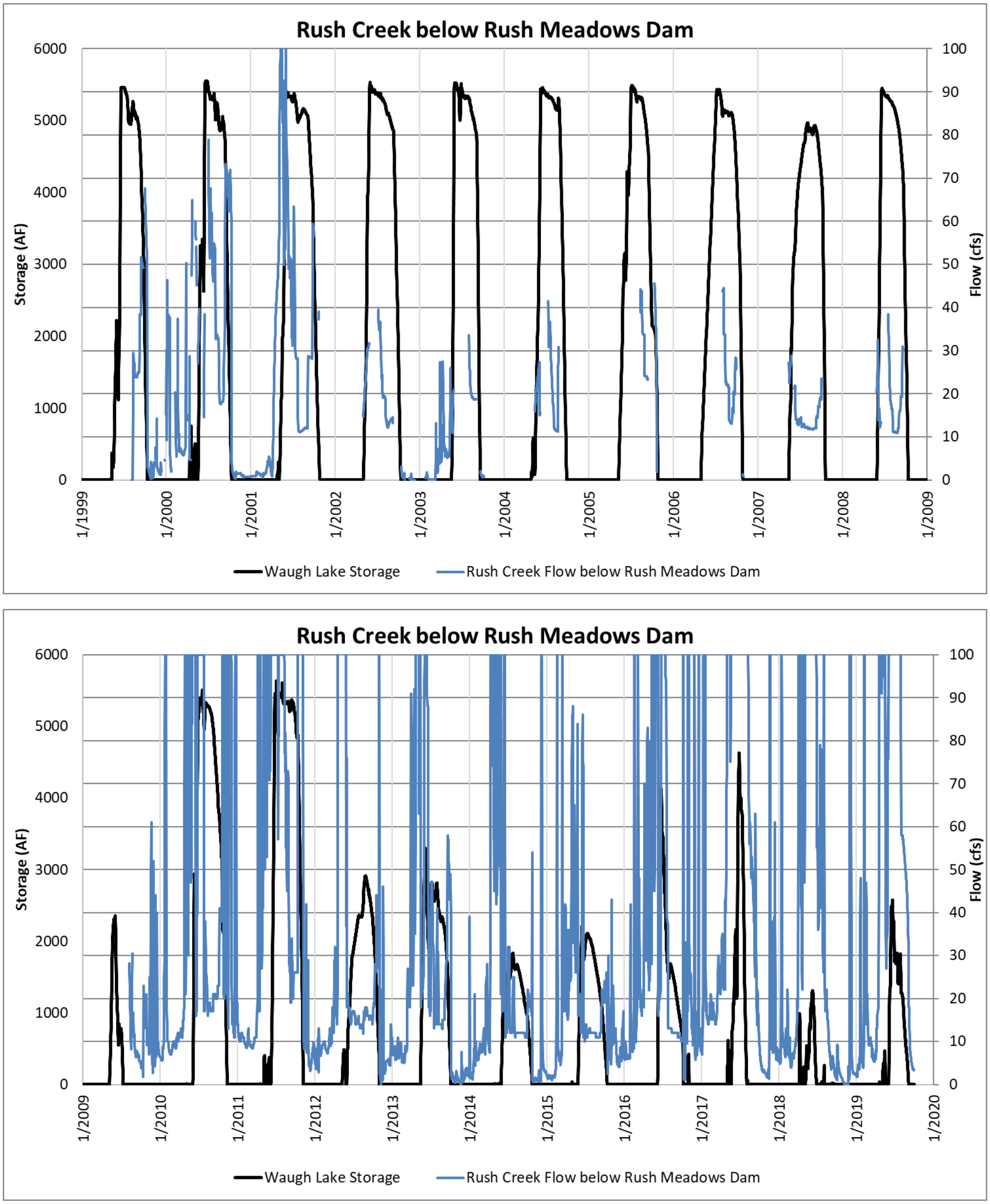
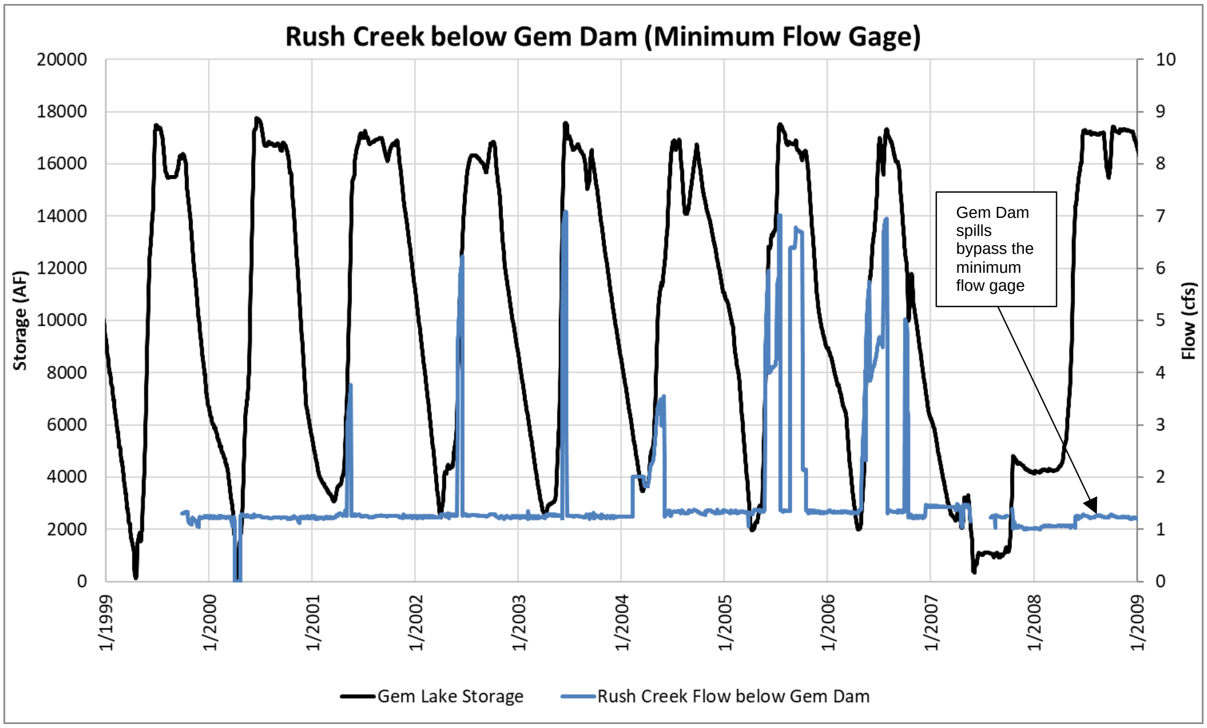
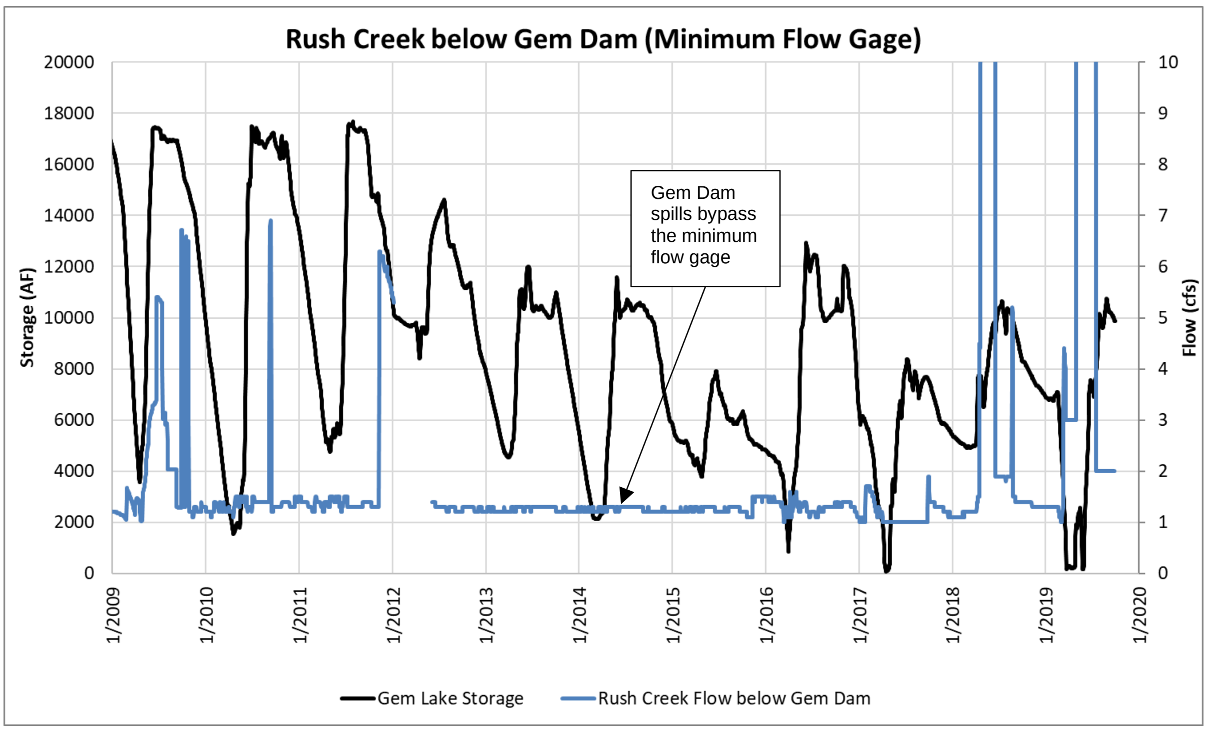


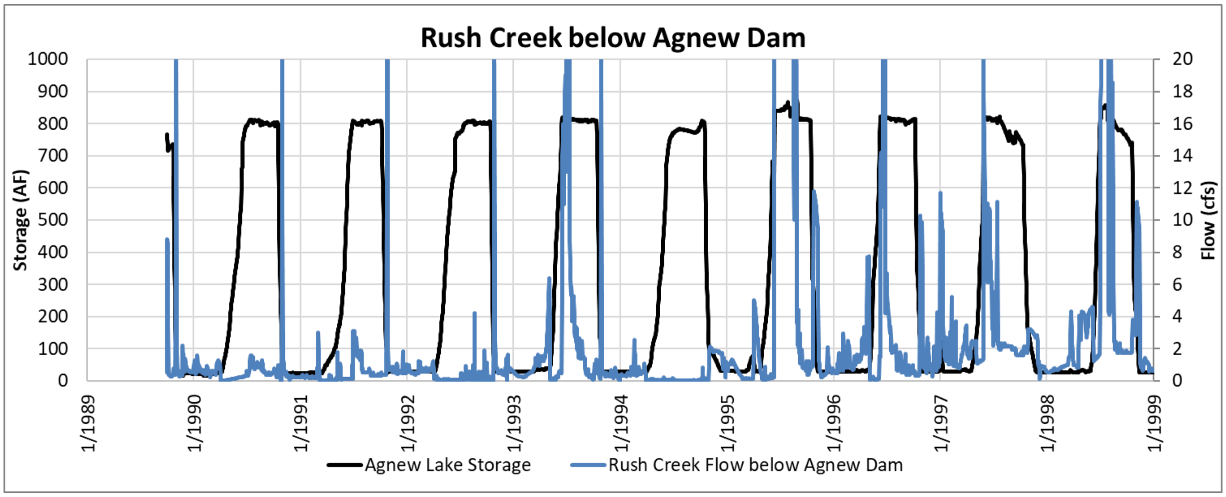
Figure 4.3-5. Historical Mean Daily Flows (1999–2019 WY) for Rush Creek Below Rush Meadows Dam (SCE 359 R/USGS 10287262).

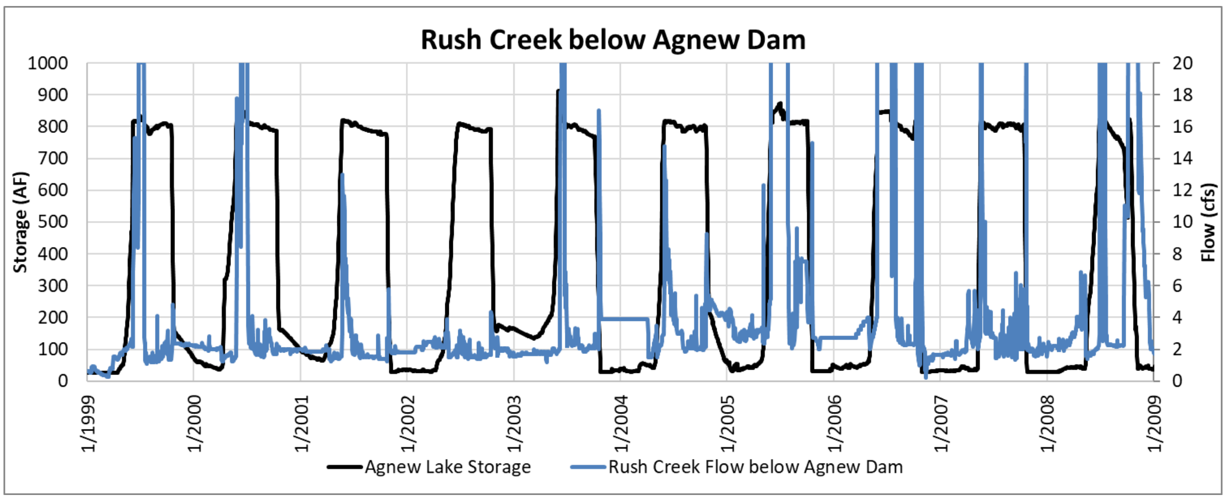




Note: The flow gage only records the minimum flow pipe release and not reservoir spills. In 2018 and 2019 bypass flow was recorded from another release pipe.

Figure 4.3-6. Historical Mean Daily Flows (1999–2019 WY) for Rush Creek below Gem Dam (SCE 352 R/USGS 10287281).





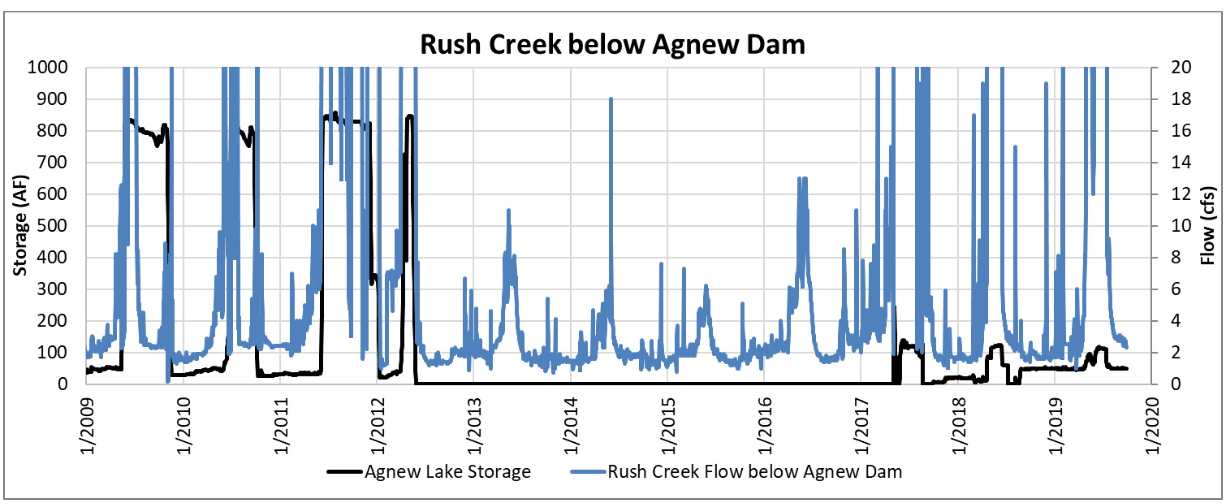
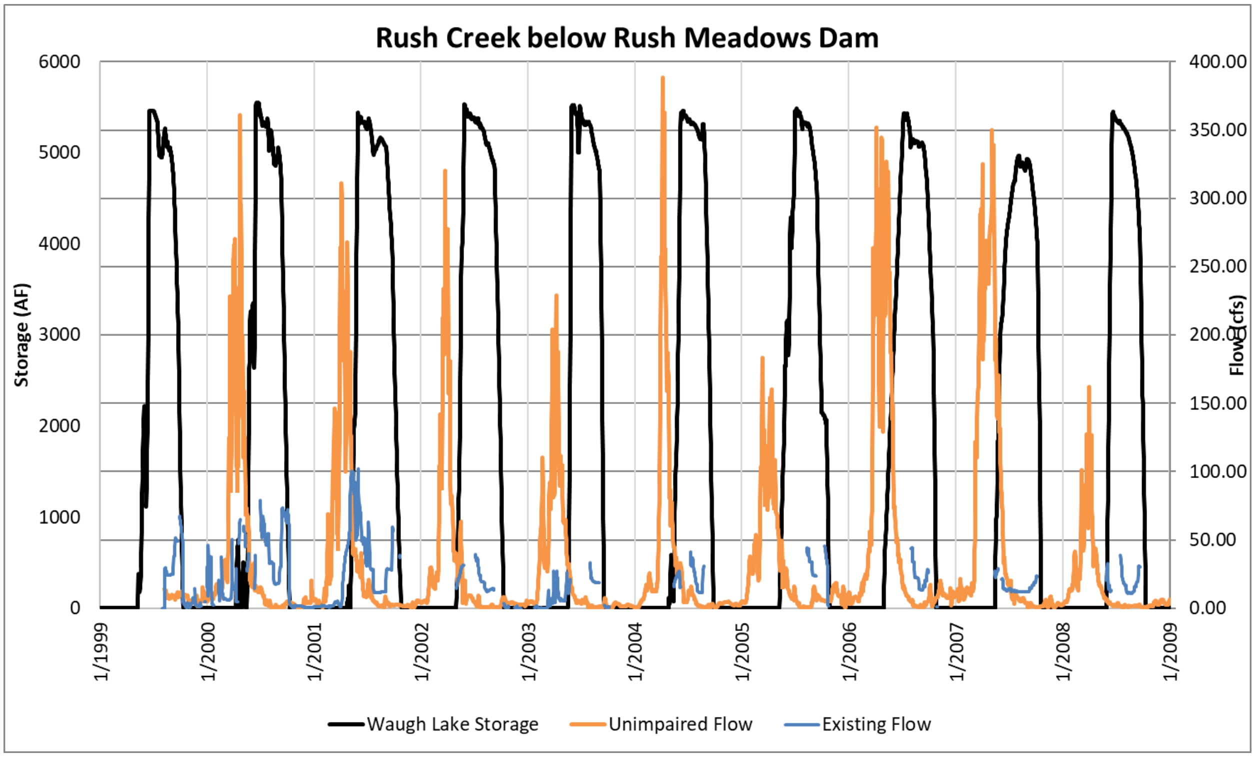


Figure 4.3-7. Historical Mean Daily Flows (1990–2019 WY) for Rush Creek below Agnew Dam (SCE 357/USGS 10287289).



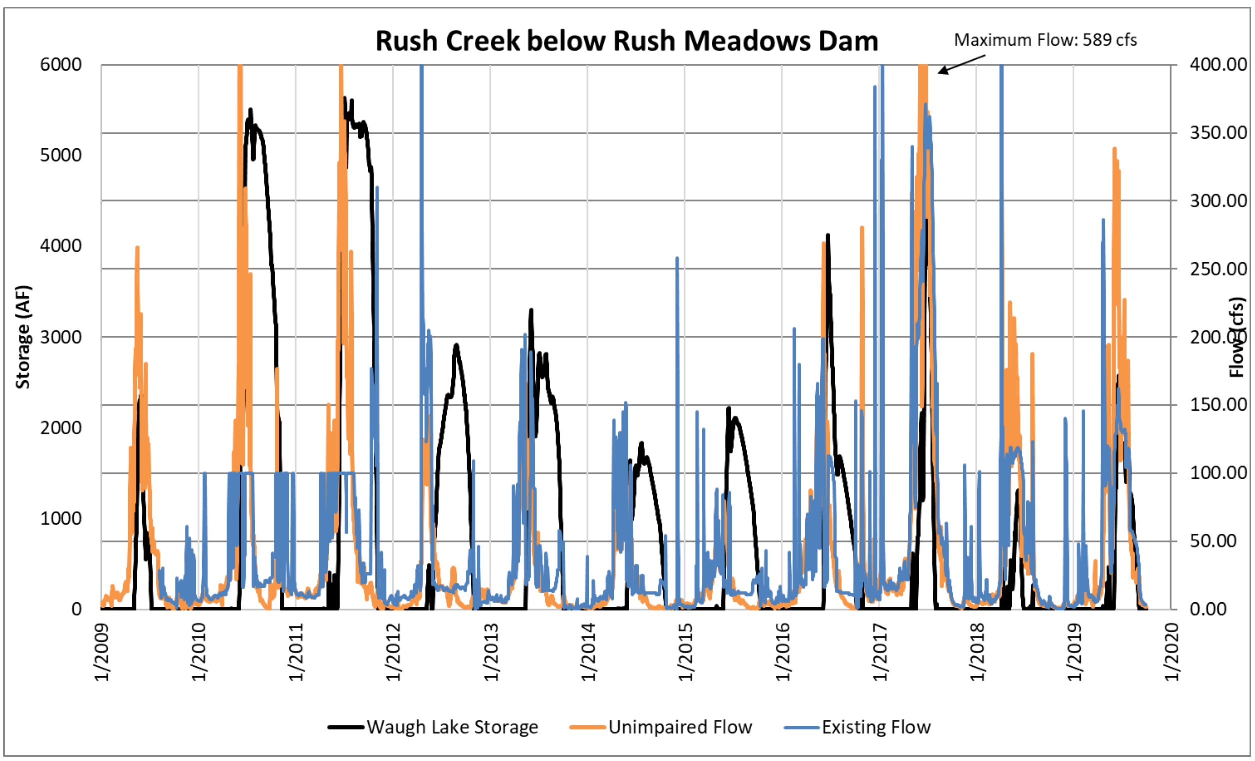
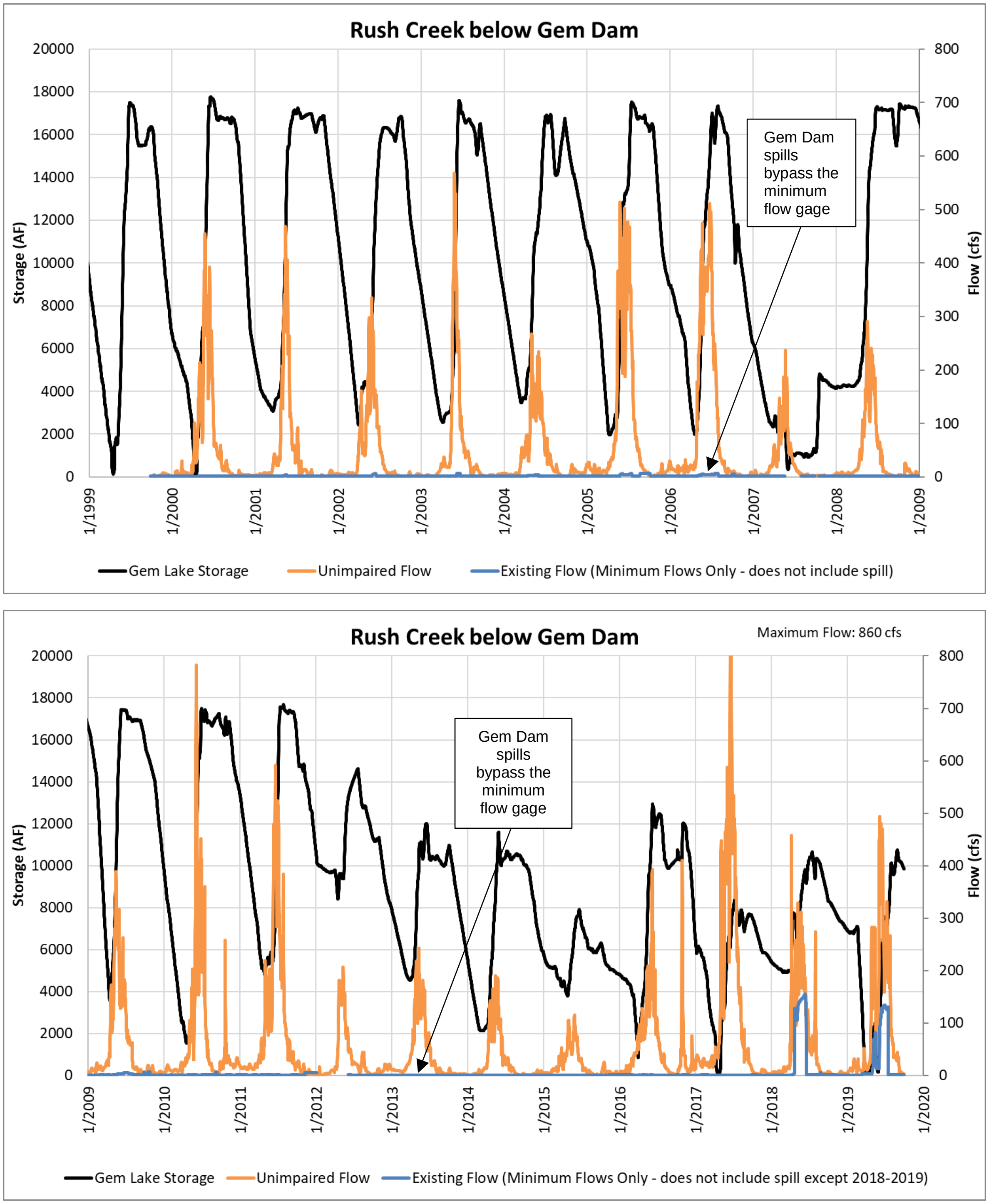


Figure 4.3-8. Historical Mean Daily Flows (1999–2019 WY) and Unimpaired Flows for Rush Creek Below Rush Meadows Dam (SCE 359 R/USGS 10287262).



Note: The flow gage only records the minimum flow pipe release and not reservoir spills. In 2018 and 2019 bypass flow was recorded from another release pipe.

Figure 4.3-9. Historical Mean Daily Flows (1999–2019 WY) and Unimpaired Flows for Rush Creek below Gem Dam (SCE 352 R/USGS 10287281).

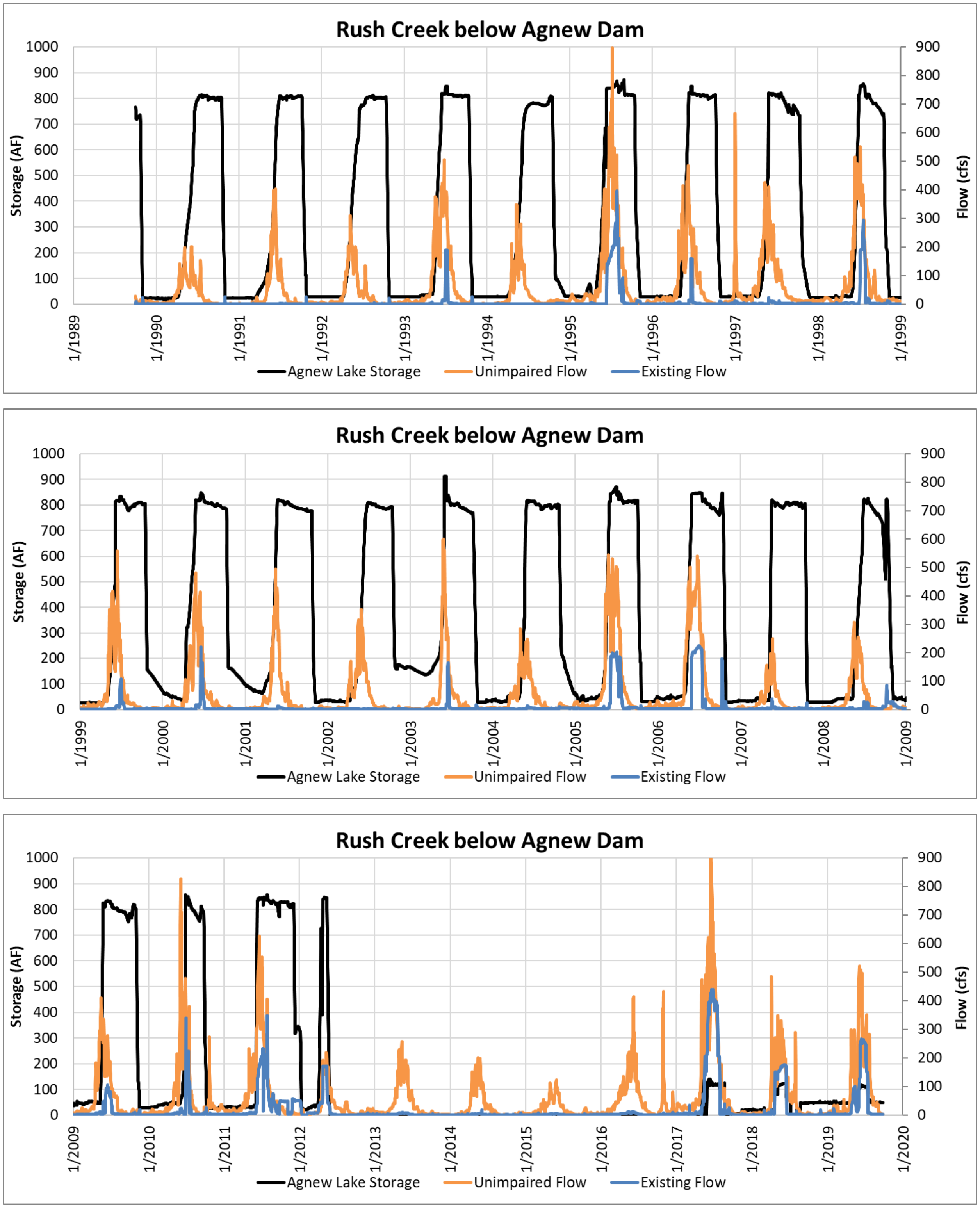


Figure 4.3-10. Historical Mean Daily Flows (1990–2019 WY) and Unimpaired Flows for Rush Creek below Agnew Dam (SCE 357/USGS 10287289).

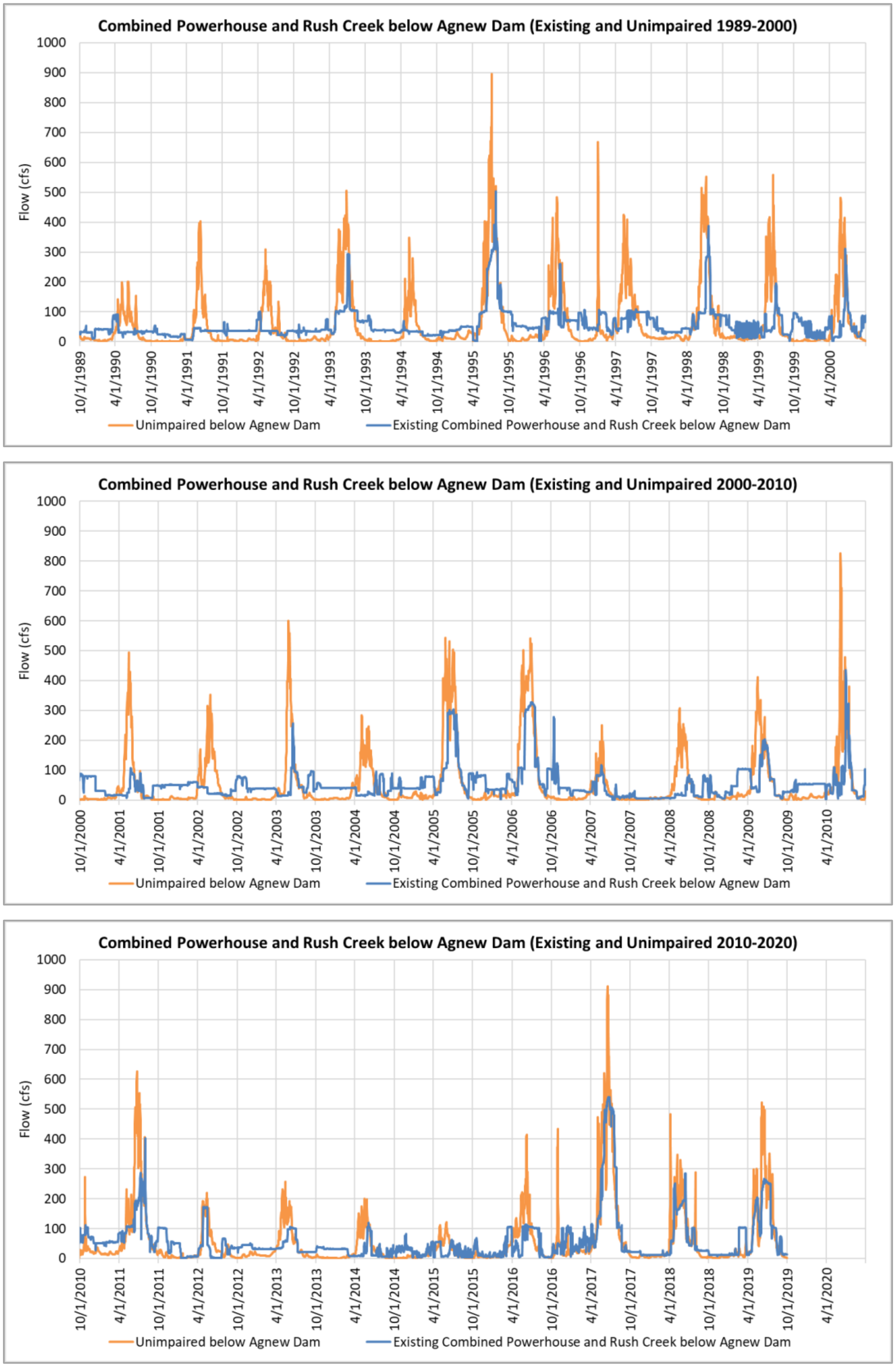


Figure 4.3-11. Historical Mean Daily Flows (1990–2019 WY) and Unimpaired Flows for the Combined Powerhouse and Rush Creek below Agnew Dam Location (SCE 357/USGS 10287289 and SCE 367/USGS 10287300).

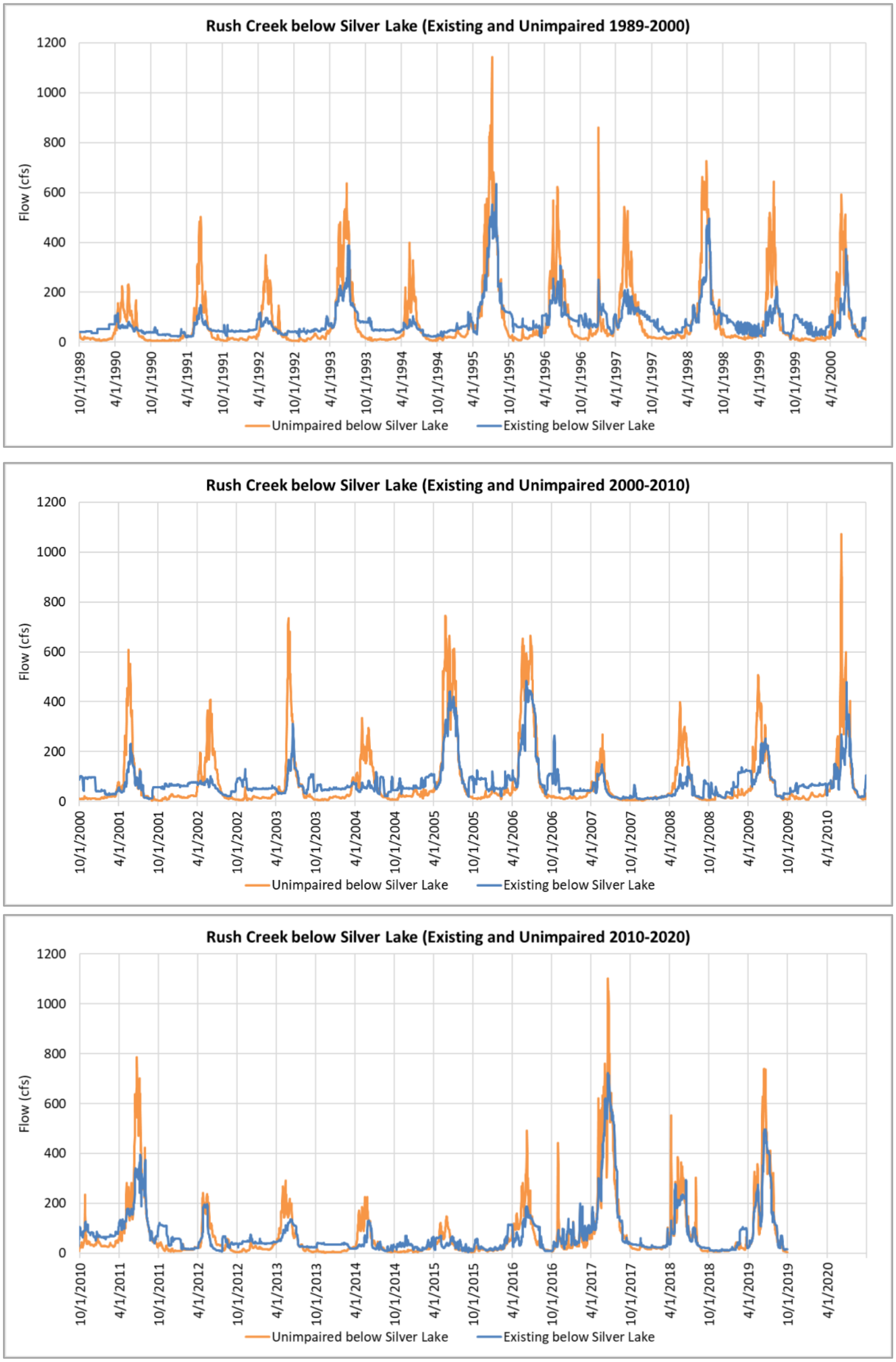


Figure 4.3-12. Historical Mean Daily Flows (1990–2019 WY) and Unimpaired Flows for Rush Creek below Silver Lake (LADWP MS 5013/ USGS 10287400).

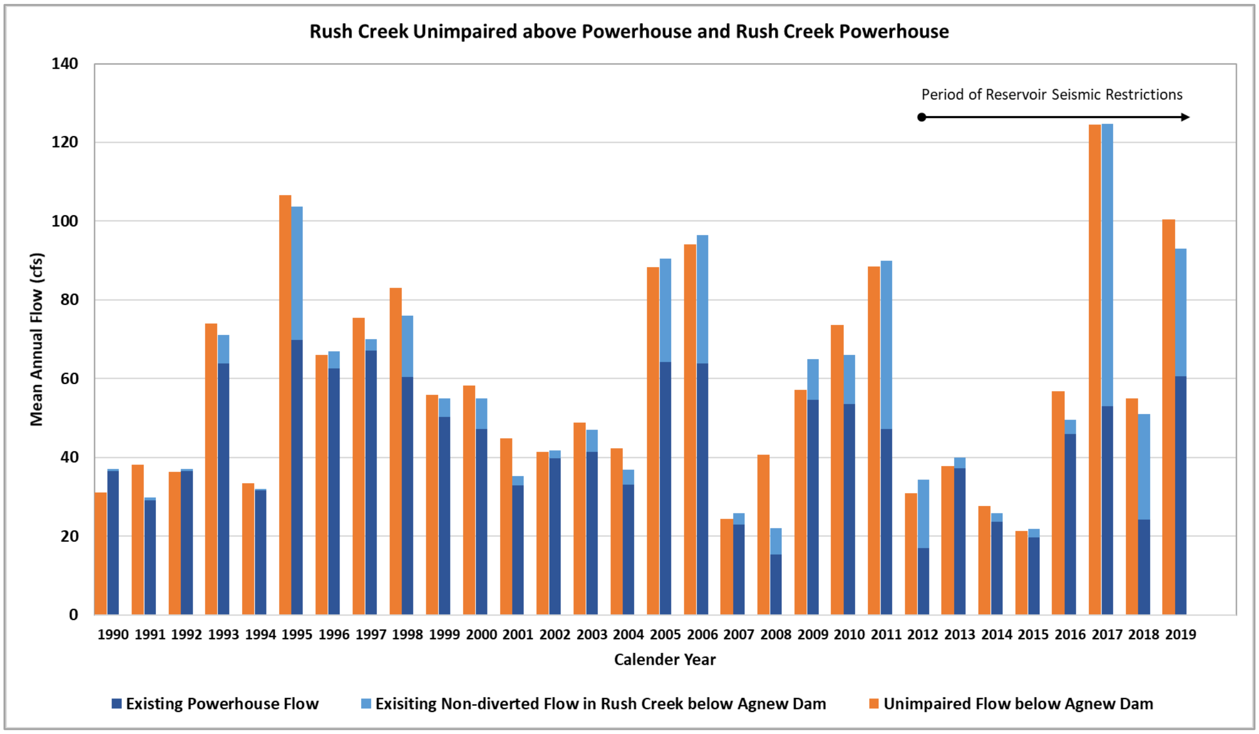


Figure 4.3-13. Mean Annual Existing and Unimpaired Flow (1990–2019) at the Combined Powerhouse and Rush Creek Powerhouse gages (SCE 357/USGS 10287289 and SCE 367/USGS 10287300).

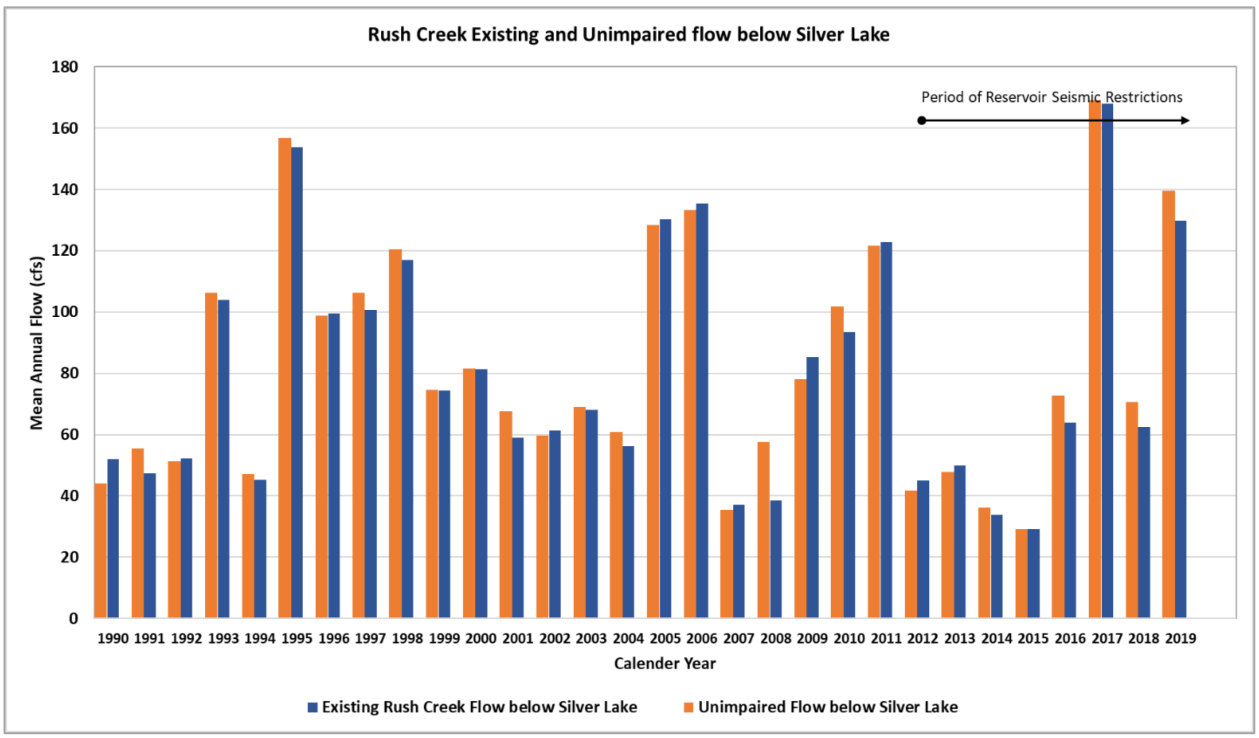
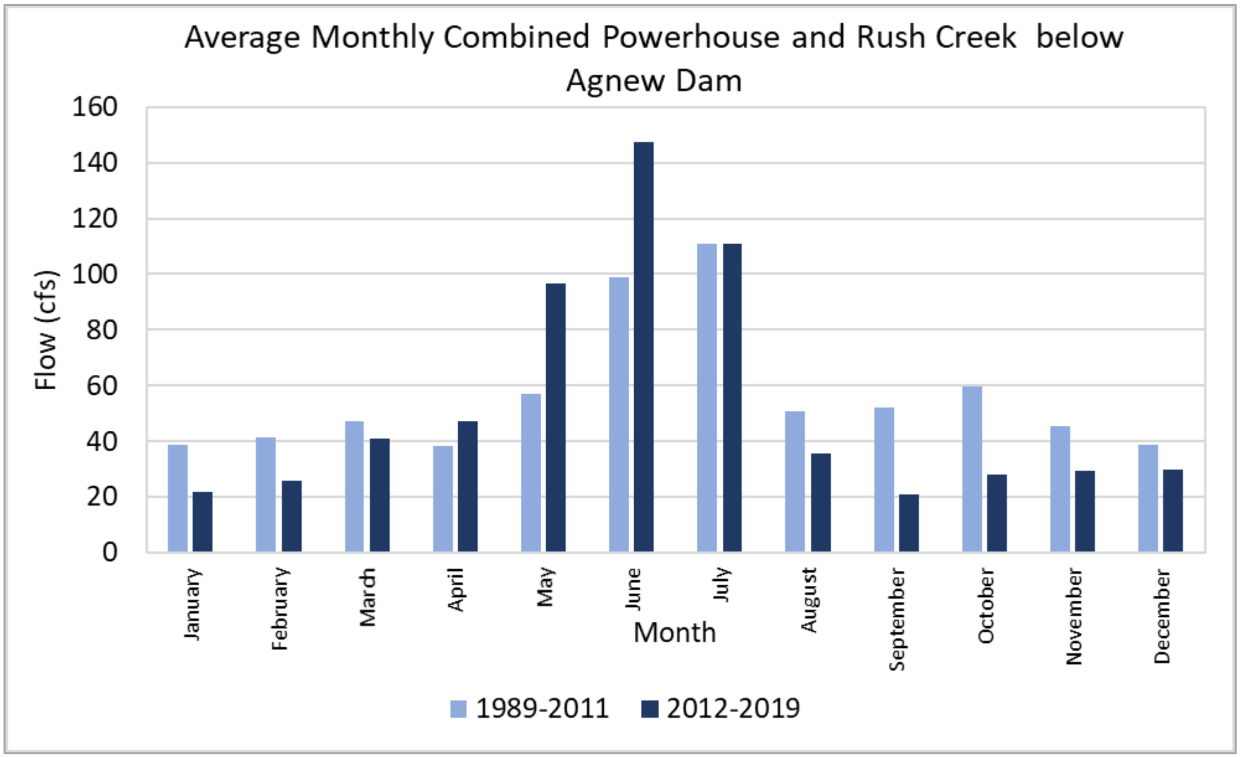


Figure 4.3-14. Mean Annual Existing and Unimpaired Flow (1990–2019) Below Silver Lake (LADWP MS 5013/USGS 10287400).



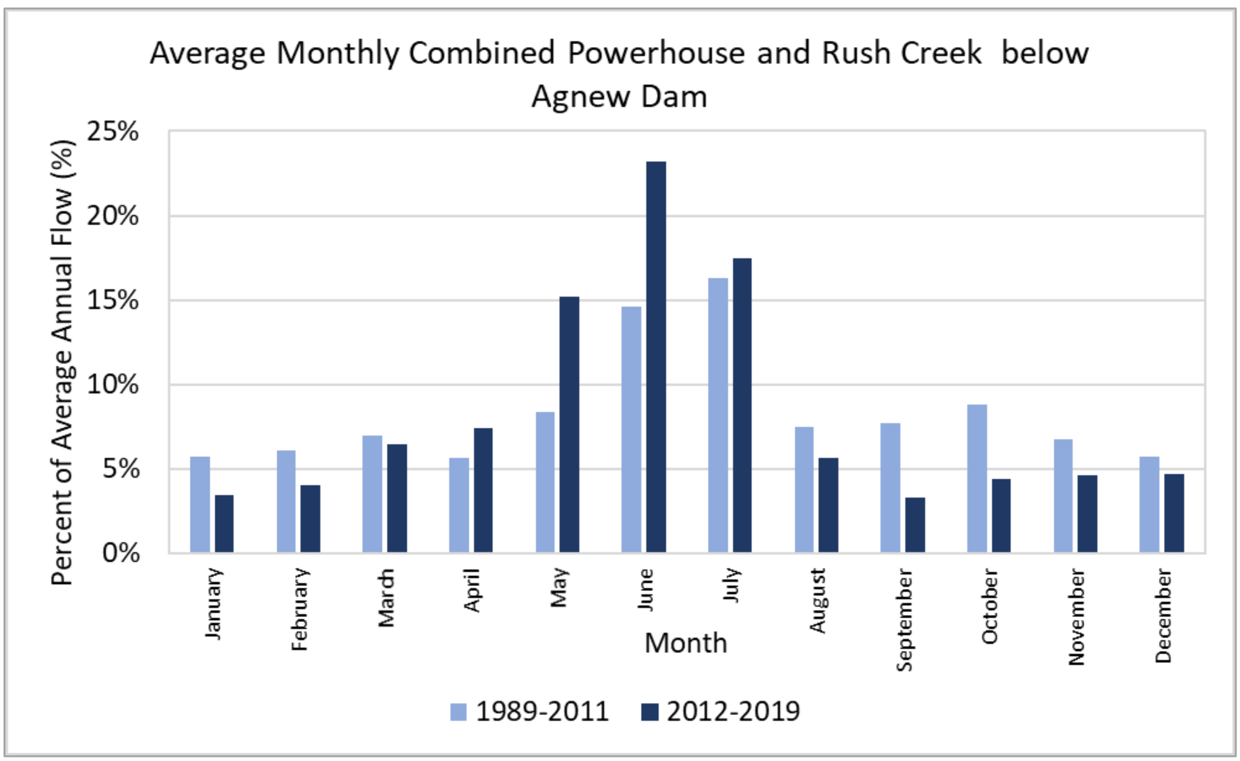
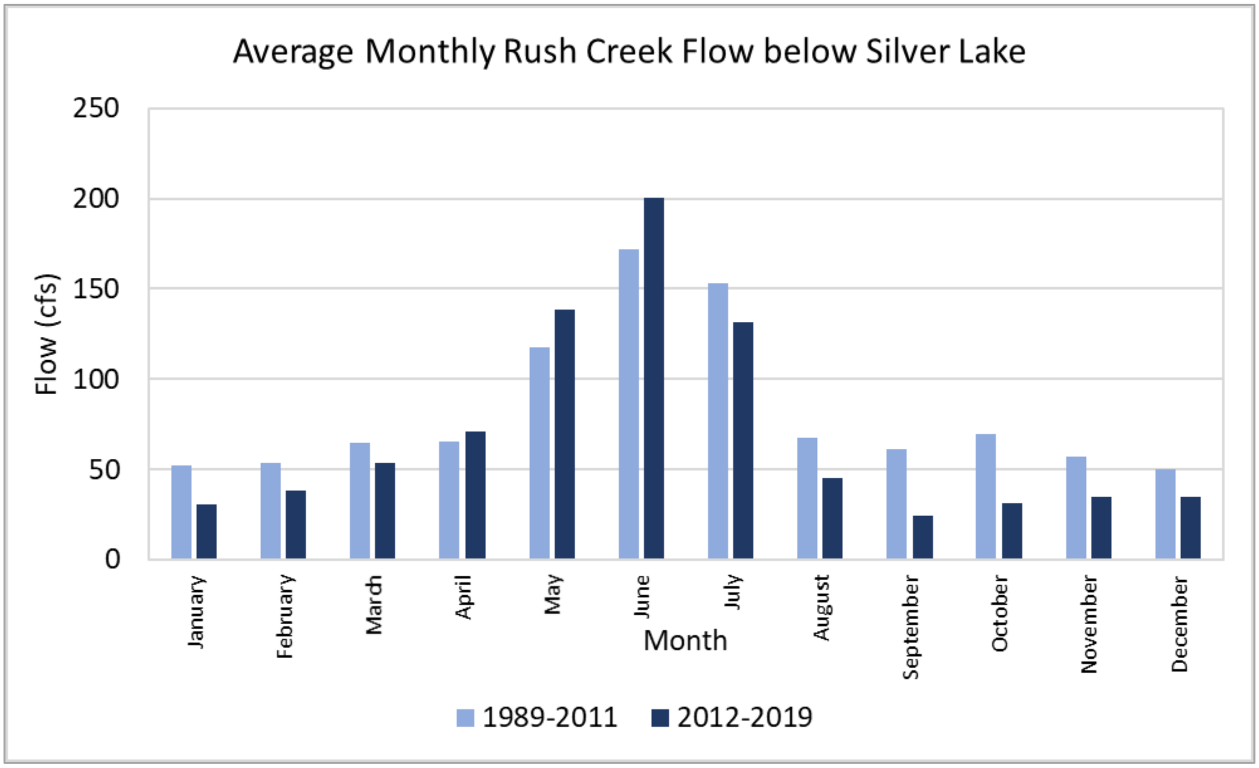


Figure 4.3-15. Average Monthly Rush Creek Flows for Combined Powerhouse and Rush Creek below Agnew Dam (SCE 357/USGS 10287289 and SCE 367/USGS 10287300) for the Pre-seismic (1989–2011) and Post-seismic (2012–2019) Restriction Time Periods (Top Graph: Flow in cfs; Bottom Graph: Percentage of Average Annual Flow).



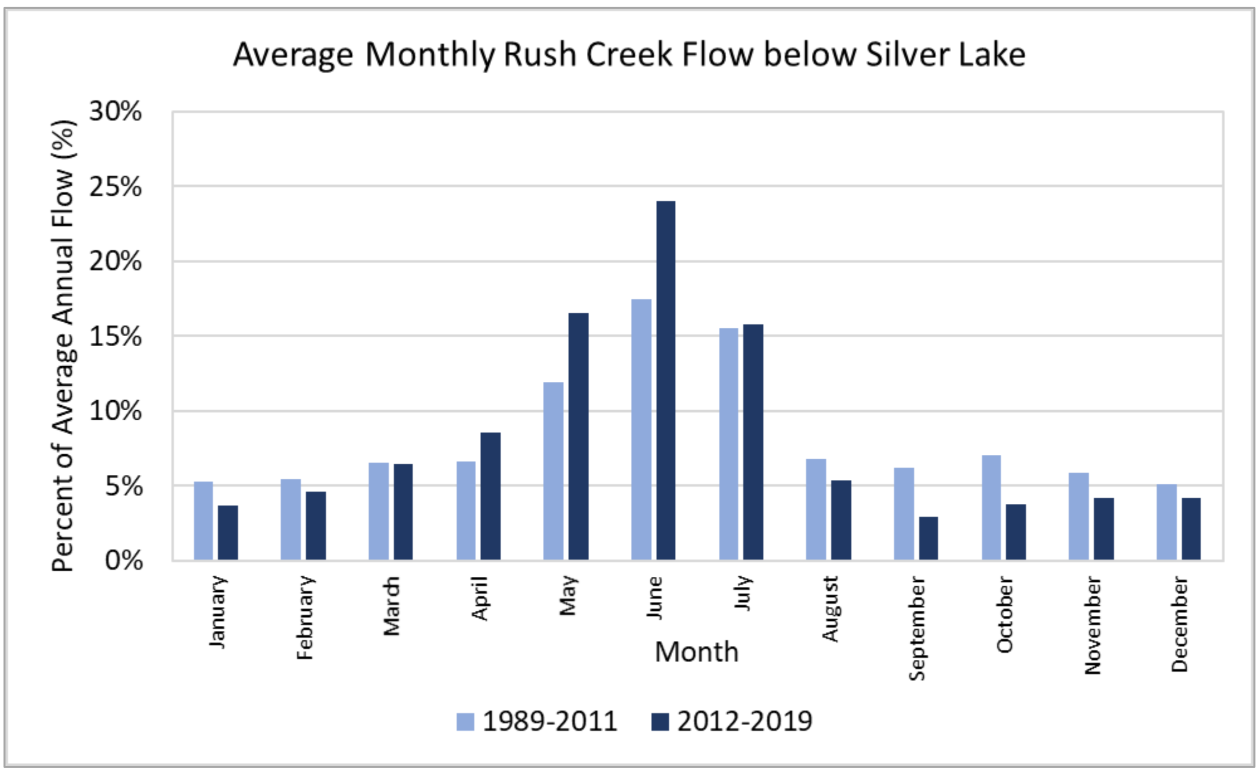


Figure 4.3-16. Average Monthly Rush Creek Flows for Below Silver Lake (LADWP MS 5013/USGS 10287400) for the Pre-seismic (1989–2011) and Post-seismic (2012–2019) Restriction Time Periods (Top Graph: Flow in cfs; Bottom Graph: Percentage of Average Annual Flow).

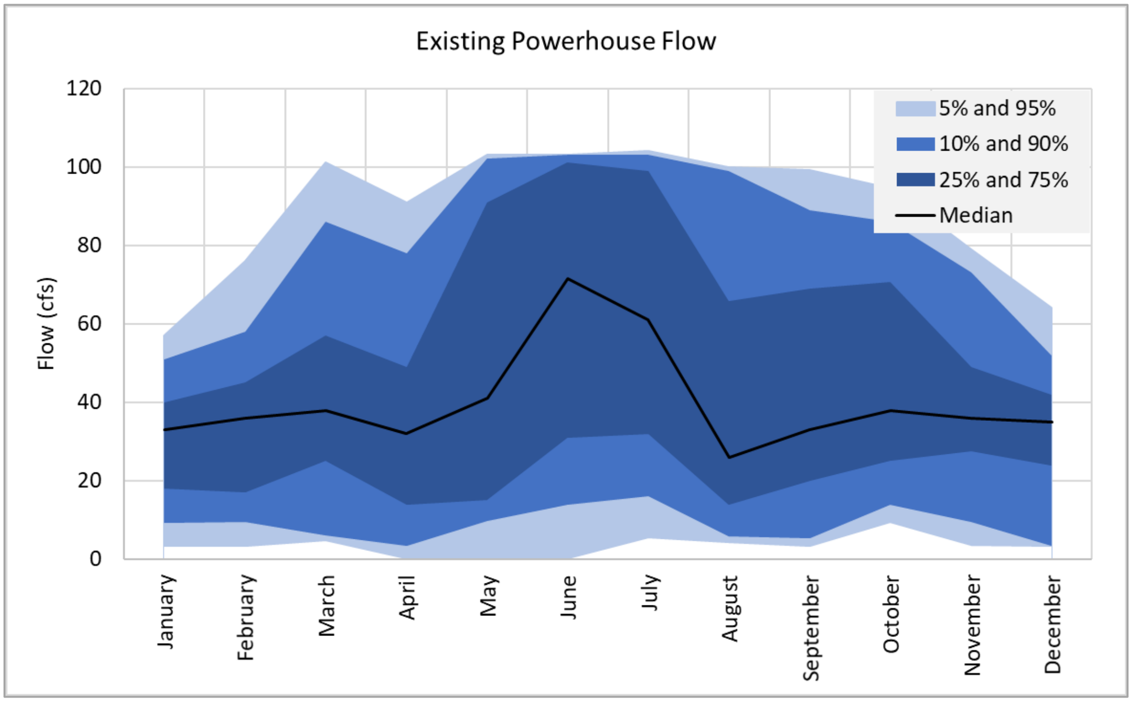


Figure 4.3-17. Monthly Flow Exceedance Curves for Rush Creek Powerhouse (1989–2019).

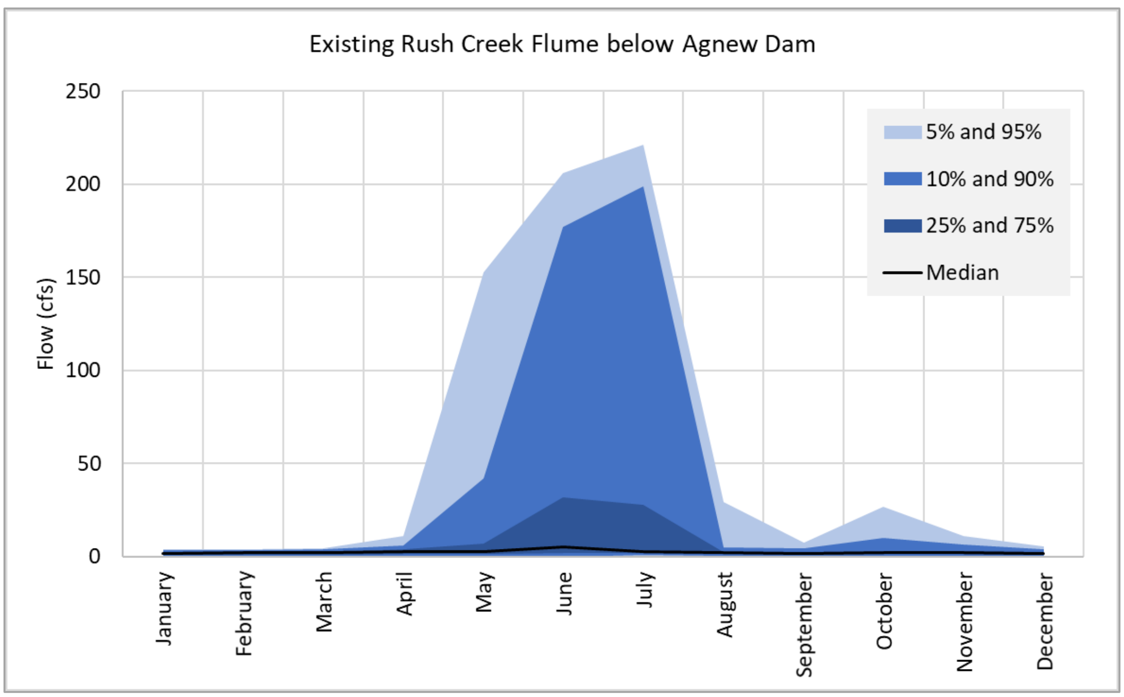
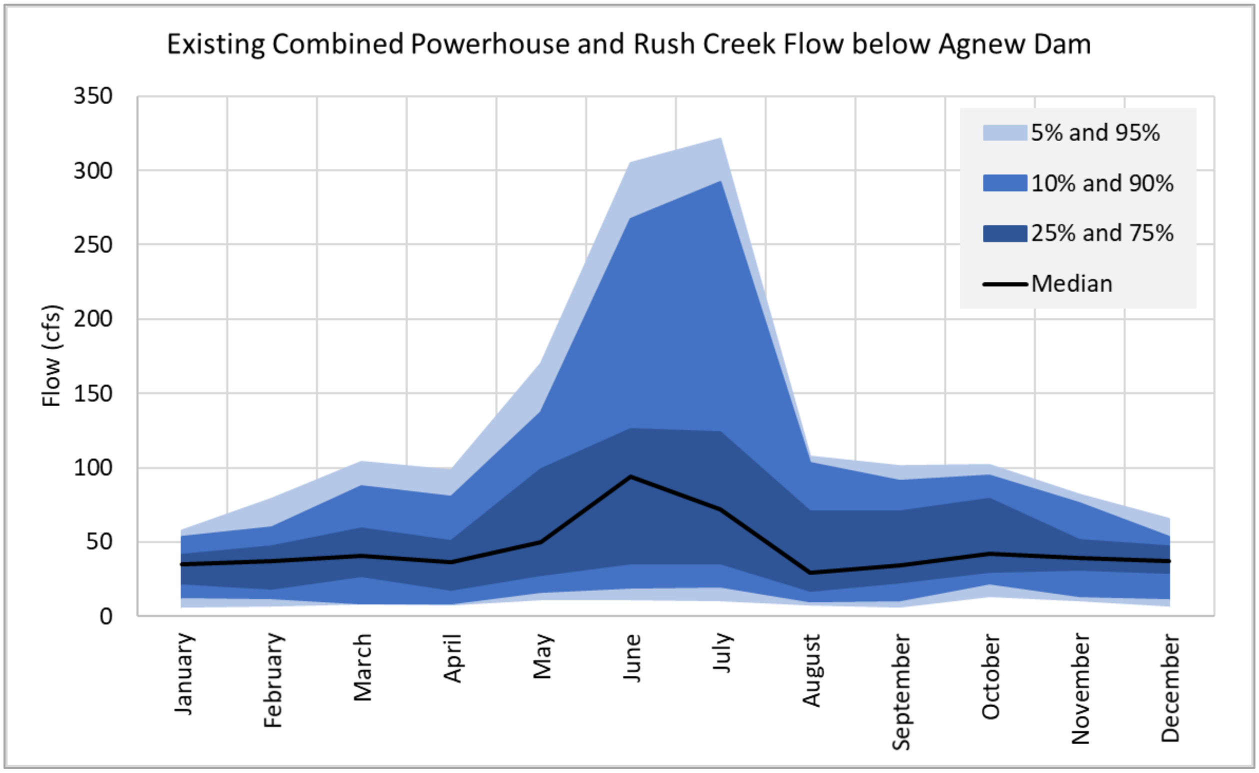


Figure 4.3-18. Monthly Flow Exceedance Curves for Rush Creek below Agnew Dam (1989–2019).



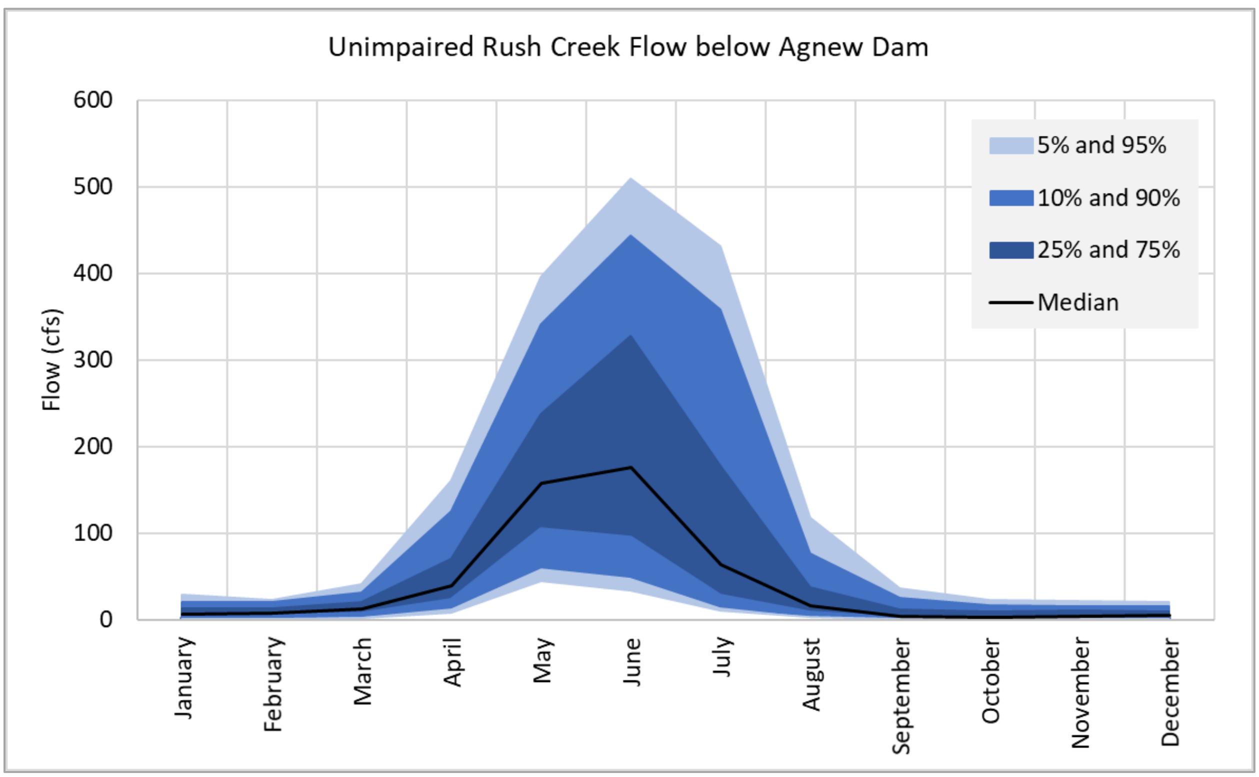


Figure 4.3-19. Monthly Flow Exceedance Curves for Combined Powerhouse and Rush Creek below Agnew Dam, Existing and Unimpaired Flows (1989–2019).

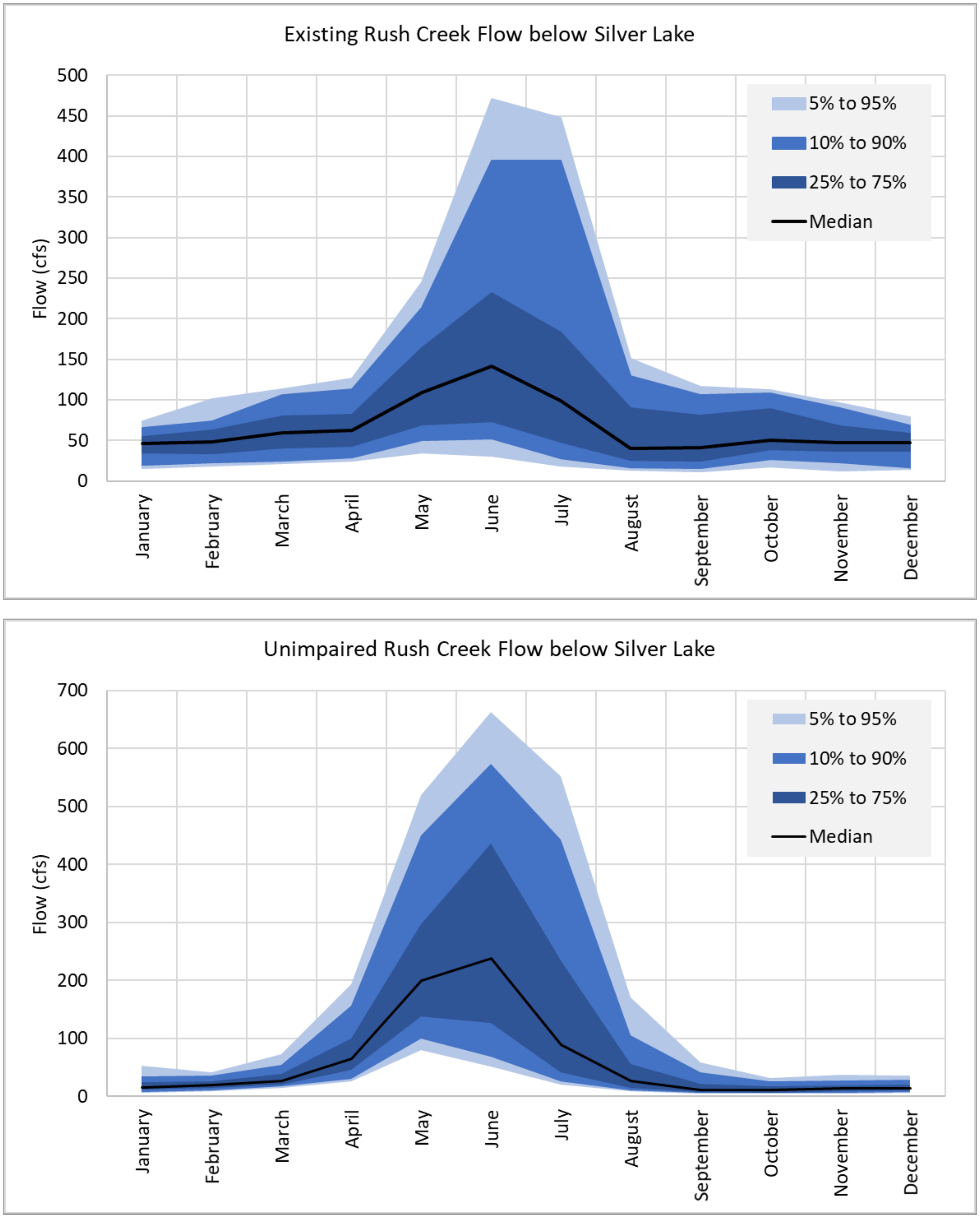


Figure 4.3-20. Monthly Flow Exceedance Curves for Rush Creek below Silver Lake, Existing and Unimpaired Flows (1989–2019).

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MAPS

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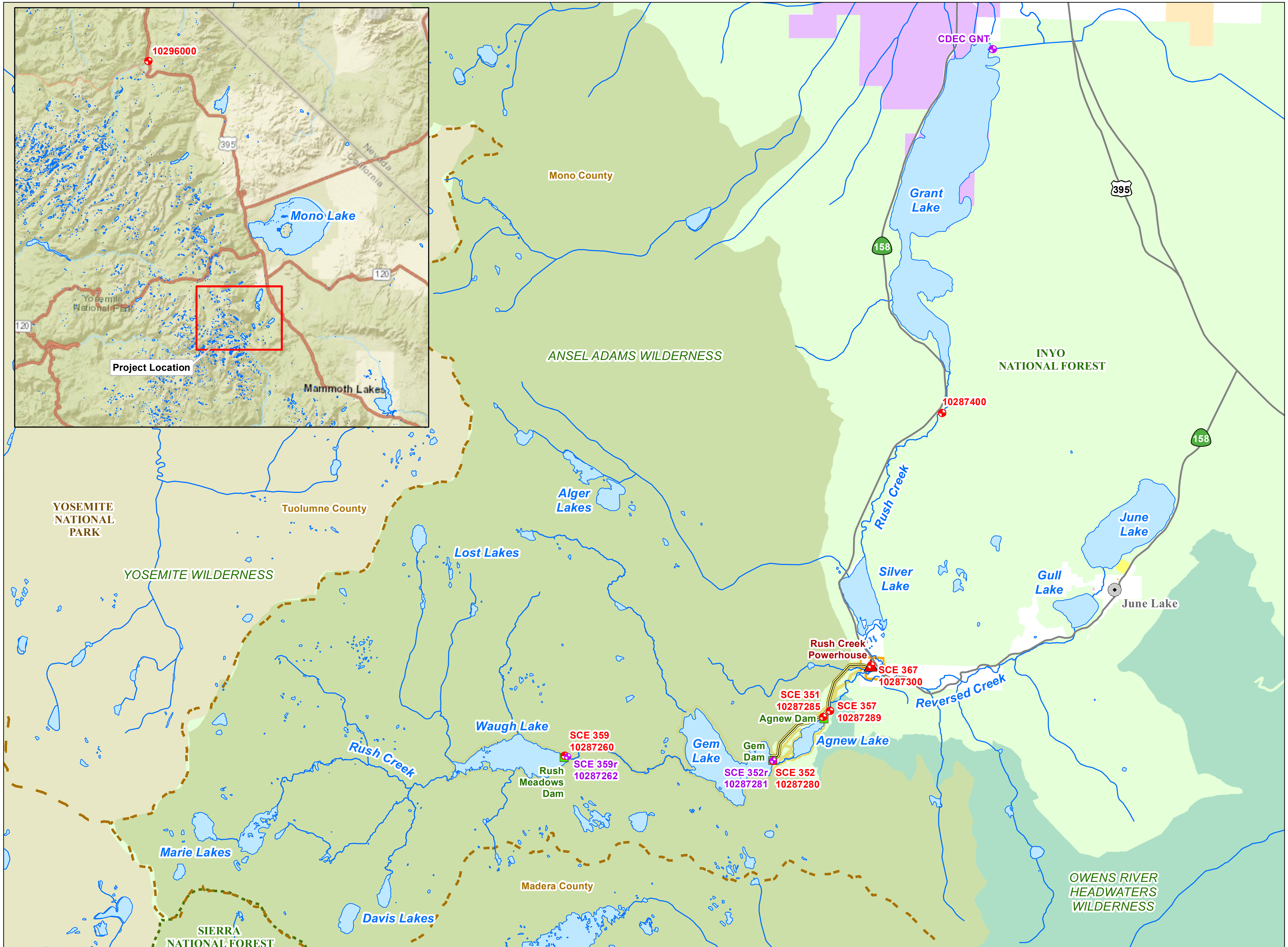

SCE Facilities

- Dam
- Powerhouse
- Flowline / Penstock
- FERC Boundary

Other Features

- City/Town
- Highway
- River/Stream
- Lake
- County Boundary

Land Jurisdiction and National Wilderness Areas/Parks*

- Local Government
- LADWP
- State Government
- Bureau of Land Management
- U.S. Forest Service
- Ansel Adams Wilderness (U.S. Forest Service)
- Owens River Headwaters Wilderness (U.S. Forest Service)
- Yosemite National Park / Yosemite Wilderness (National Park Service)
- Private (Blank)

*SOURCES: BLM, 2020.
Mono Co., 2019.
Wilderness.net, 2019.

Gages used for Unimpaired Flow Calculations

- Unimpaired Calculation
- Comparison Only

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Rush Creek Project (FERC 1389)

Map 4.3-1

Sources and Locations of Gaged Flow Data

N W E S

0 0.5 1 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 7/9/2021

C:\GIS\Cardno\30735240_SCE_EasternHydro\map\Rush Creek\HydroMaps\SCE_RUSH_CREEK_Gages_UnimpairedFlow_17i11i_02.mxd

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APPENDIX 4.3-A

Unimpaired Flow Calculation Methods

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cfs	cubic foot/feet per second

1.0 INTRODUCTION

This appendix describes the Rush Creek Project unimpaired hydrology calculation methods and results. Hydrology data were available to calculate unimpaired Rush Creek daily average streamflow for the 1990 through 2019 water years at two locations: 1) Rush Creek below Agnew Dam and 2) Rush Creek below Silver Lake (upstream of Grant Lake). In addition, unimpaired hydrology was prorated via a watershed-based area ratio method to two locations upstream of Agnew Dam—Rush Creek at Rush Meadows Dam and Rush Creek at Gem Dam. Data limitations and missing data required the use of a variety of techniques to develop accurate daily unimpaired flow estimates. The methods used included: 1) mass balance calculations (using stream and reservoir gages); 2) development of flow lag time/travel time relationships; 3) data smoothing; 4) the use of an unimpaired reference gage; and, 5) proration of flow using watershed area. The data sources, methods, and results are described below.

2.0 DATA SOURCES

The sources of flow and reservoir storage data used to calculate unimpaired flows for Rush Creek are provided in Table A-1.

3.0 METHODOLOGY

3.1 INITIAL UNIMPAIRED MASS BALANCE FLOW CALCULATION

The Rush Creek unimpaired streamflow was computed by estimating inflow to the upstream reservoirs (Waugh, Gem and Agnew) from their daily change in storage volume and adding this to the measured flow downstream. This calculation was carried out at two locations: Rush Creek below Agnew Dam and Rush Creek below Silver Lake.

The daily average unimpaired flow calculation for Rush Creek below Agnew Dam is shown below:

$$\begin{aligned} &\textit{Rush Creek Unimpaired Daily Average Flow below Agnew Dam } (cfs) \\ &\quad = \Delta\, \textit{Waugh Storage}(cfs) + \Delta\, \textit{Gem Storage}(cfs) \\ &\quad + \Delta\, \textit{Agnew Storage}(cfs) \\ &\quad + \textit{Rush Creek Daily Average Flow at Flume below Agnew Dam } (cfs) \\ &\quad + \textit{Rush Creek Daily Average Power Plant Tailrace Flow } (cfs) \end{aligned}$$

(Equation 1)

The daily average unimpaired flow calculation for Rush Creek below Silver Lake is shown below:

$$\begin{aligned} &\textit{Rush Creek Unimpaired Daily Average Flow below Silver Lake } (cfs) \\ &\quad = \Delta\, \textit{Waugh Storage}(cfs) + \Delta\, \textit{Gem Storage}(cfs) \\ &\quad + \Delta\, \textit{Agnew Storage}(cfs) \\ &\quad + \textit{Rush Creek Daily Average Flow below Silver Lake } (cfs) \end{aligned}$$

(Equation 2)

3.2 LAG TIME CALCULATION

An analysis of the flow data was used to determine the lag time that should be built into the unimpaired flow calculations for the downstream Rush Creek site below Silver Lake to account for travel time. This was done by comparing the shape of the flow hydrograph at Rush Creek below Silver Lake with the combined hydrograph of the two upstream gages, Rush Creek below Agnew Dam and the Rush Creek Power Plant Tailrace at various flow rates. Current and previous day flow weighting factors were calculated as a function of the Rush Creek below Agnew unimpaired daily average flow rate. These weighting factors range from 0 to 1 (0 to 100%) and add up to 1 (or 100%). The general equation to adjust upstream storage to account for travel time downstream to the Rush Creek below Silver Lake location was as follows:

$$\begin{aligned}
&Rush\ Creek\ Unimpaired\ Daily\ Average\ Flow\ below\ Silver\ Lake(cfs)_i\\
&= Current\ Day\ Flow\ Weighting\ Factor\ (Flow)_i \times (\Delta\, Waugh\ Storage(cfs)\\
&+\ \Delta\, Gem\ Storage(cfs) +\ \Delta\, AgnewStorage(cfs))_i\\
&+ Previous\ Day\ Flow\ Weighting\ Factor\ (Flow)_i \times (\Delta\, Waugh\ Storage(cfs)\\
&+\ \Delta\, Gem\ Storage(cfs) +\ \Delta\, AgnewStorage(cfs))_{i-1}\\
&+ Rush\ Creek\ Daily\ Average\ Flow\ below\ Silver\ Lake\ (cfs)_i
\end{aligned}$$

(Equation 3)

Where:

Current Day Flow Weighting Factor $(Flow)_i$ = number from 0 to 1, as a function of flow, for day i

Previous Day Flow Weighting Factor $(Flow)_i$ = 1- Current Day Flow Weighting Factor $(Flow)_i$

i=current day, i-1=previous day

3.3 UNIMPAIRED FLOW SMOOTHING

Unimpaired flows calculated from daily changes in reservoir volume, especially during low flow periods, are frequently imprecise (noisy) because of small inaccuracies in the daily changes in reservoir volume. At periods of low flow, the calculated unimpaired flows can exhibit unrealistic flow fluctuations from day to day and, potentially, negative flow rates. The calculated raw unimpaired flow was "smoothed" by smoothing/averaging the daily change in storage for each of the reservoirs by a varying number of days based on flow rate. Also, it was observed that the volume-elevation relationships for some of the reservoirs resulted in unrealistically large changes in volume as the reservoirs neared dead-pool. These large changes in volume resulted in large positive/negative flow volumes in the unimpaired calculation that were not realistic. The low elevation portion of the volume-elevation curves were adjusted slightly to better represent changes in volume at low water surface elevations.

3.4 UNIMPAIRED REFERENCE GAGE

At the Rush Creek below Silver Lake location, in order to fill data gaps and replace days of calculated negative unimpaired flow rates (due to imprecise daily changes in reservoir storage), it was necessary to identify an unimpaired watershed with good quality gage data for the same period that had a similar hydrograph to Rush Creek. Unimpaired watersheds within the vicinity of Rush Creek were identified and those with data available from 1989 through 2019 where compared to the unimpaired hydrology calculated for Rush Creek below Silver Lake. Particular attention was paid to low flow agreement, since all the periods with calculated negative unimpaired flows occurred during periods of low flow. Once a watershed was selected, a monthly regression was developed to determine an appropriate monthly flow scaling factor. This factor was applied to the daily flow rate of the representative watershed and was used to fill in periods of calculated negative flows.

At the Rush Creek below Agnew Dam location, when calculated negative flow rates required that an alternative dataset be used to estimate unimpaired flow, the average difference in flow between Rush Creek below Agnew Dam and Rush Creek below Silver Lake was calculated from the flow record immediately preceding and following the negative flow period. Then the below Silver Creek flow data for the period in question was adjusted by that average difference to estimate the flow below Agnew Dam. A minimum flow rate of 1 cubic foot per second (cfs) was used in the event that the estimated flow dropped below 1 cfs.

3.5 PRORATION USING WATERSHED AREA

Unimpaired hydrology was prorated via a watershed-based area ratio method to two locations upstream of Agnew Dam—Rush Creek at Rush Meadows Dam and Rush Creek at Gem Dam. The unimpaired flow calculated for Rush Creek below Agnew Dam was scaled to the smaller watersheds upstream using the following equations:

$$Rush\ Creek\ Unimpaired\ Daily\ Average\ Flow\ at\ Rush\ Meadows\ Dam\ (cfs) = \frac{15.0}{23.2} * \ Rush\ Creek\ Daily\ Average\ Unimpaired\ below\ Agnew\ Dam\ (cfs)$$ **(Equation 4)**

$$Rush\ Creek\ Unimpaired\ Daily\ Average\ Flow\ at\ Gem\ Dam\ (cfs) = \frac{21.9}{23.2} * \ Rush\ Creek\ Daily\ Average\ Unimpaired\ below\ Agnew\ Dam\ (cfs)$$ **(Equation 5)**

Where

15.0, 21.9, and 23.2 equal the watershed area in square miles upstream of Rush Meadows Dam, Gem Dam, and Agnew Dam, respectively.

3.6 FINAL UNIMPAIRED FLOW CALCULATIONS

The unimpaired flow calculation for Rush Creek below Agnew Dam and Rush Creek below Silver Lake was calculated using Equations 1 and 2. Once the reservoir storage and subsequently the flow was smoothed, negative flow periods removed and replaced with estimated data, and an appropriate flow travel time lag was added to the downstream Rush Creek below Silver Lake location (Equation 3), the final unimpaired flow for Rush Creek below Agnew Dam and Rush Creek below Silver Lake was calculated. Equations 4 and 5 were then used to calculate unimpaired flow for Rush Creek at Rush Meadows Dam and at Gem Dam.

4.0 RESULTS

4.1 INITIAL UNIMPAIRED MASS BALANCE FLOW CALCULATION

Reservoir storage data for Waugh, Gem and Agnew for water years 1990 through 2019 are plotted in Figure A-1. Rush Creek measured stream flows for water years 1990 through 2019 are plotted in Figure A-2.

4.2 LAG TIME CALCULATION

The multiplier (flow weighting factor) used to calculate the flow adjustment to account for travel time to the Rush Creek site below Silver Lake are provided in Table A-2

4.3 UNIMPAIRED FLOW SMOOTHING

The number of days reservoir storage (change in storage) was averaged for smoothing the calculated raw unimpaired flow is provided in Table A-3 as a function of flow rate.

4.4 UNIMPAIRED REFERENCE GAGE

After comparing hydrology from several local unimpaired watersheds, it was determined that the best agreement between calculated unimpaired flow on Rush Creek and a reference gage was Walker River near Coleville California (USGS 10296000), particularly at low flows. A regression for each month of the year was developed to determine an appropriate monthly flow scaling factor. The monthly flow comparisons can be seen in Figure A-3. A plot of the raw unimpaired Rush Creek flow below Silver Lake and the scaled Walker River Flow for water years 1990 through 2019 is shown in Figure A-4, along with an indication of when scaled Walker River flows were used (Table A-4). When scaled Walker River flows were used to estimate Rush Creek flow below Silver Lake, it was often also necessary to fill gaps in Rush Creek flow below Agnew Dam. This was done by subtracting estimated accretion flows from the final smoothed unimpaired flow calculated at Rush Creek below Silver Lake.

4.5 FINAL UNIMPAIRED FLOW CALCULATION

Figure A-5 compares the initial raw unimpaired flow calculation to the final smoothed unimpaired flow calculation for Rush Creek below Agnew Dam. Figure A-6 compares the initial raw unimpaired flow calculation to the final smoothed unimpaired flow calculation for Rush Creek below Silver Lake.

Figure A-7 provides the final unimpaired Rush Creek flows below Agnew Dam and below Silver Lake for water years 1990 through 2019.

Figure A-8 shows the watershed area prorated flows for Rush Creek at Rush Meadows Dam and Gem Dam.

TABLES

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Table A-1. Flow and Reservoir Gages Used for Unimpaired Rush Creek Flow Calculations

Location	Entity and Station No.	Data Type	Period of Record	Notes	Data Use	Location (NAD27)	Drainage Area (Square Miles)	Elevation (Feet above NGVD29)
Waugh Lake								
Waugh Lk near June Lake CA	SCE 359 and USGS 10287260	Daily Storage	10/01/1989–09/30/2019	Full Record Available	Unimpaired Calculation	Latitude 37°45'04", Longitude 119°10'52"	15.3	9,370
Rush Creek below Rush Meadows Dam (Rush Creek below Waugh Lake)								
Rush C controlled release below Waugh Lk near June Lake CA	SCE 359 R and USGS 10287262	Daily Flow	08/11/1999–09/30/2019	Spotty data – no flows recorded above 30 cfs	Comparison Only	Latitude 37°45'04", Longitude 119°10'50"	15.3	9,375
Gem Lake								
Gem Lake	SCE 352 and USGS 10287280/ CDEC GLK	Daily Storage	10/01/1989–09/30/2019	Full Record Available	Unimpaired Calculation	Latitude 37°45'07", Longitude 119°08'25"	22	8,970
Rush Creek below Gem Dam (Rush Creek below Gem Lake)								
Rush C controlled release below Gem Lake near June Lake, CA	SCE 352 R and USGS 10287281	Daily Flow	10/19/1999–09/30/2019	Full Record Available	Comparison Only	Latitude 37°45'05", Longitude 119°08'26"	22	9,000
Agnew Lake								
Agnew Lk near June Lake CA	SCE 351 and USGS 10287285	Daily Storage	10/01/1989–09/30/2019	Full Record Available	Unimpaired Calculation	Latitude 37°45'30", Longitude 119°07'52"	23.3	8,470
Rush Creek below Agnew Dam (Rush Creek at Flume below Agnew)								
Rush Creek at Flume below Agnew Lake near June Lake CA	SCE 357 and USGS 10287289	Daily Flow	10/01/1988–09/30/2019	Full Record Available	Unimpaired Calculation	Latitude 37°45'33", Longitude 119°07'47"	NA	8,440

Location	Entity and Station No.	Data Type	Period of Record	Notes	Data Use	Location (NAD27)	Drainage Area (Square Miles)	Elevation (Feet above NGVD29)
Rush Creek PP Tailrace								
Rush Creek PP tailrace near June Lake CA	SCE 367 and USGS 10287300	Daily Flow	10/01/1986–09/30/2019	Full Record Available	Unimpaired Calculation	Latitude 37°45'59", Longitude 119°07'17"	NA	7,230
Rush Creek below Silver Lake (Rush Creek above Grant Lake)								
Rush Creek ab Grant Lake near June Lake CA	LADWP MS 5013 and USGS 10287400	Daily Flow	10/01/1986–09/30/2019	Pre-1990 Monthly Only	Unimpaired Calculation	Latitude 37°48'23", Longitude 119°06'29"	51.3	7,200
Grant Lake								
Grant Lake	CDEC GNT	Monthly Storage	01/01/1956–09/30/2019	Only monthly data available on CDEC	Comparison Only	Latitude 37°51'43.2", Longitude 119°6'7.2"		7,140
Walker River								
Walker River	USGS 10296000	Daily Flow	04/01/1938–09/30/2019	Full Record Available	Comparison and Gap Filling	Latitude 38°22'47", Longitude 119°26'57"	181	6,591

Notes: CDEC GNT = California Data Exchange Center Grant Lake Station (GNT)
LADWP MS 5013 = Los Angeles Department of Water and Power Measuring Station 5013
NAD27 = North American Datum of 1927
NGVD29 = National Geodetic Vertical Datum of 1929
PP = Powerplant
SCE = Southern California Edison Company
USGS = U.S. Geological Survey

Table A-2. Flow Lag Calculation for Rush Creek Below Silver Lake as a Function of Unimpaired Flow Rate Below Agnew Dam (see Equation 3)

Unimpaired Flow Below Agnew – No Smoothing (cfs)	Current Day Flow Weighting Factor
0	0.0
40	0.2
55	0.4
70	0.5
200	0.5
300	0.6
>400	1.0

Table A-3. Smoothing Factors by Flow Rate

Daily Change in Storage (cfs)	Smoothing Interval (Days)
0-20	11
>20-100	7
>100-150	3
>150	1

Table A-4. Walker River Flow Scaler for Rush Creek below Silver Lake by Month

Month	Walker River Scaler for Rush Creek above Grant Lake
January	0.23
February	0.28
March	0.20
April	0.22
May	0.25
June	0.28
July	0.31
August	0.34
September	0.31
October	0.27
November	0.30
December	0.27
Average	*0.27*

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FIGURES

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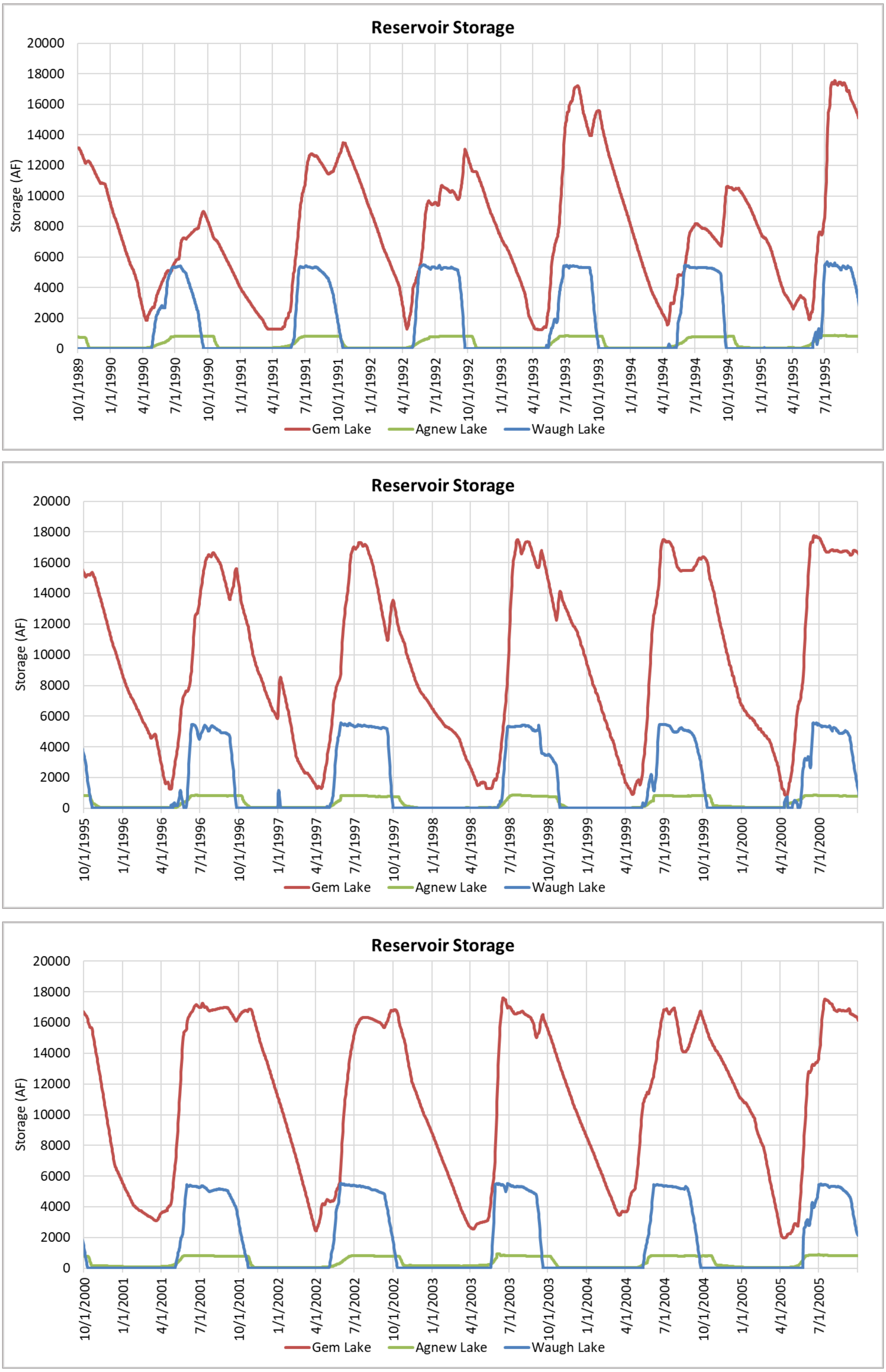

Figure A-1. Rush Creek Project Reservoir Storage (WY 1990–2005)

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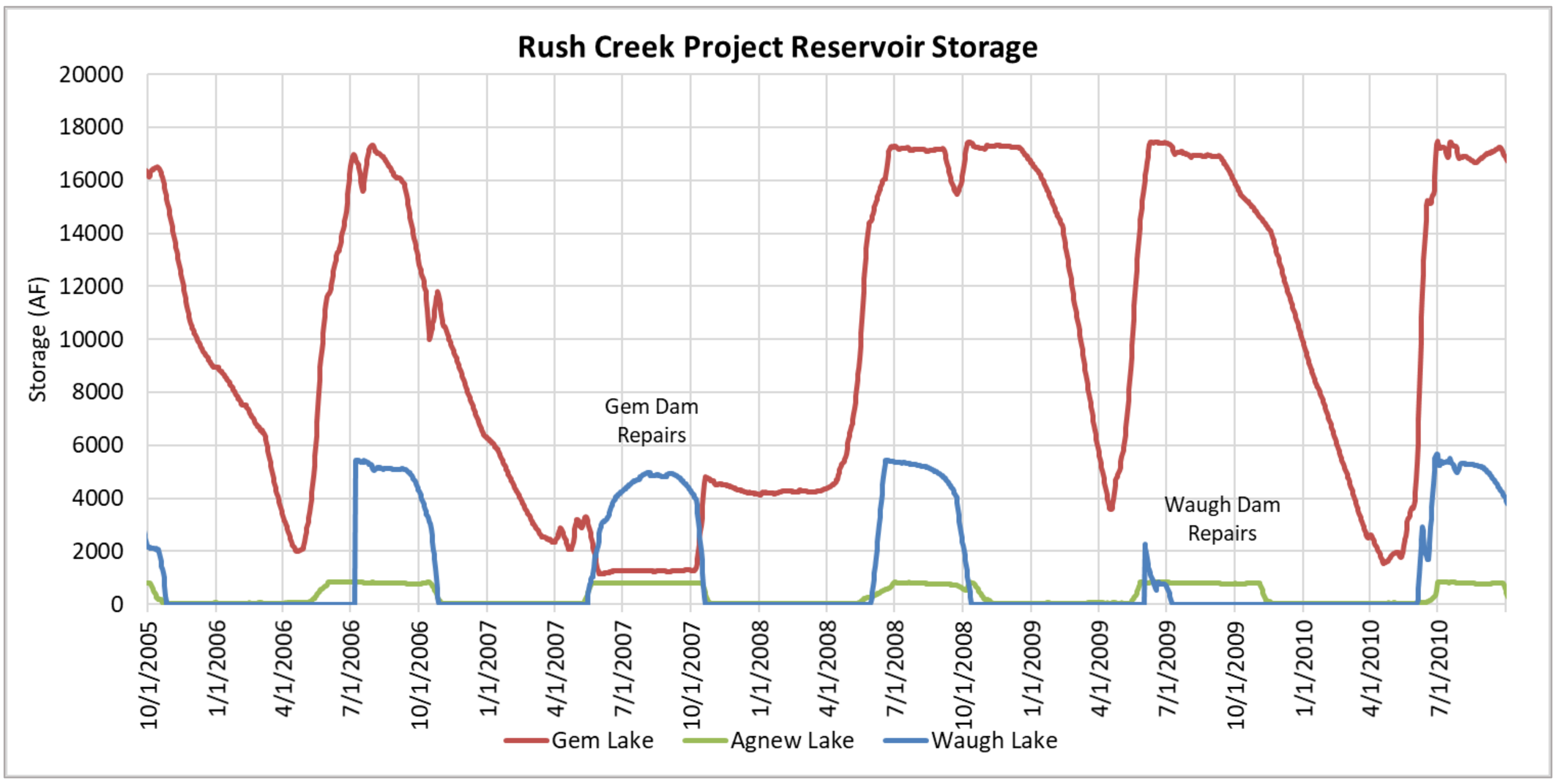

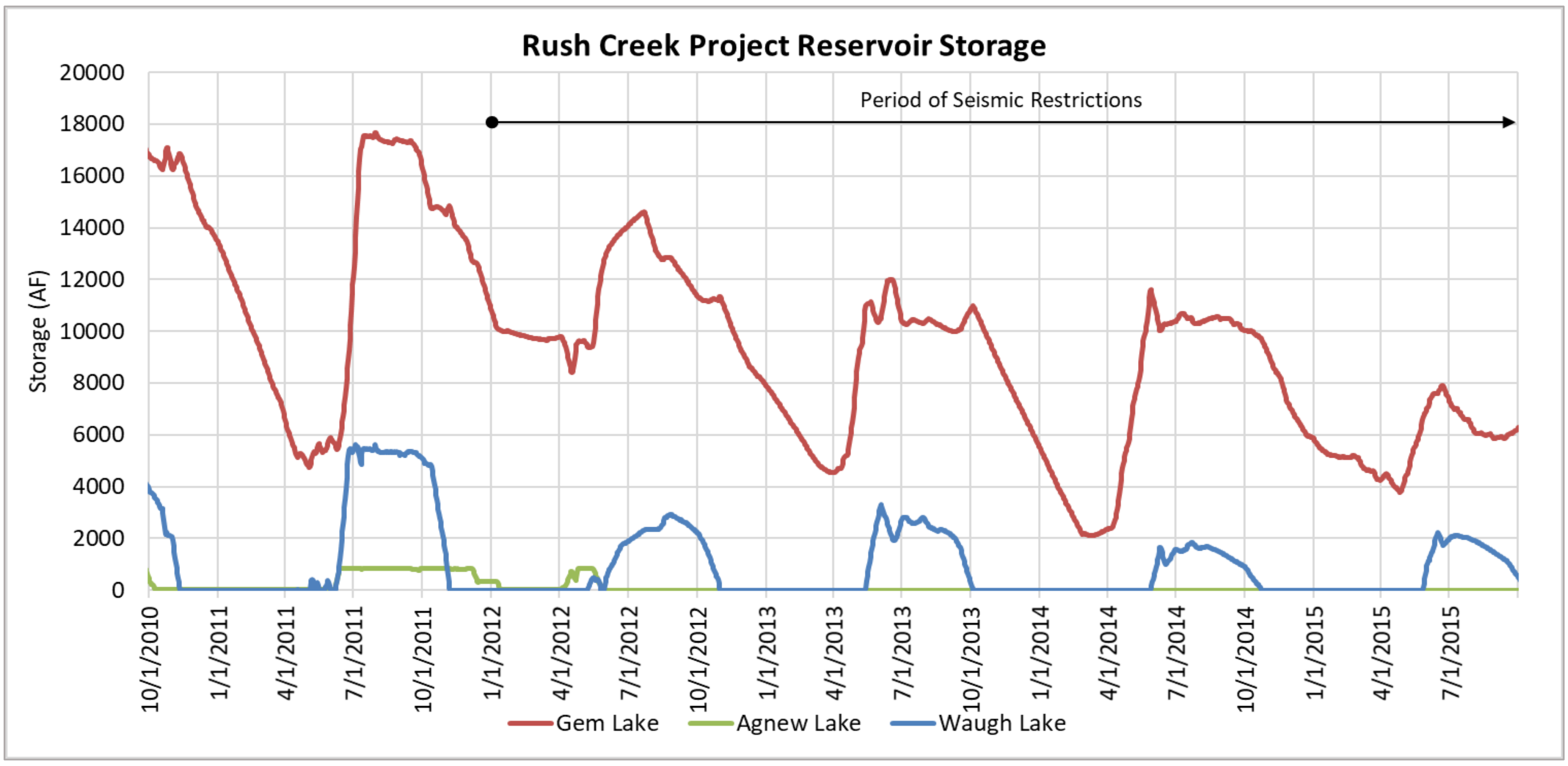

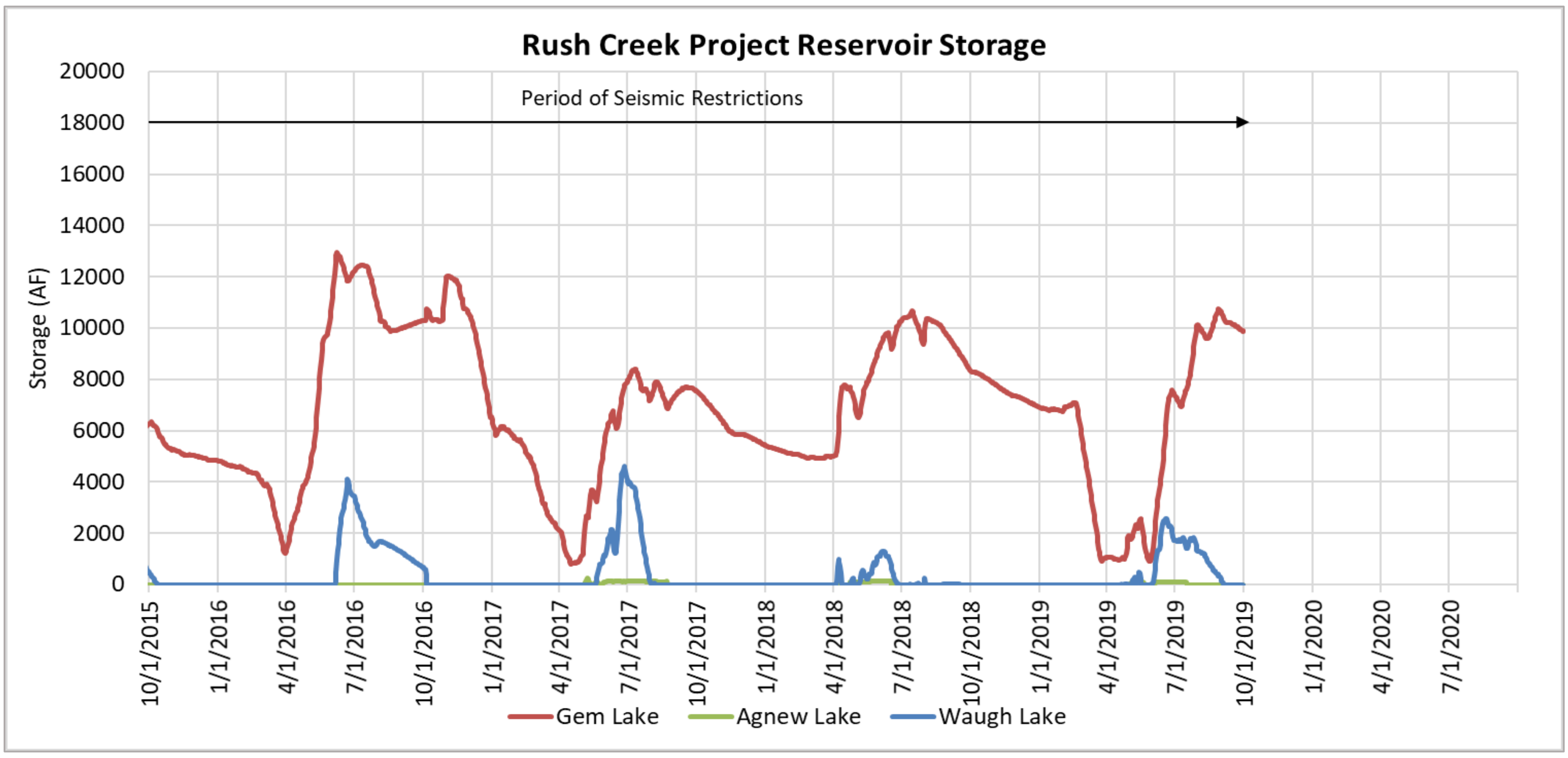

Figure A-1 (continued). Rush Creek Project Reservoir Storage (WY 2006–2019)

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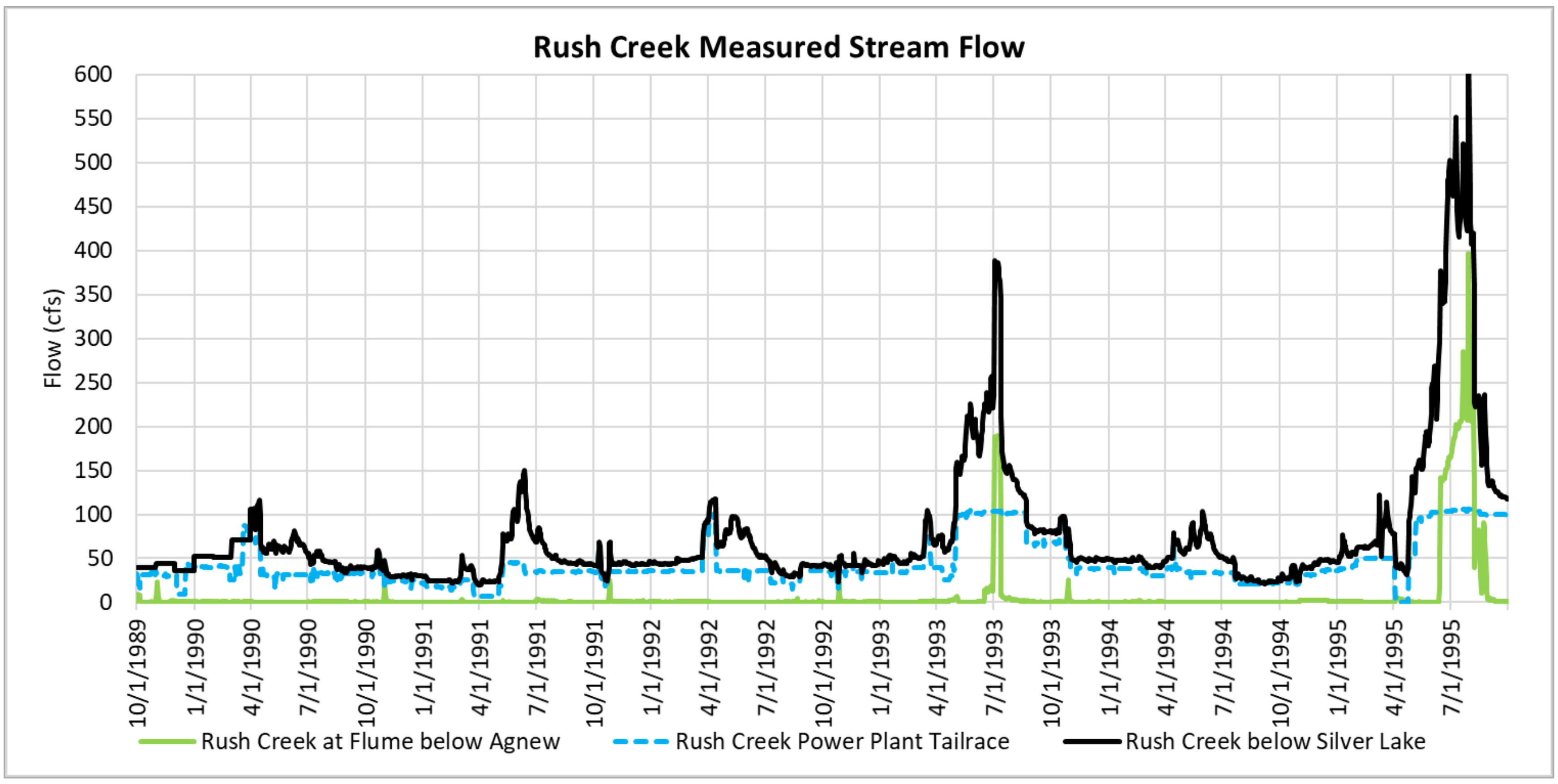

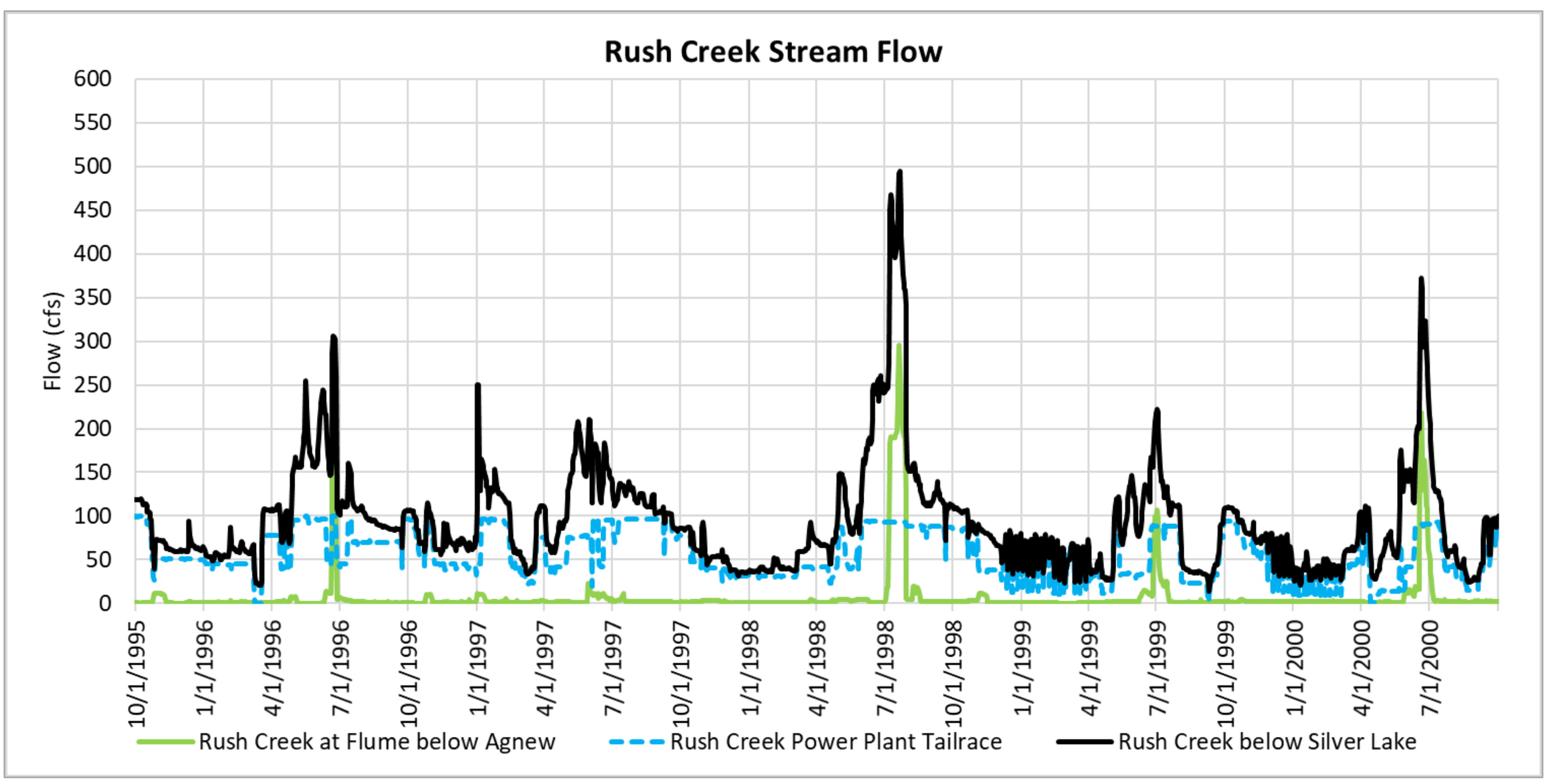

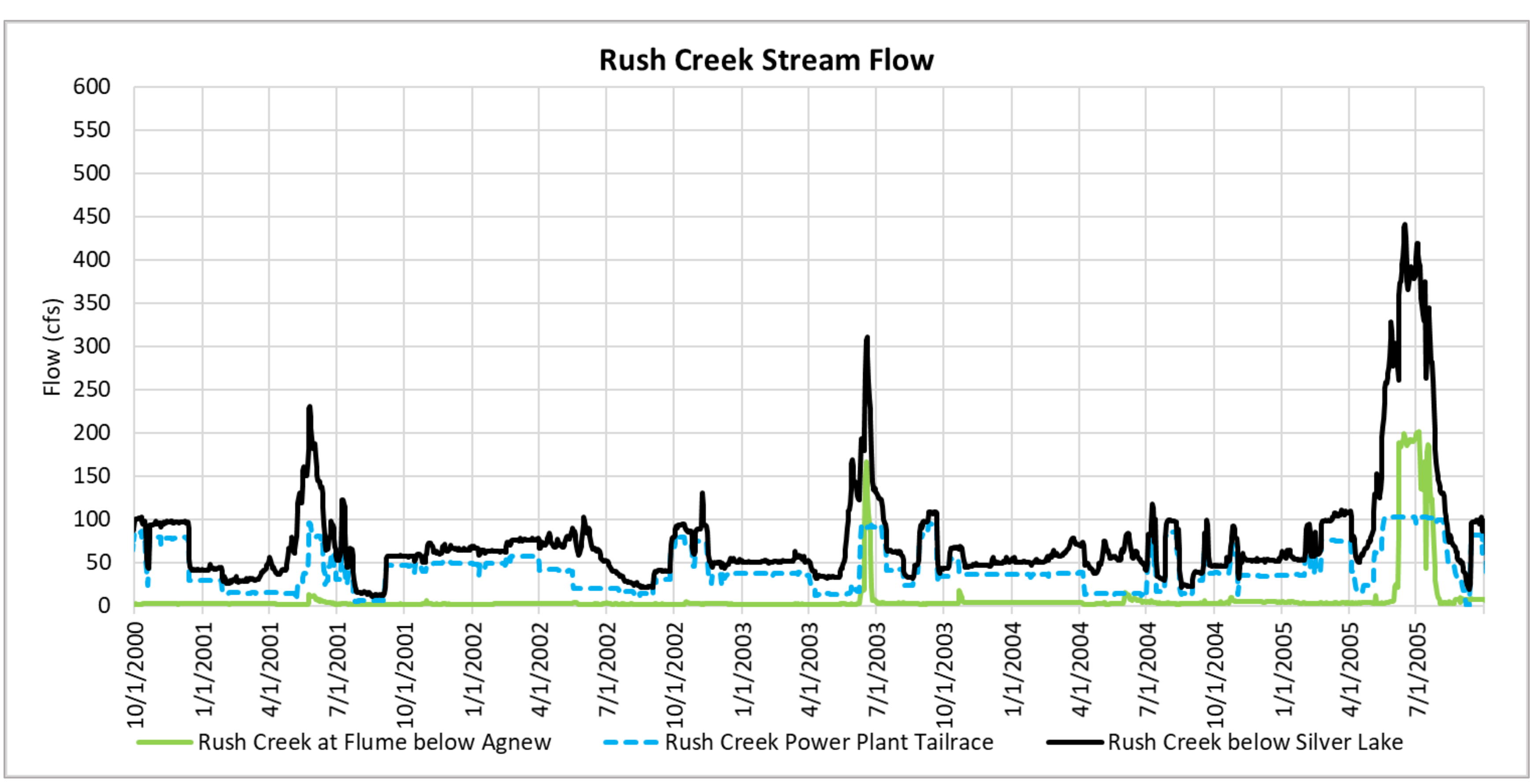

Figure A-2. Rush Creek Measured Stream Flows (WY 1990–2019)

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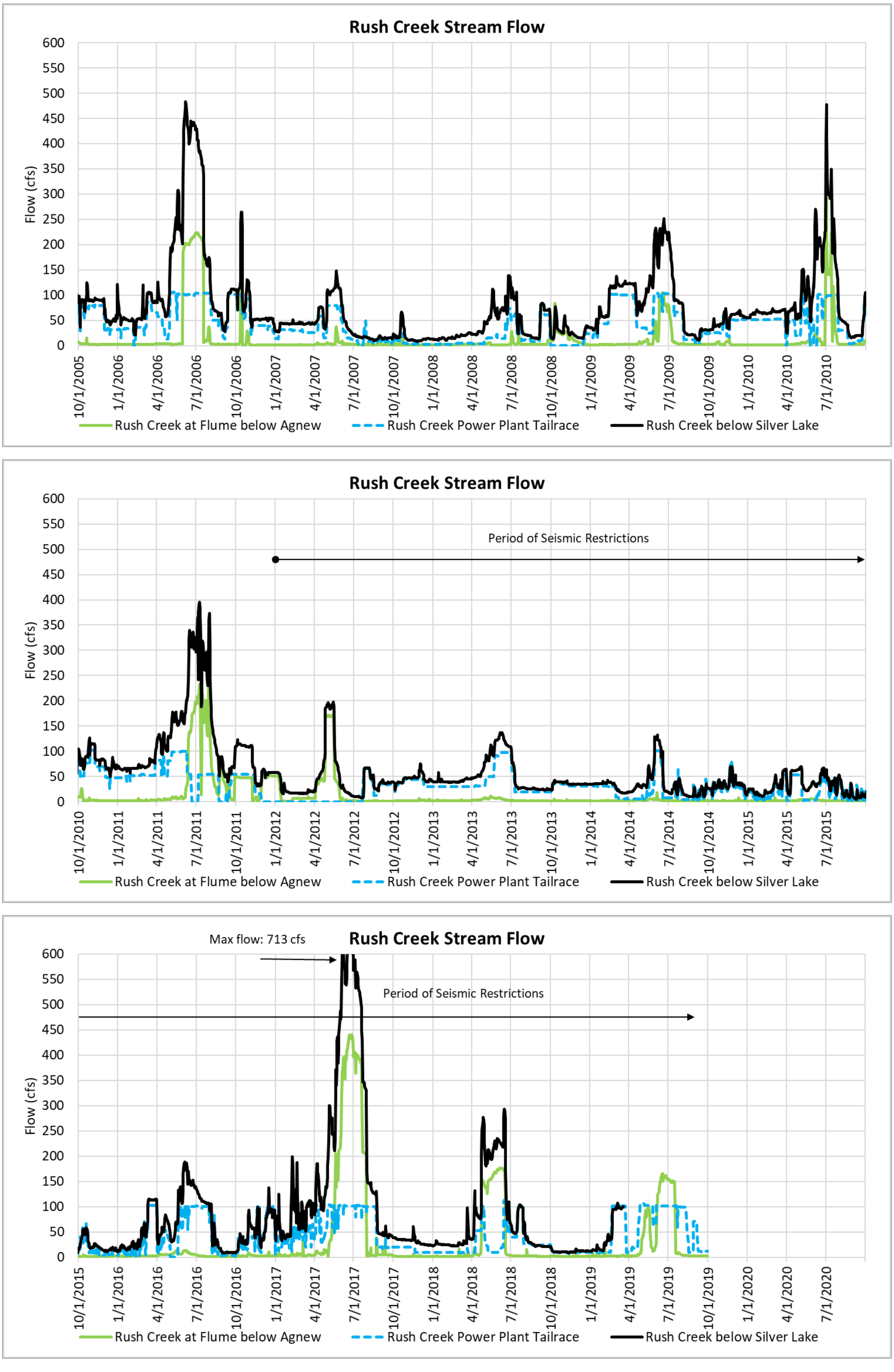

Figure A-2 (continued). Rush Creek Measured Stream Flows (WY 1990–2019)

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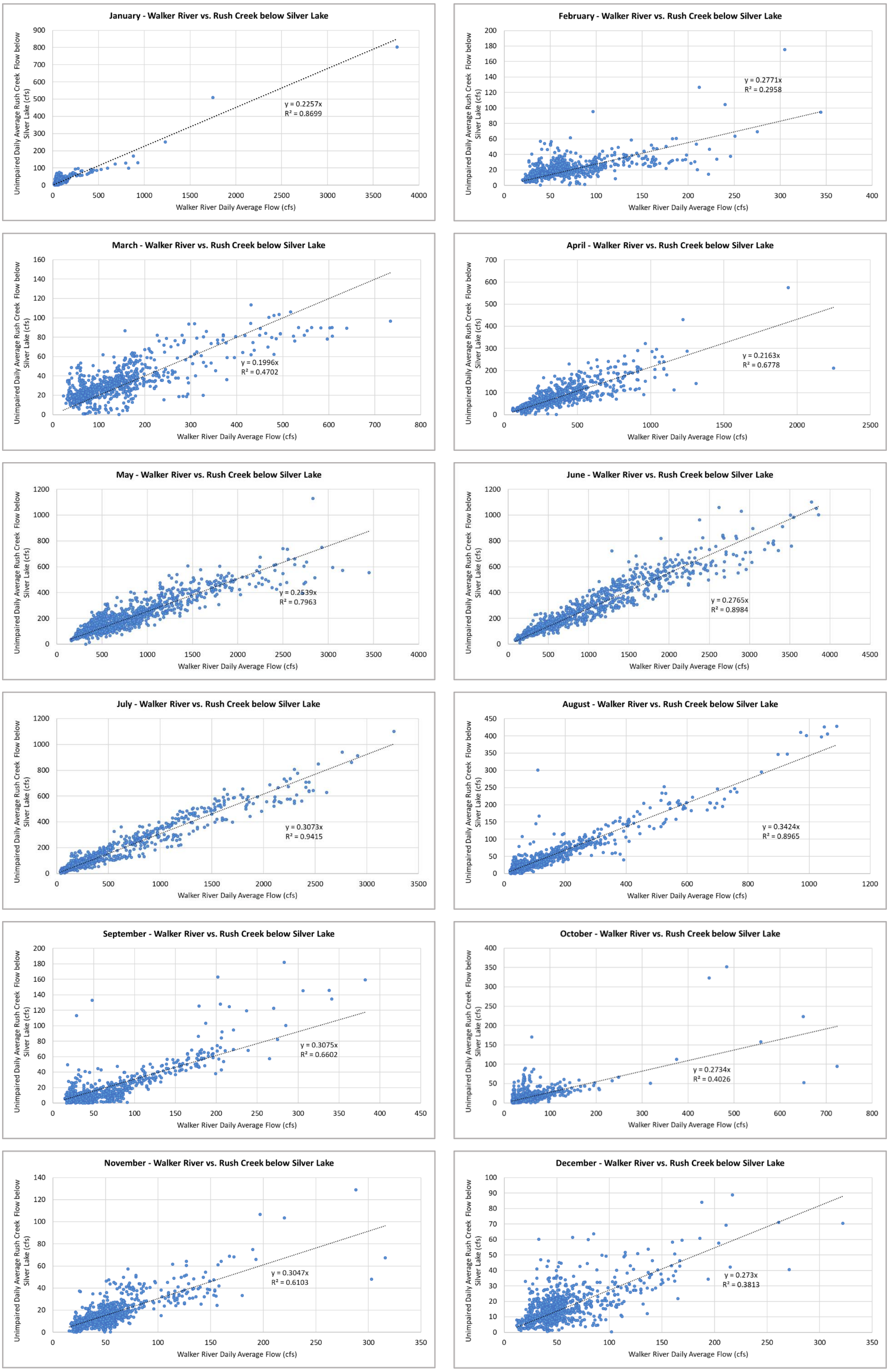

Figure A-3. Monthly Walker River vs. Rush Creek Below Silver Lake Flows

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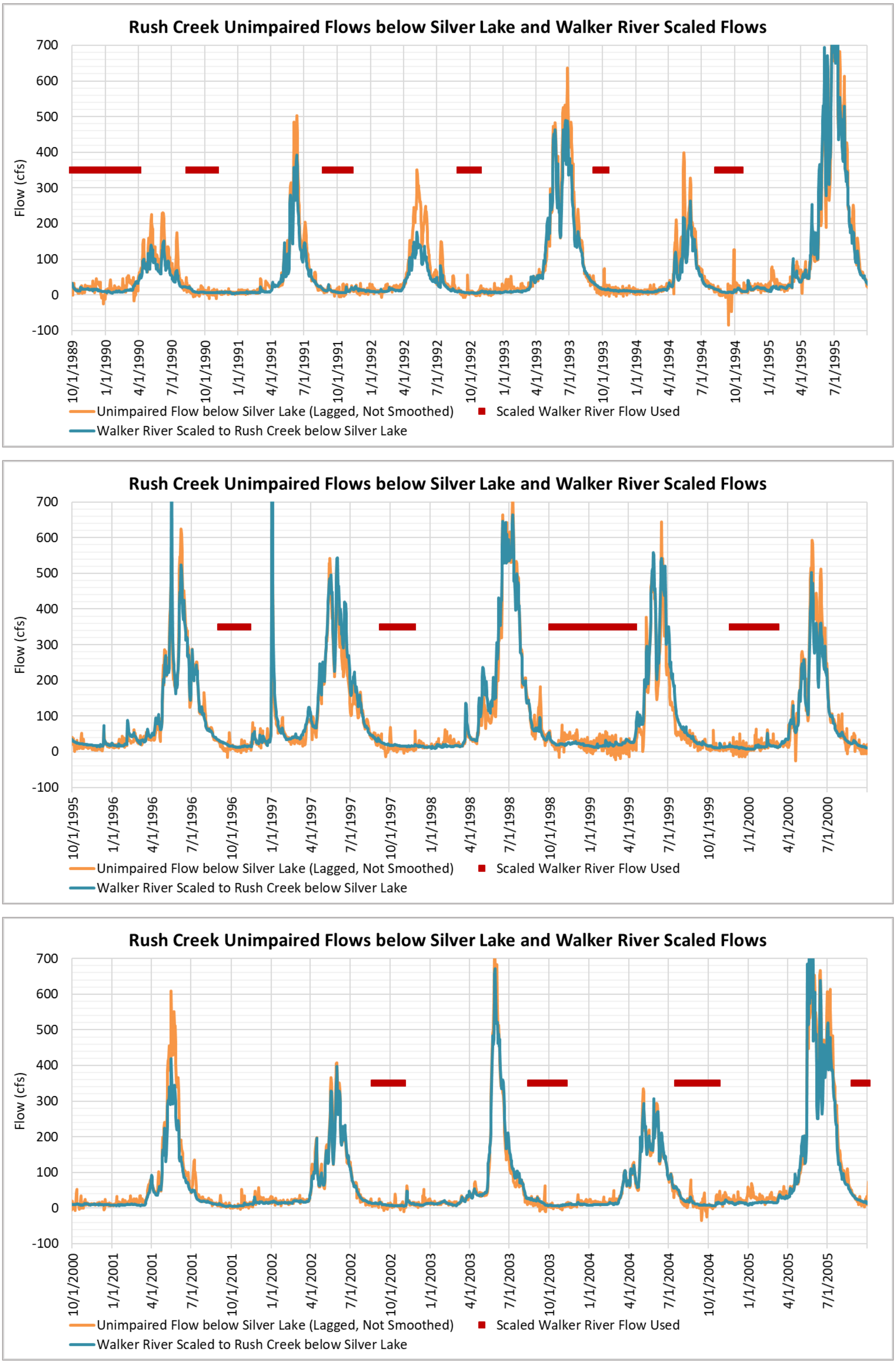

Figure A-4. Rush Creek Unimpaired Flow Below Silver Lake (Not Smoothed) and Scaled Walker River Flows (WY 1990–2019)

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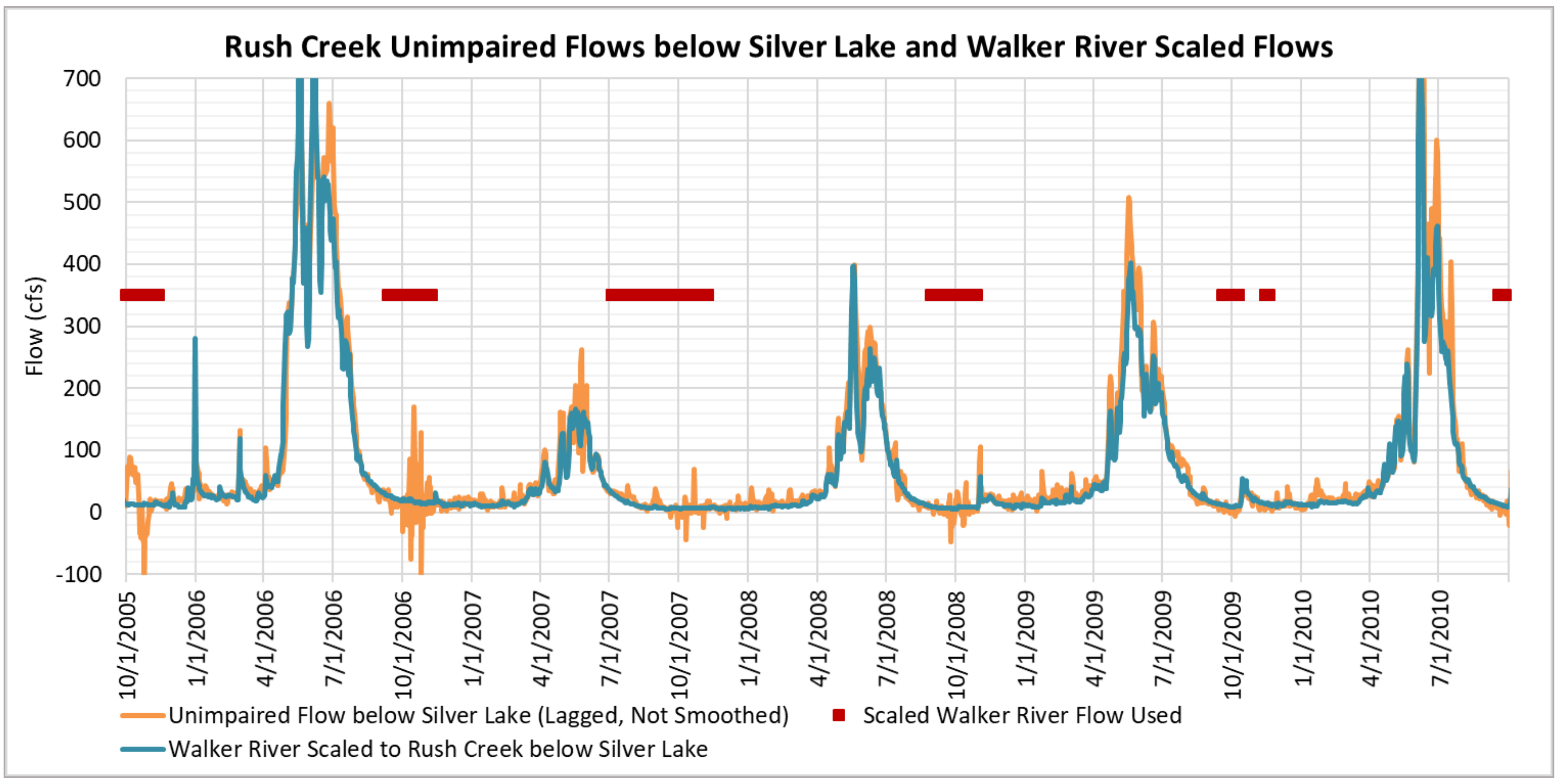

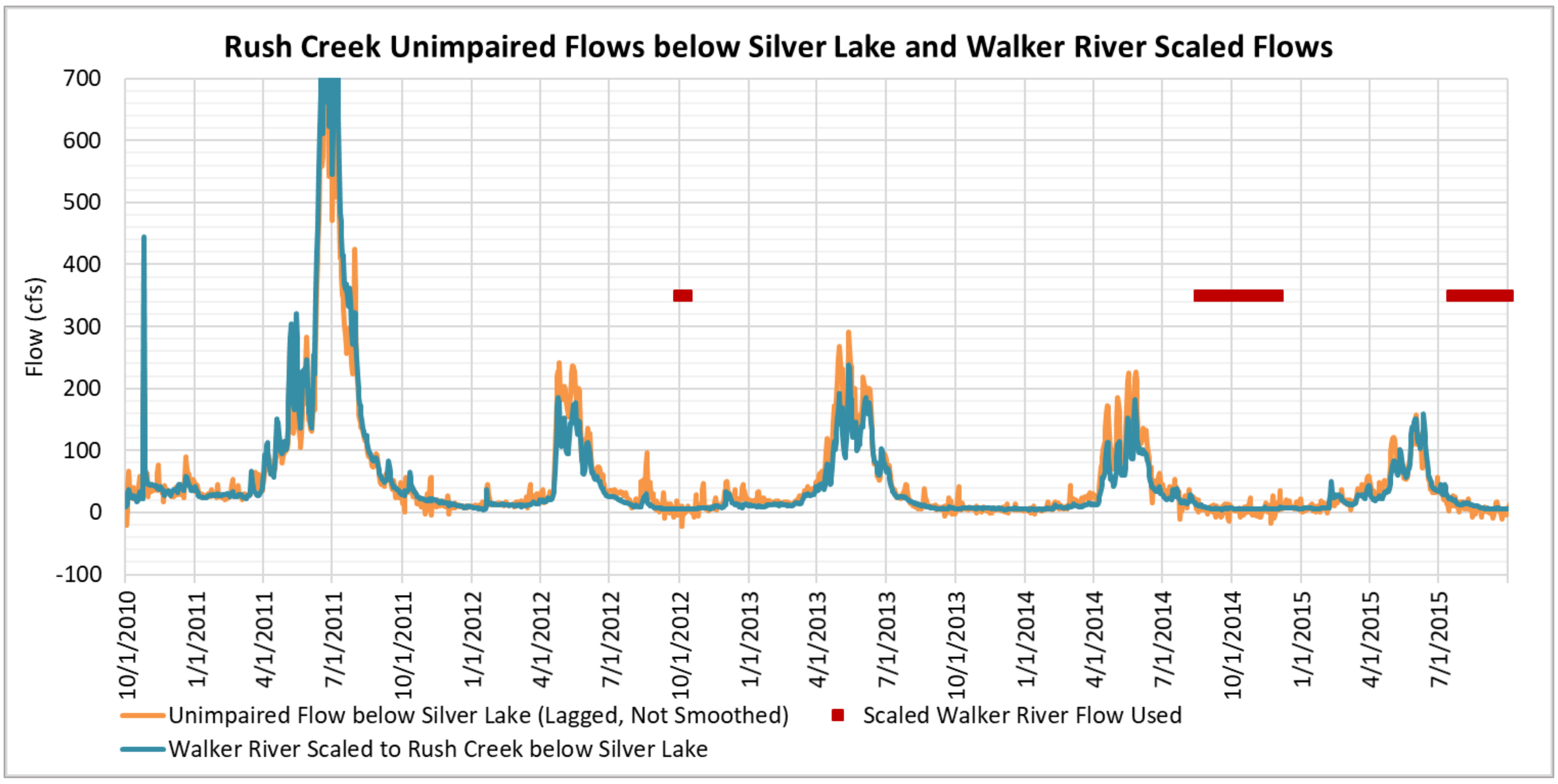

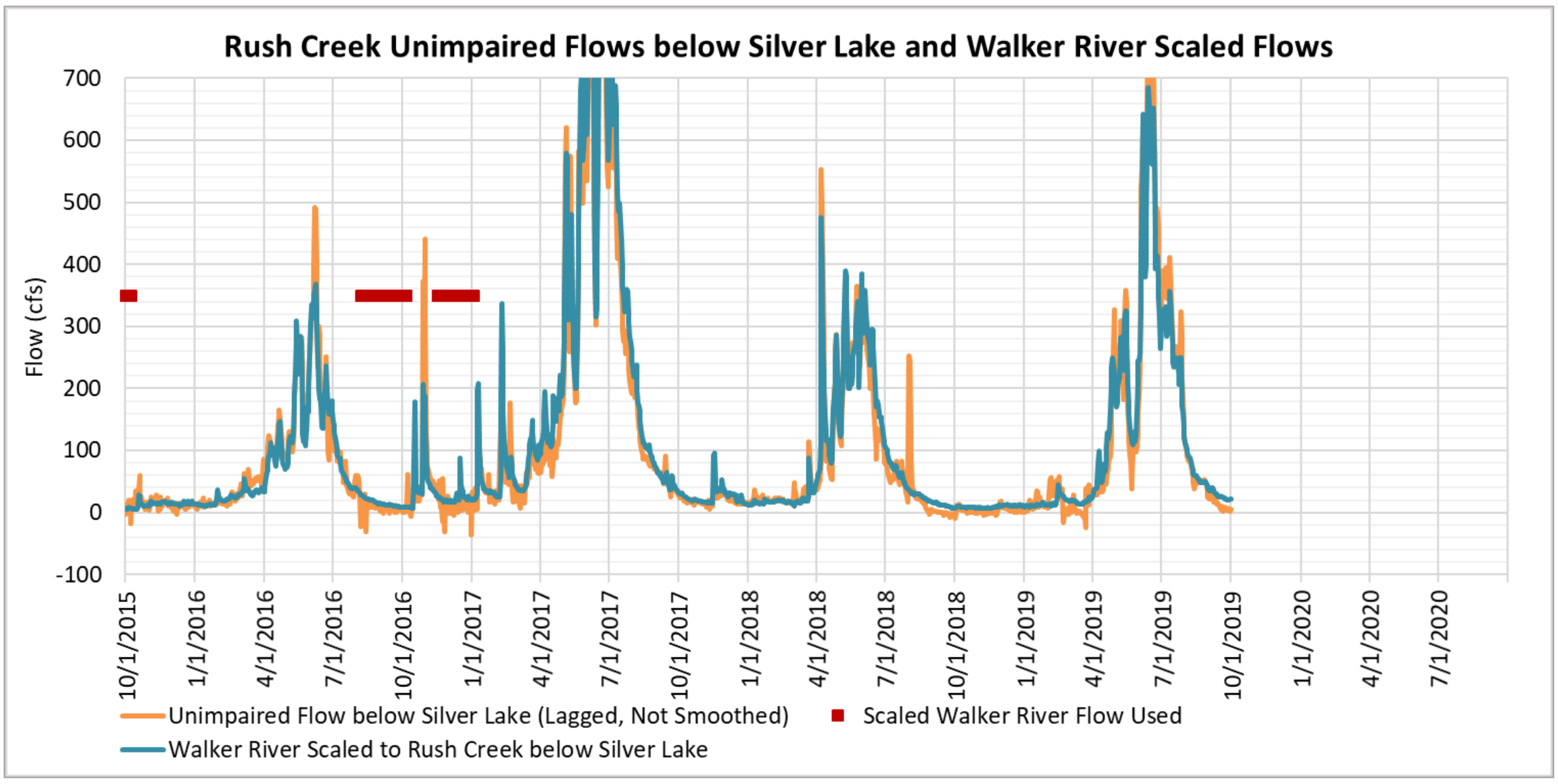

Figure A-4 (continued). Rush Creek Unimpaired Flow Below Silver Lake (Not Smoothed) and Scaled Walker River Flows (WY 1990–2019)

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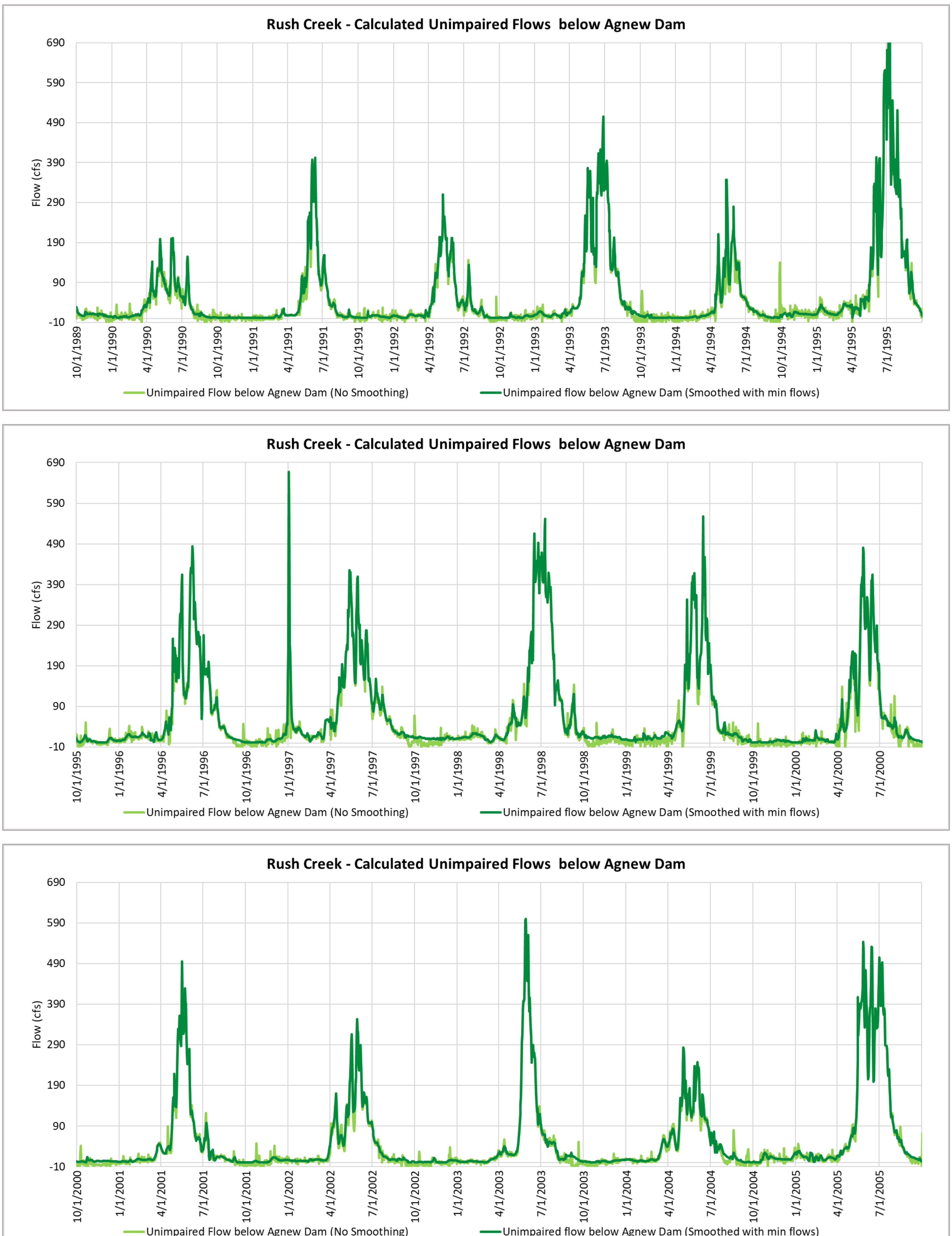

Figure A-5. Rush Creek Raw vs. Smoothed Calculated Unimpaired Flows Below Agnew Dam (WY 1990–2019)

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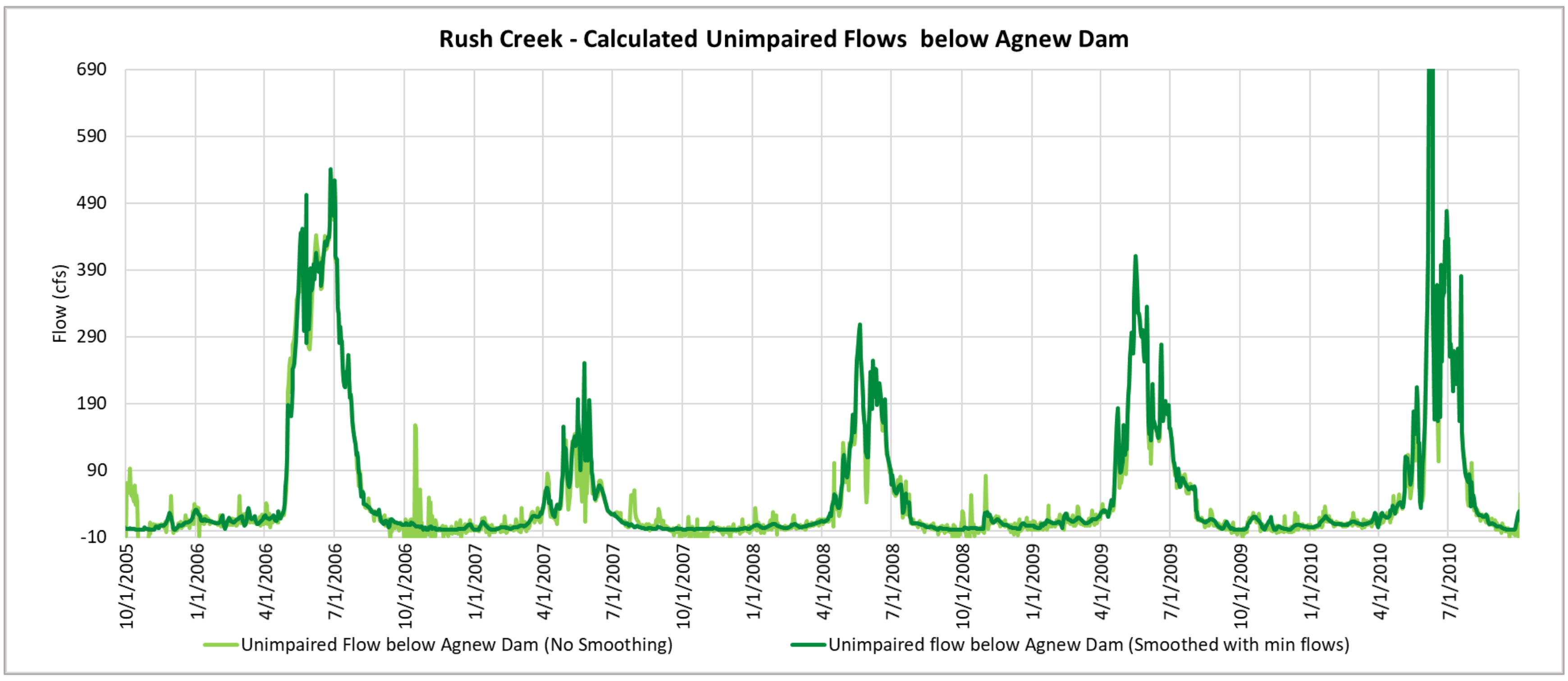

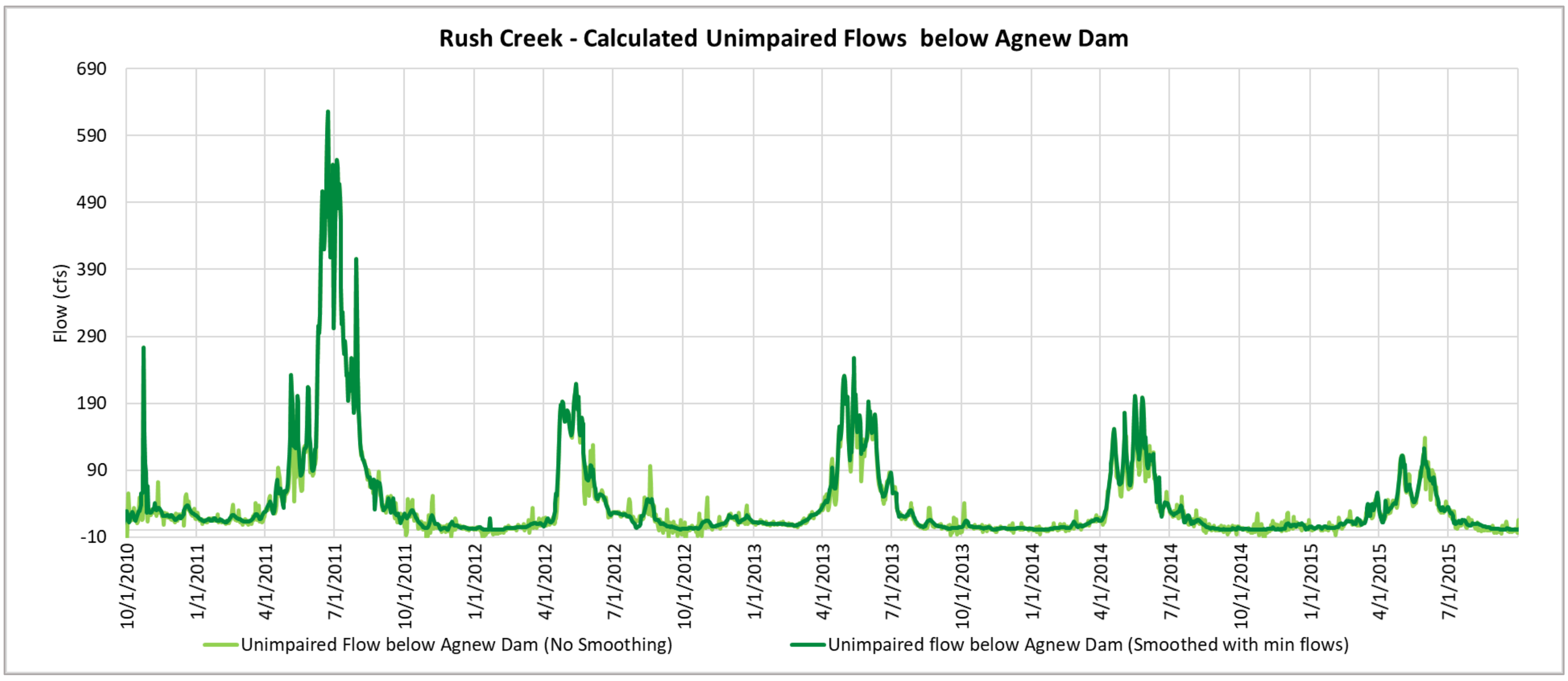

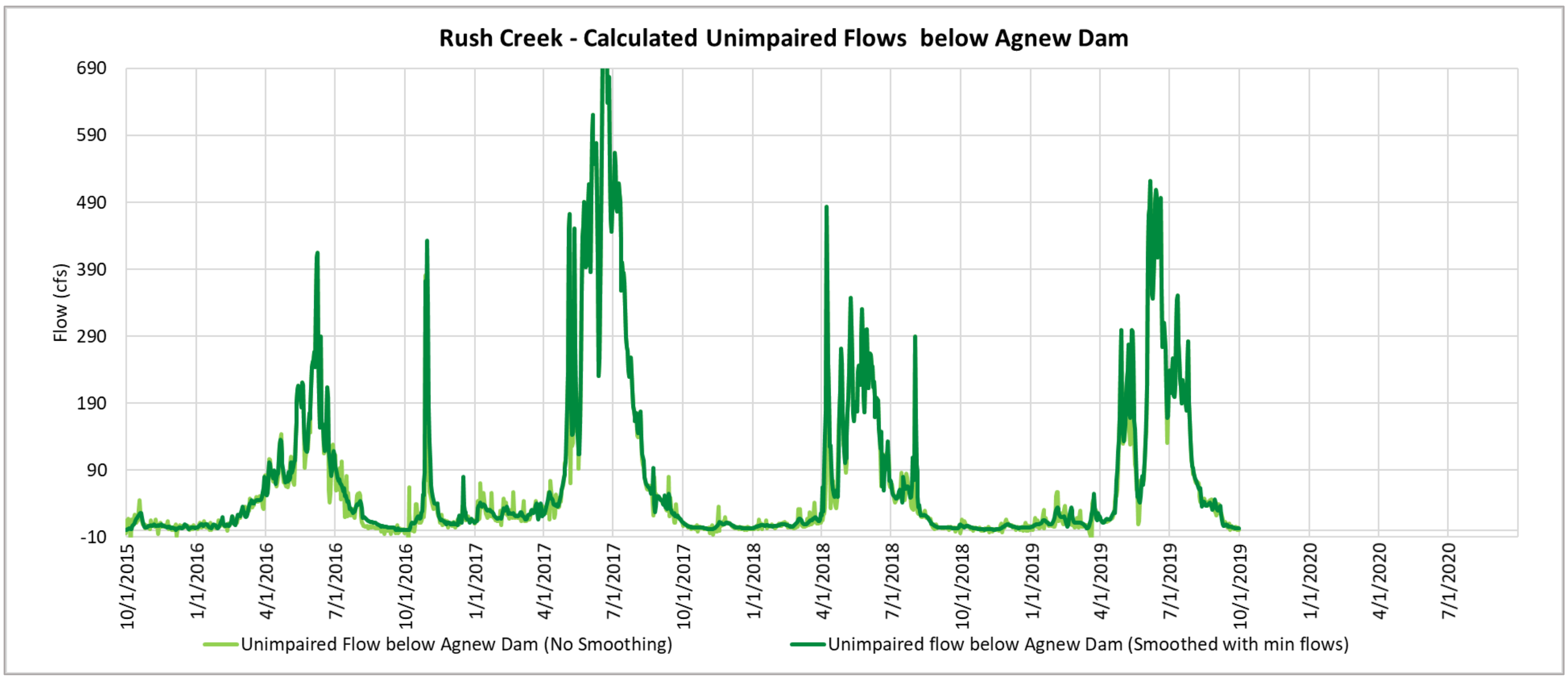

Figure A-5 (continued). Rush Creek Raw vs. Smoothed Calculated Unimpaired Flows Below Agnew Dam (WY 1990–2019)

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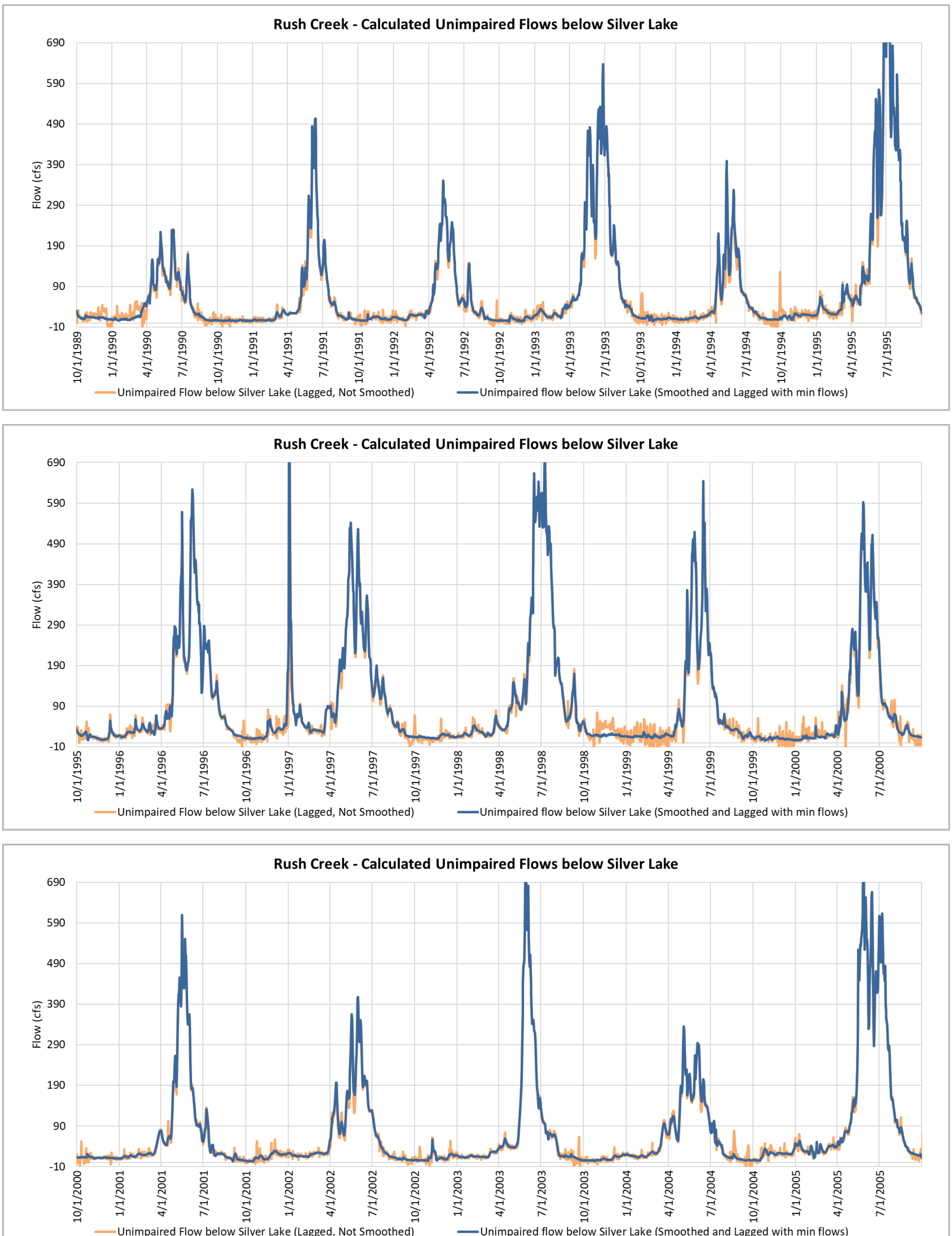

Figure A-6. Rush Creek Raw vs. Smoothed Calculated Unimpaired Flows Below Silver Lake (WY 1990–2019)

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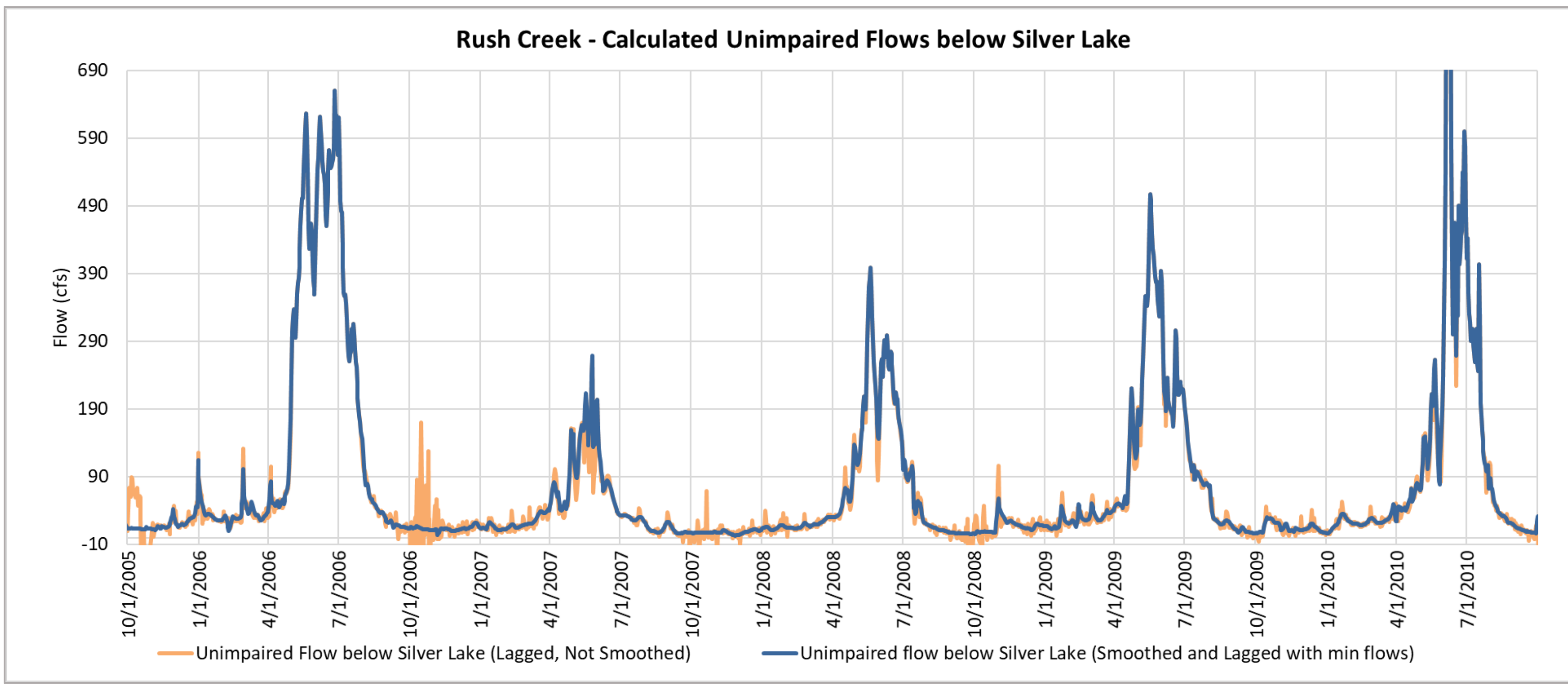

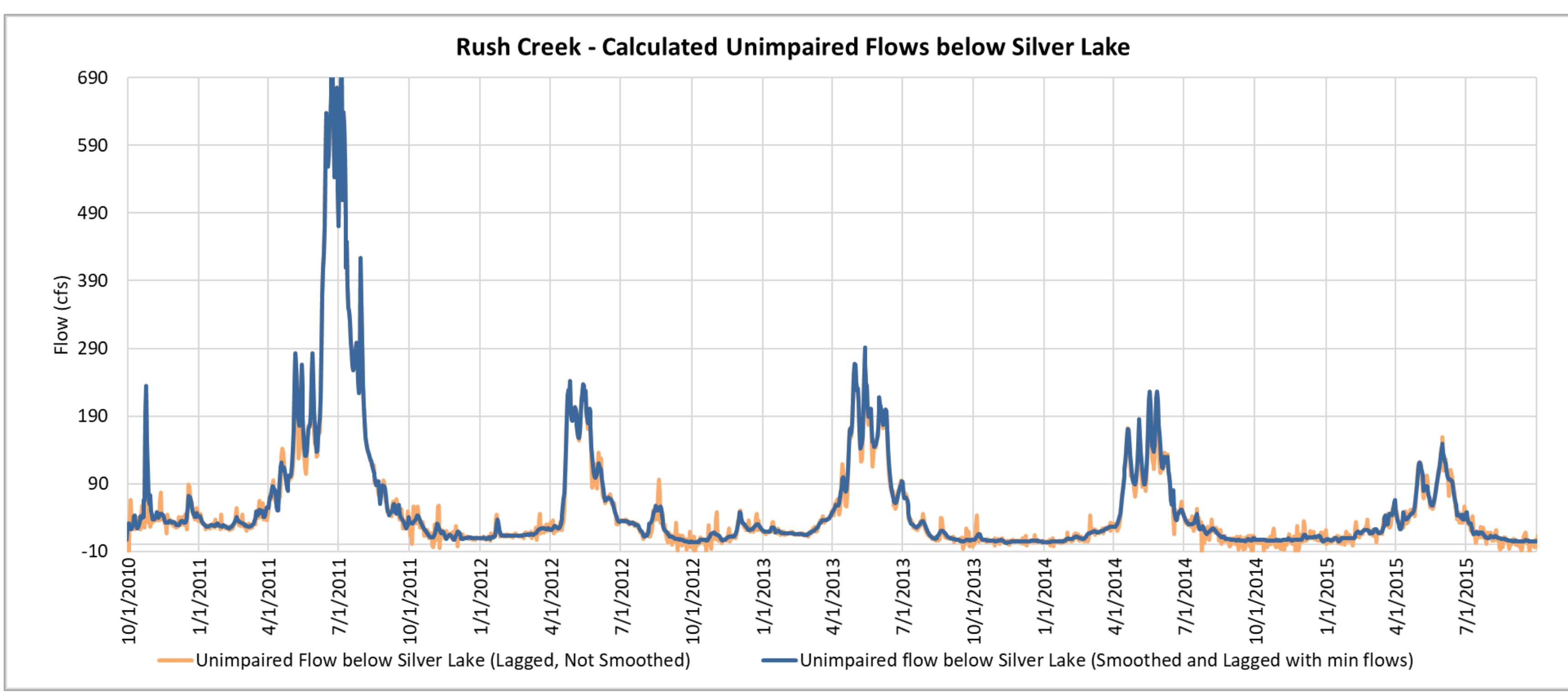

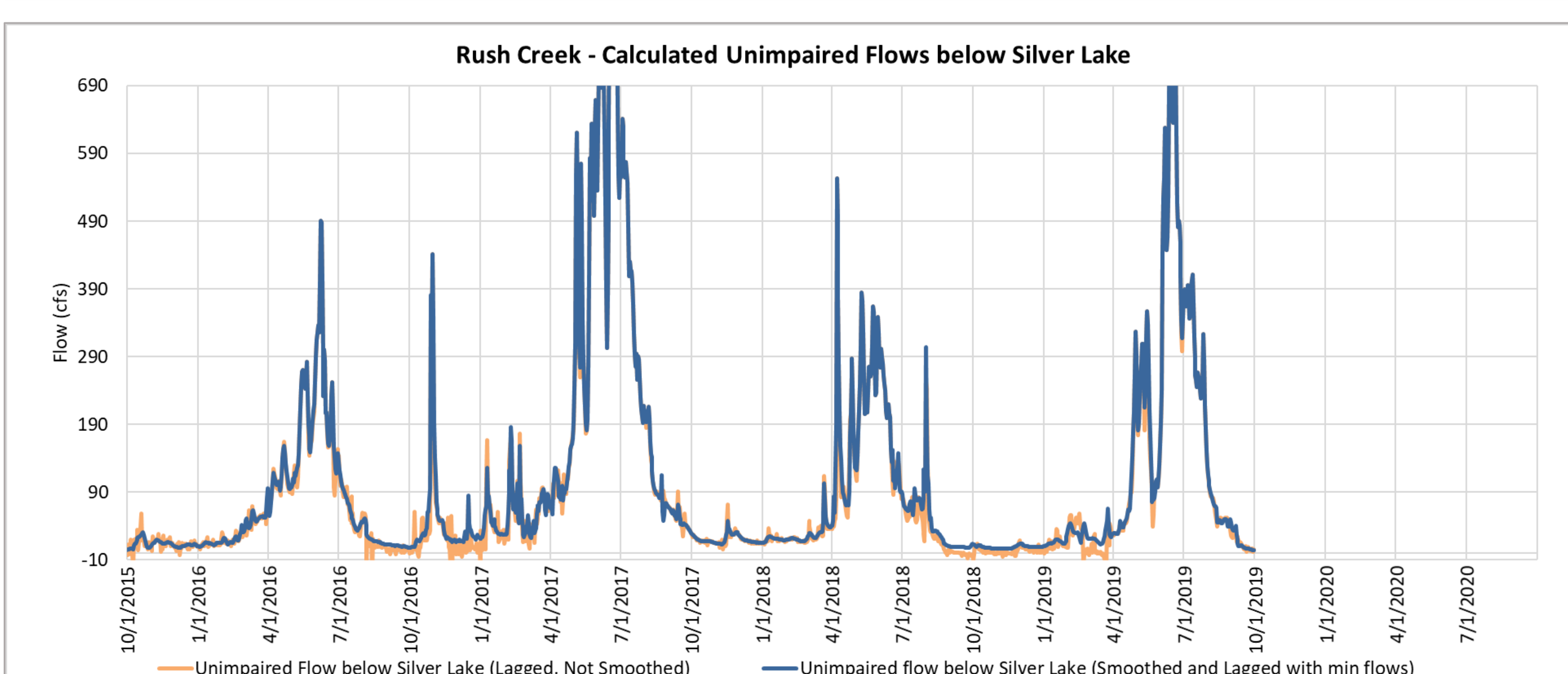

Figure A-6 (continued). Rush Creek Raw vs. Smoothed Calculated Unimpaired Flows Below Silver Lake (WY 1990–2019)

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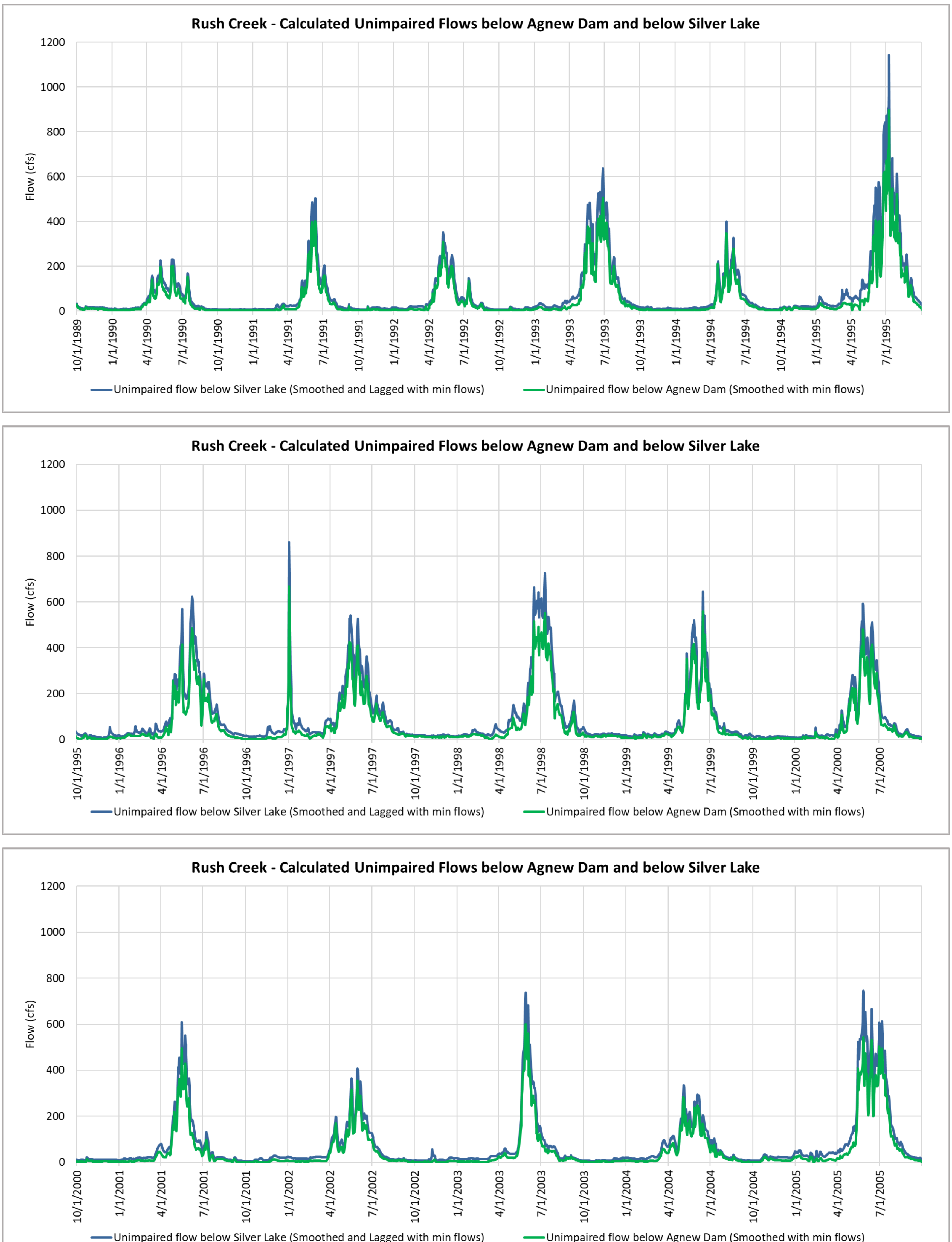

Figure A-7. Rush Creek Final Unimpaired Flows Below Agnew Dam and Below Silver Lake (WY 1990–2019)

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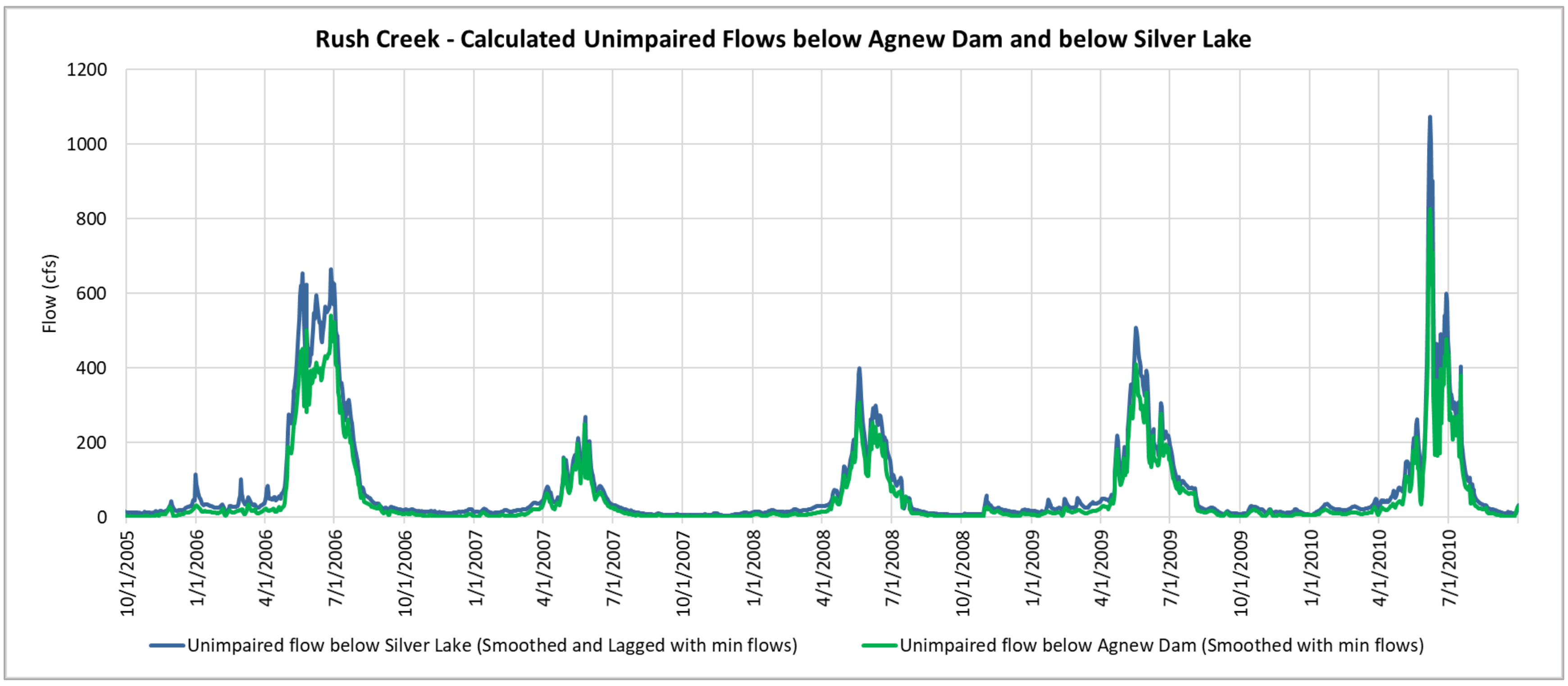

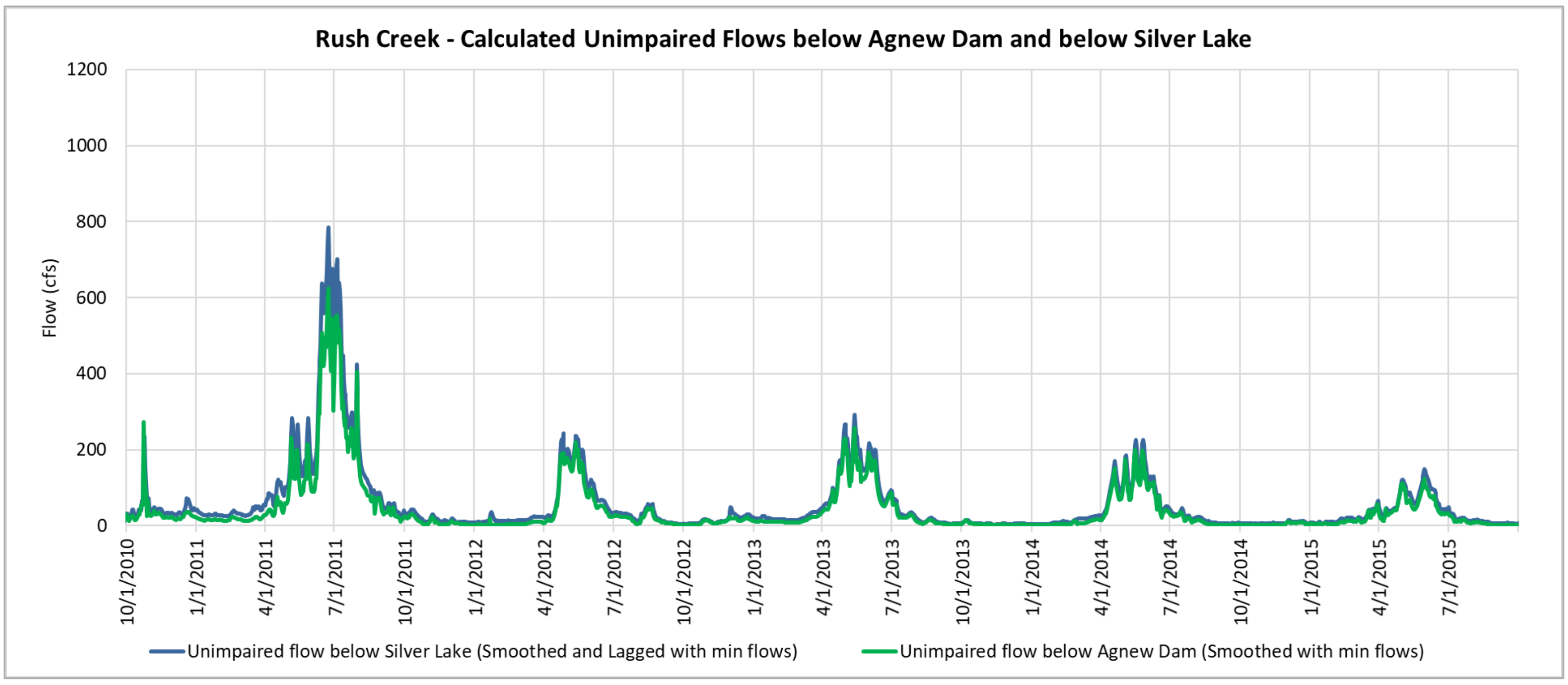

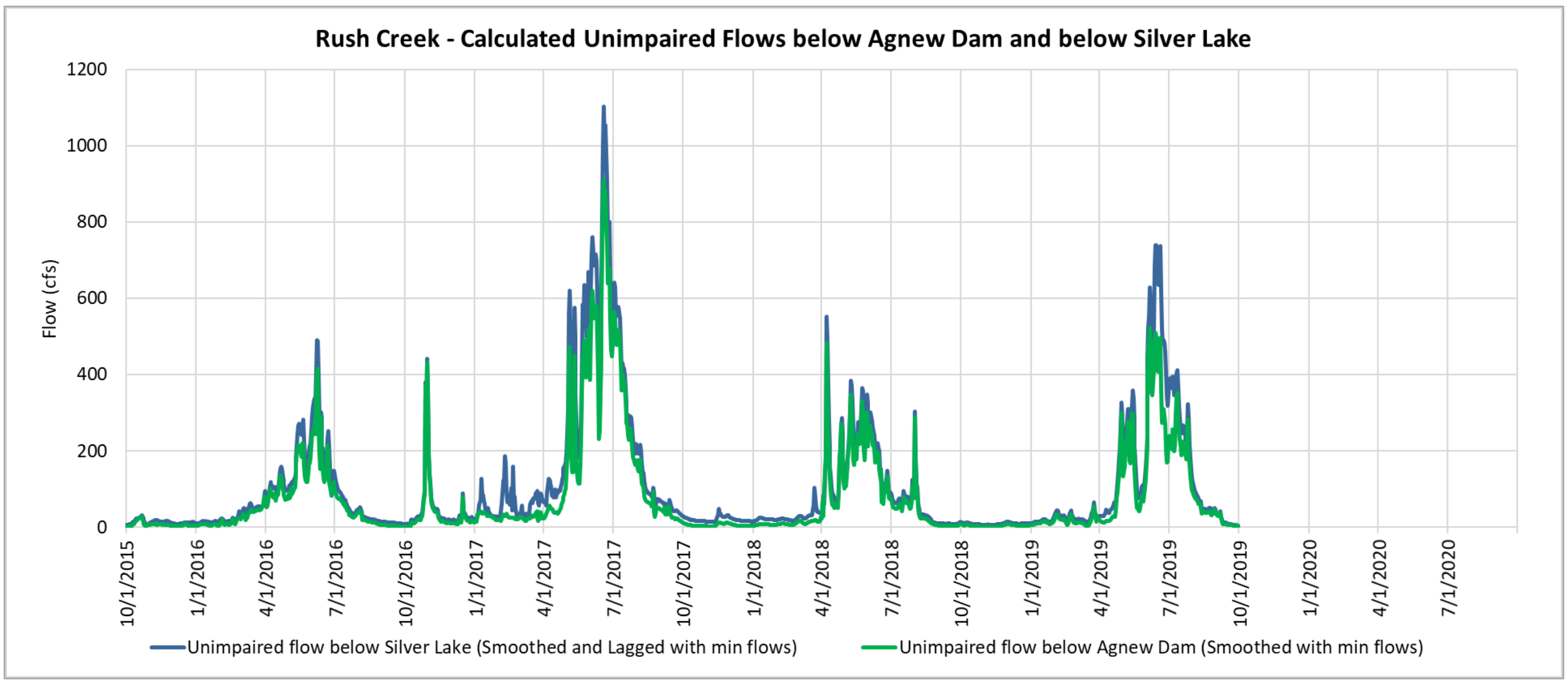

Figure A-7 (continued). Rush Creek Final Unimpaired Flows Below Agnew Dam and Below Silver Lake (WY 1990–2019)

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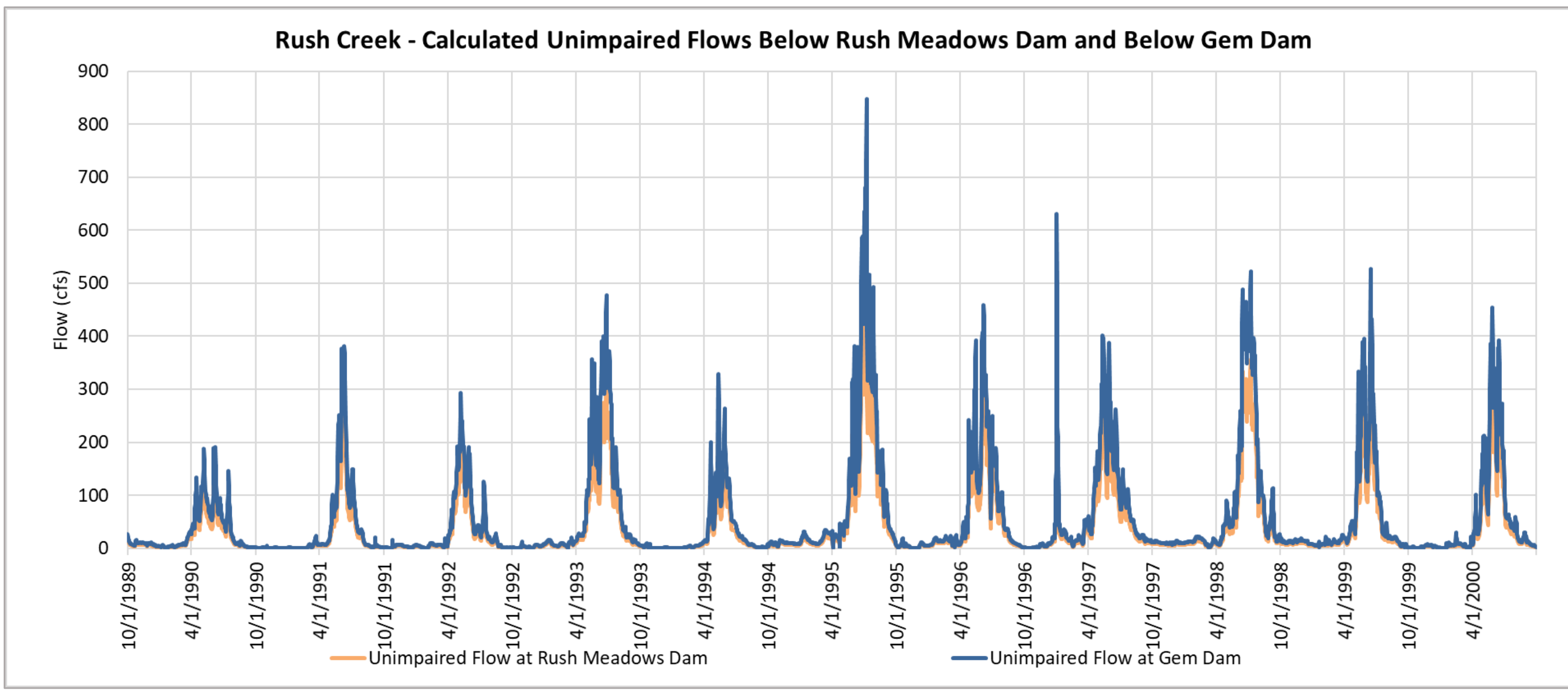

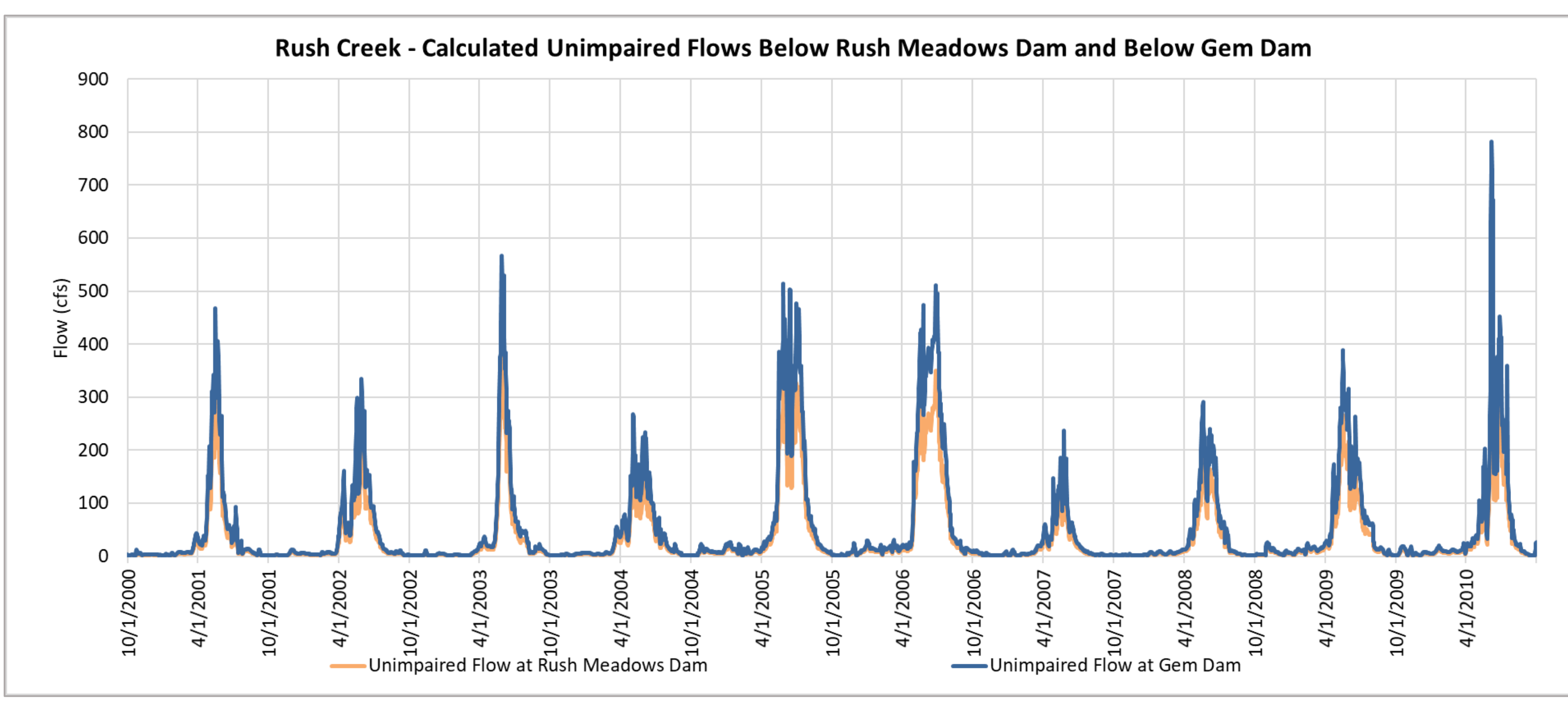

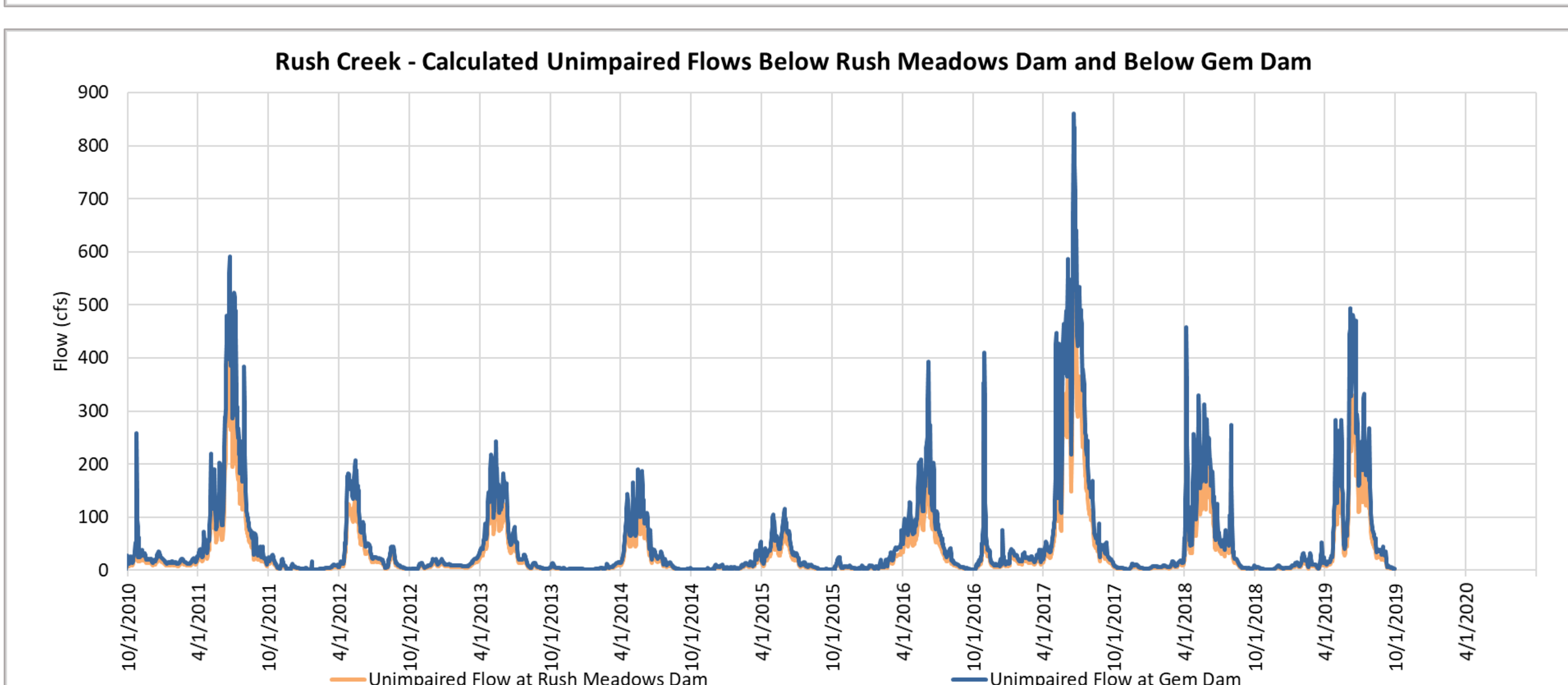

Figure A-8. Rush Creek Final Unimpaired Flows at Rush Meadows Dam and Gem Dam (WY 1990–2019)

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MAPS

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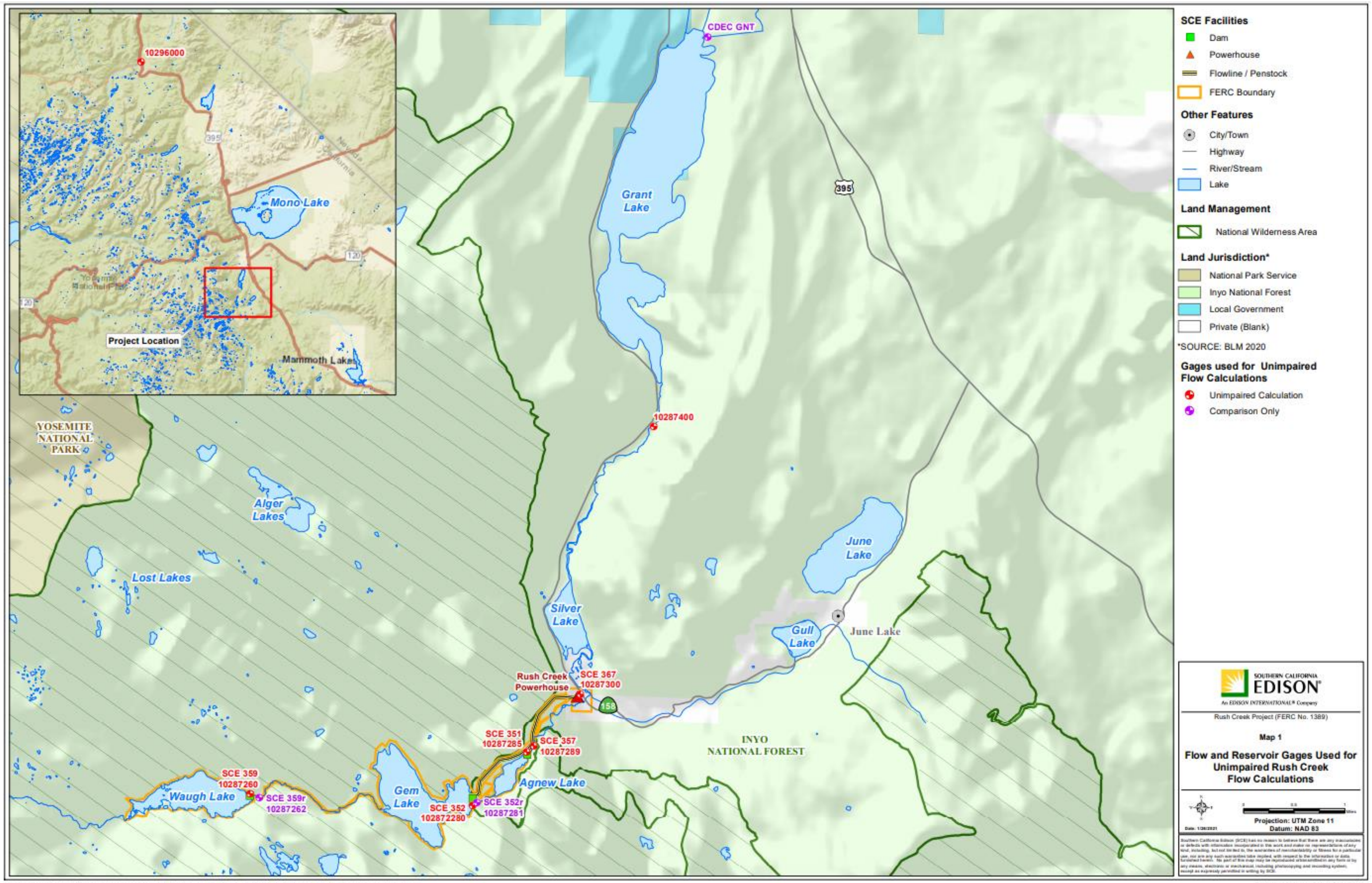

C:\GIS\Cardno\30735240_SCE_EasternHydro\map\Rush Creek\HydroMaps\SCE_RUSH_CREEK_Gages_UnimpairedFlow_17i11i_01.mxd

Map A-1. Location of Flow and Reservoir Gages Used for Unimpaired Rush Creek Flow Calculations

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APPENDIX 4.3-B

Existing and Unimpaired Monthly Flow Duration Curves (1989–2019)

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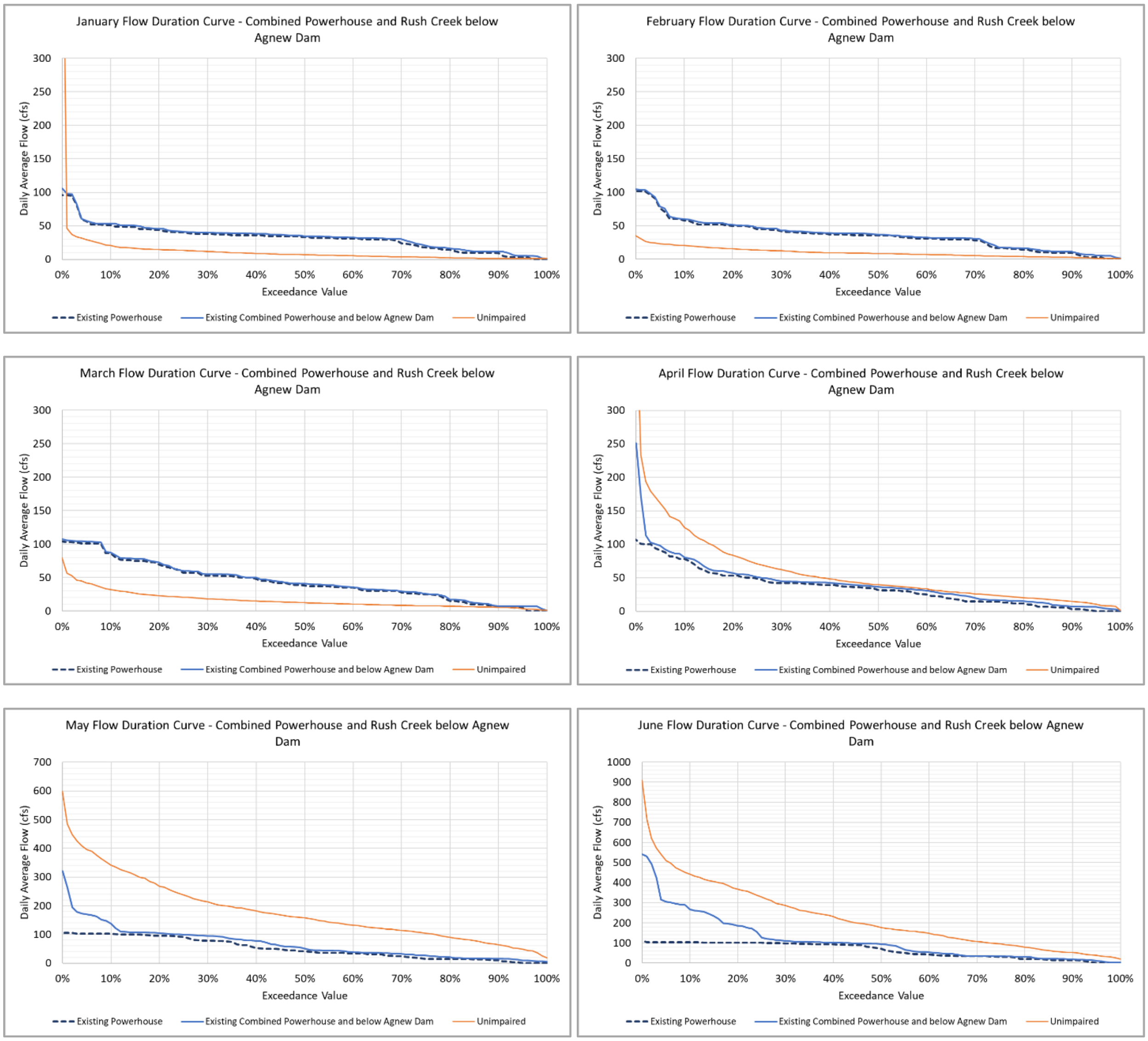

Figure B-1. Monthly Flow Duration Curves for Combined Powerhouse and Rush Creek below Agnew Dam, Existing and Unimpaired Flows (January–June).

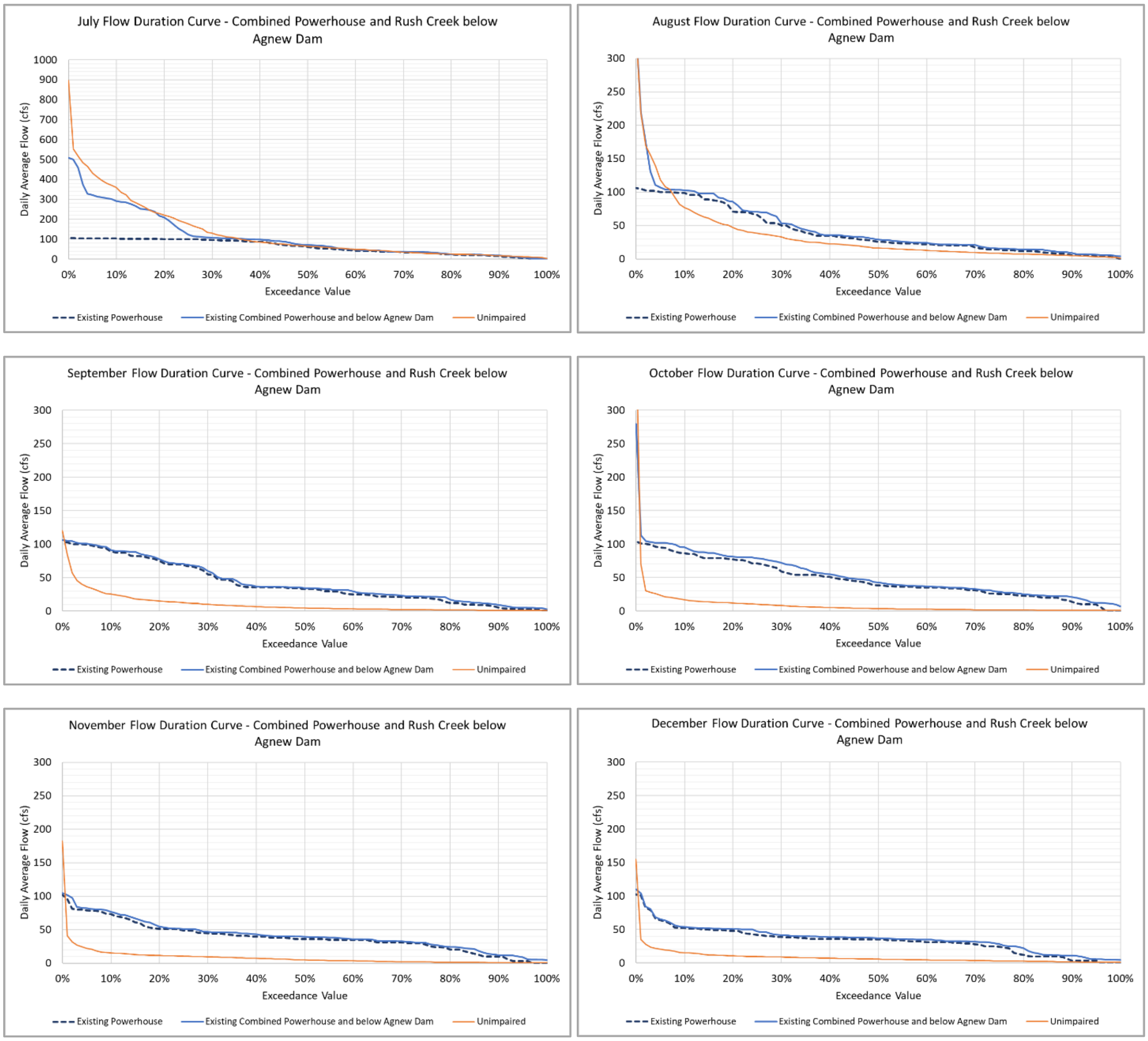

Figure B-2. Monthly Flow Duration Curves for Combined Powerhouse and Rush Creek below Agnew Dam, Existing and Unimpaired Flows (July–December).

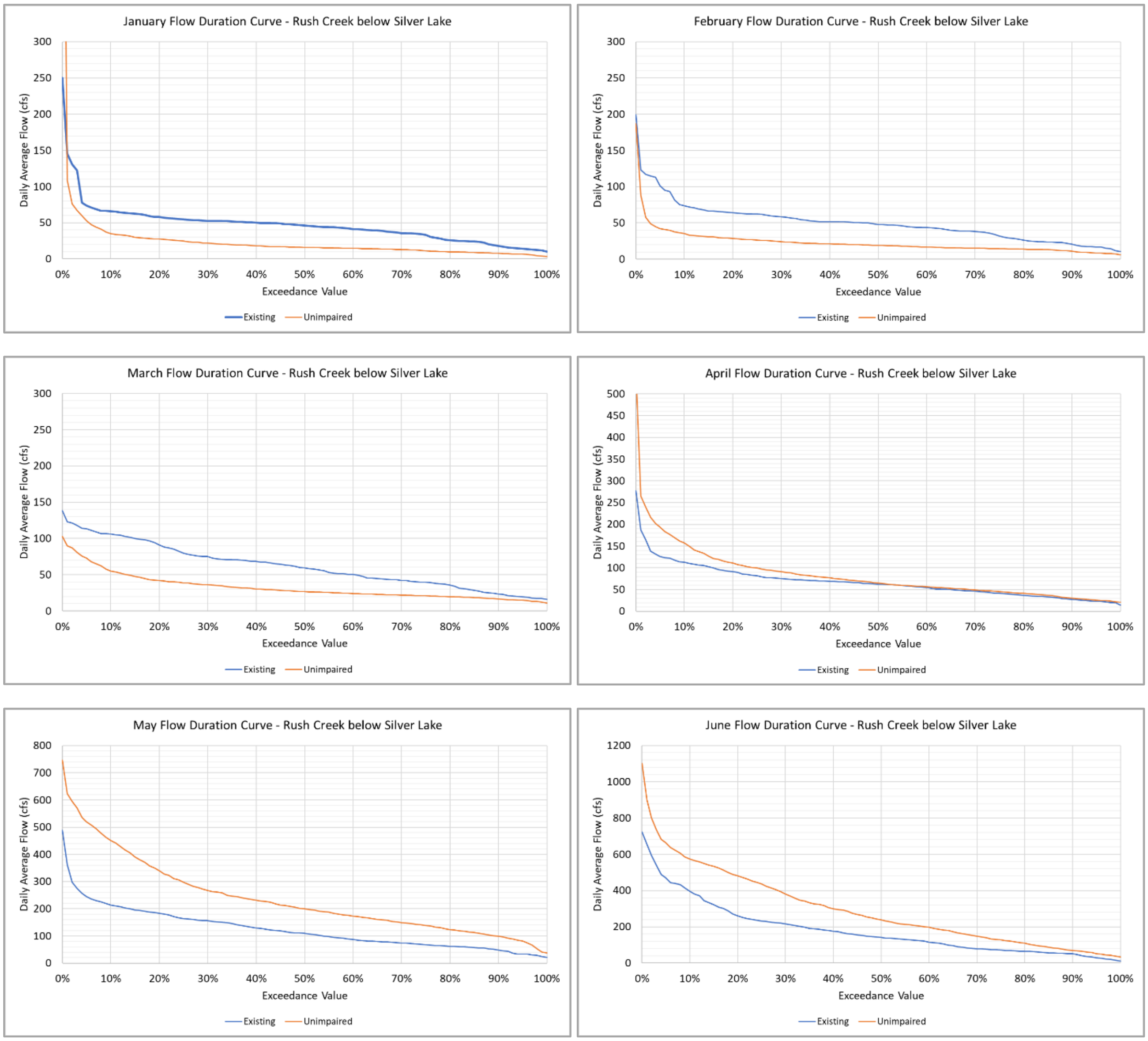

Figure B-3. Monthly Flow Duration Curves for Rush Creek below Silver Lake, Existing and Unimpaired Flows (January–June).

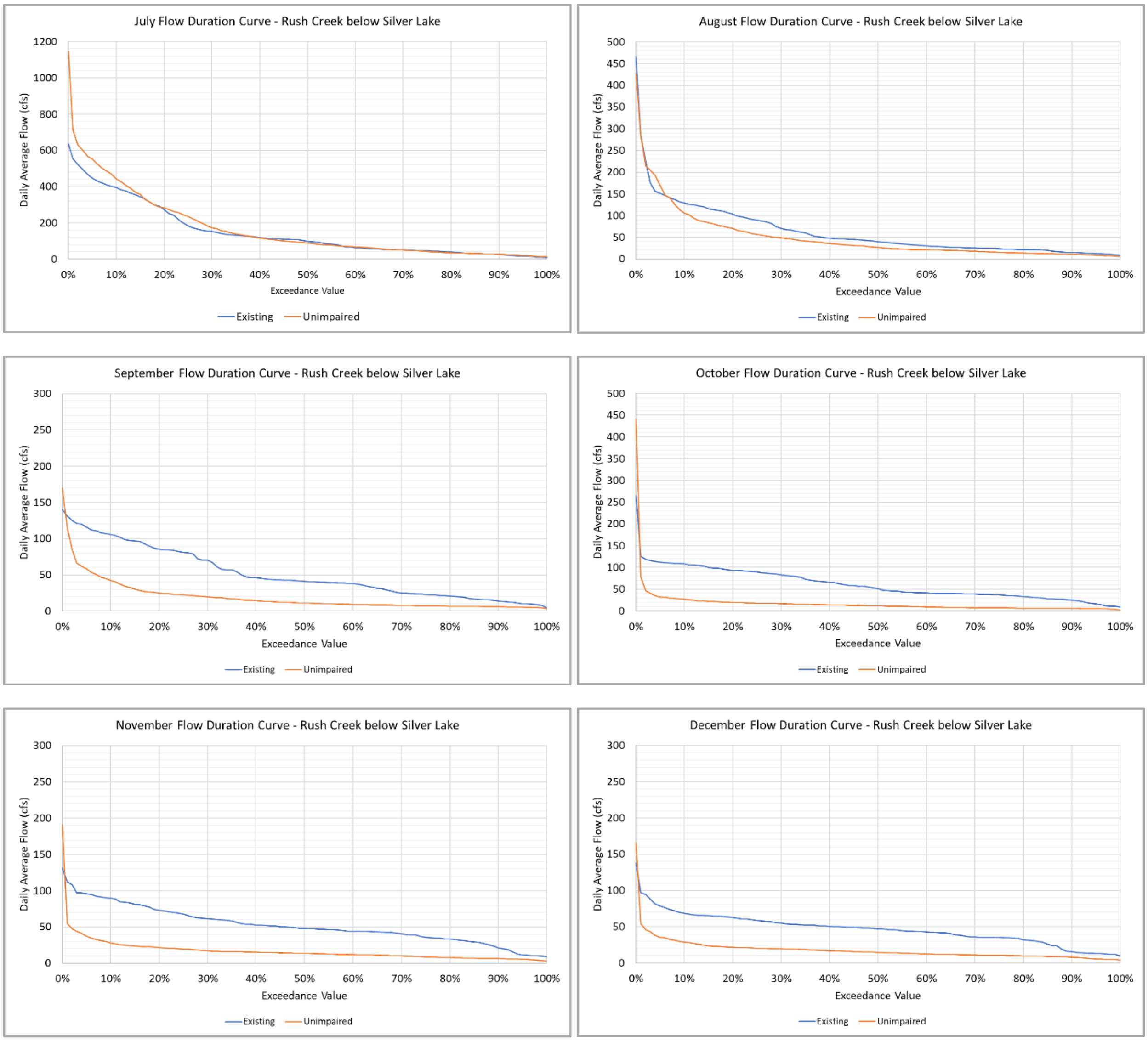

Figure B-4. Monthly Flow Duration Curves for Rush Creek below Silver Lake, Existing and Unimpaired Flows (July–December).

APPENDIX 4.3-C

Computed Natural Monthly Flow Duration Curves (1971–1985)

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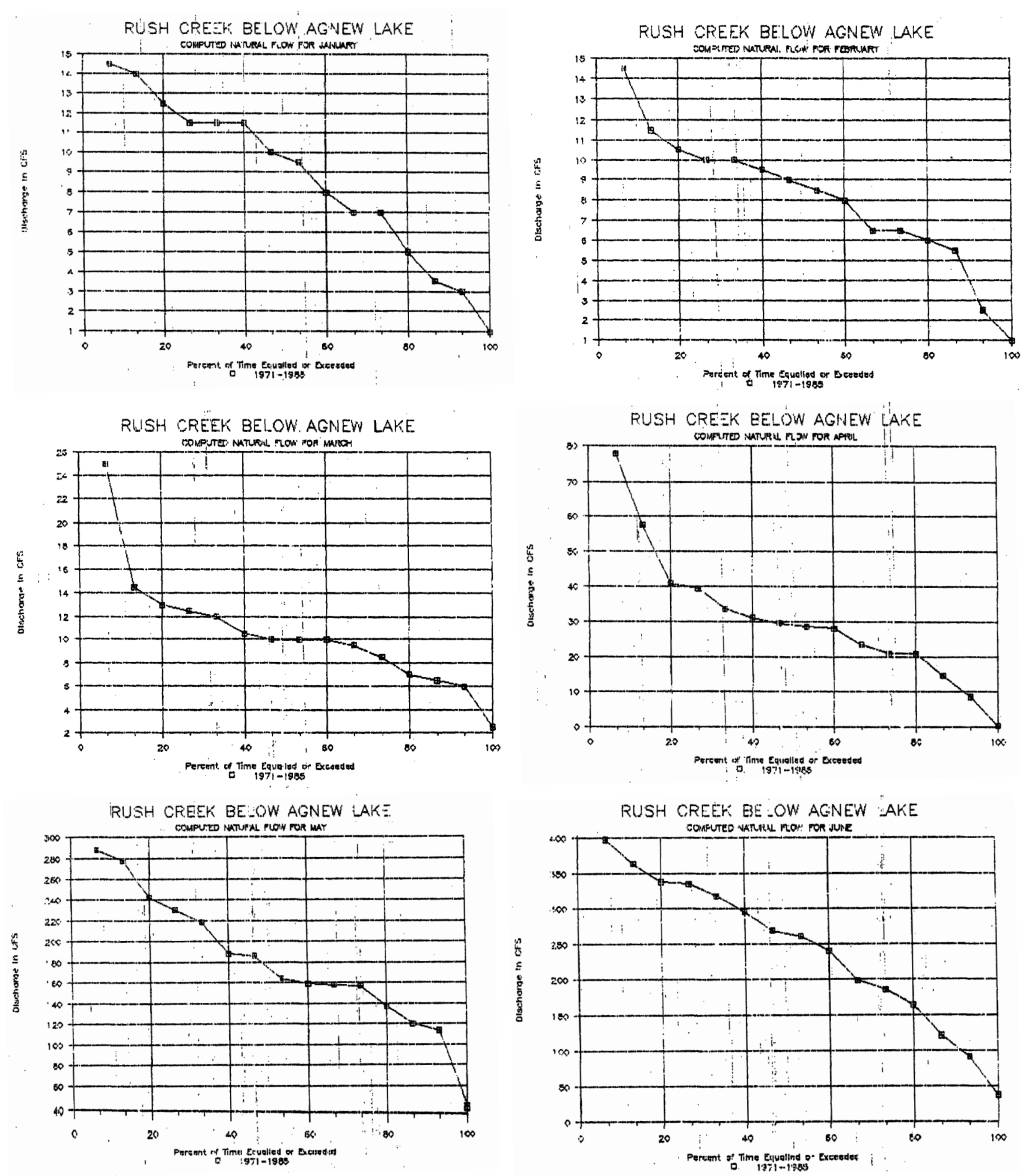

Figure C-1. Monthly Flow Duration Curves for Computed Natural Flow in Rush Creek below Agnew Dam (January–June, 1971–1985) (Lund 1988).

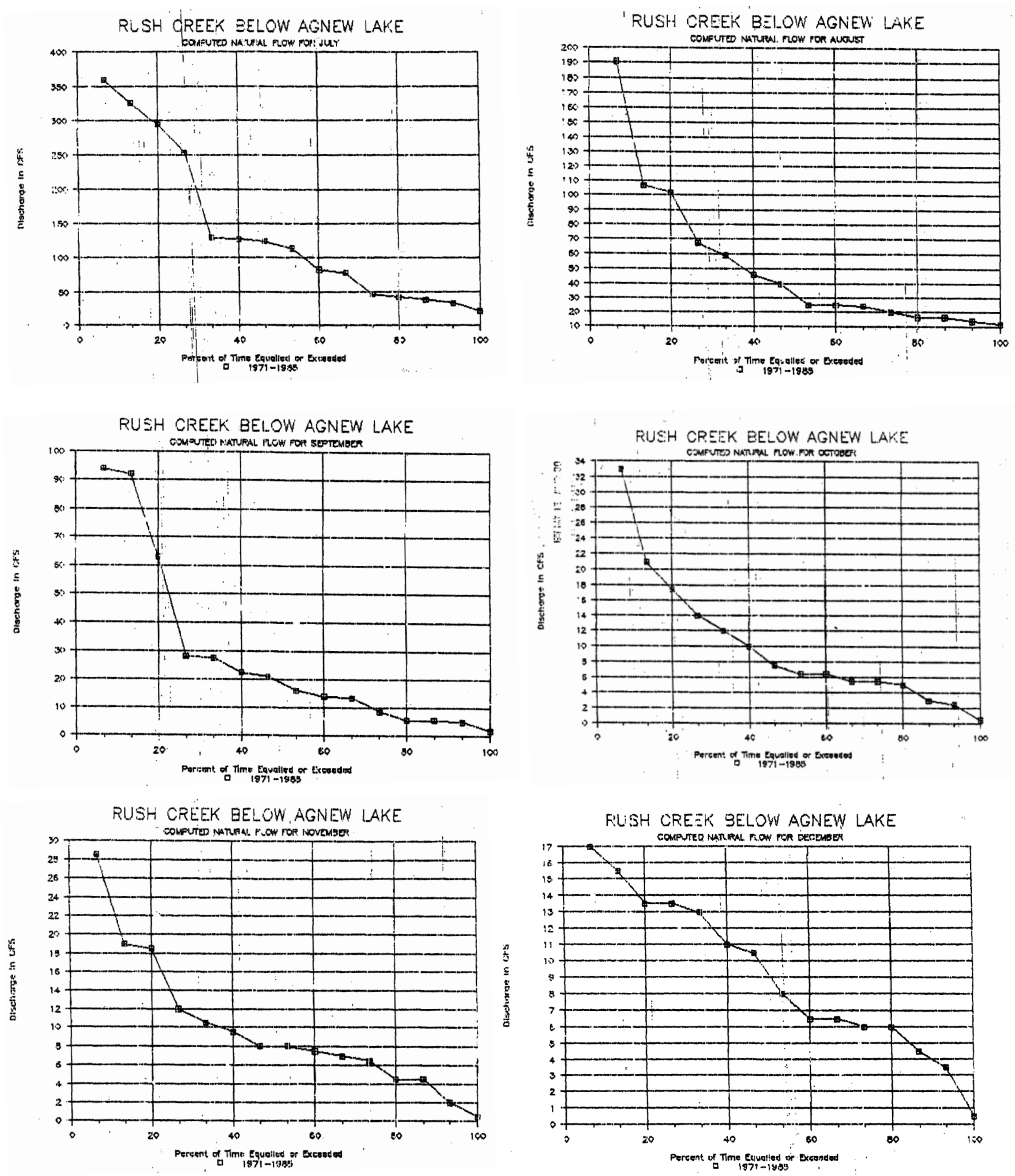

Figure C-1. Monthly Flow Duration Curves for Computed Natural Flow in Rush Creek below Agnew Dam (July–December) (1971–1985). (Lund 1988).

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LIST OF ACRONYMS

°C	Celsius
AWQC	Ambient Water Quality Criteria
CEDEN	California Environmental Data Exchange Network
CTR	California Toxics Rule
EA	Environmental Assessment
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
INF	Inyo National Forest
LADWP	Los Angeles Department of Water and Power
NTR	National Toxics Rule
Project	Rush Creek Project

RWQCB	Regional Water Quality Control Board
SCE	Southern California Edison Company
SWRCB	State Water Resources Control Board
TMDL	Total Maximum Daily Loads
USGS	United States Geological Survey

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4.4 WATER QUALITY

This section describes water quality in Rush Creek, as it relates to Southern California Edison Company's (SCE) Rush Creek Project (Project). The Federal Energy Regulatory Commission's (FERC) content requirements for this section are specified in Title 18 of the Code of Federal Regulations Chapter I § 5.6(d)(3)(iii).

The FERC regulations require information on both water quantity (water use and hydrology) and water quality for waters affected by the Project. This section presents information on water quality. Information on water quantity is addressed in Section 4.3, Water Use and Hydrology.

4.4.1 Information Sources

This section was prepared utilizing the following information sources:

- Water quality standards
  - California Toxics Rule (CTR) "Water Quality Standards: Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California" (Federal Register, 65 FR 31682, EPA 2000);
  - National Toxics Rule (NTR) Water Quality Standards: Establishment of Numeric Criteria for Priority Toxic Pollutants" (Federal Register, 57 FR 60848, EPA 1992); and
  - Water Quality Control Plan for the Lahontan Region (Basin Plan) (CRWQCB 2019).
- Previously published study reports and data
  - The United States Geological Survey's (USGS) National Water Information System and the California Environmental Data Exchange Network (CEDEN) online databases provided water quality information;
  - Draft Environmental Impact Report (EIR) for the Review of Mono Basin Water Rights of the City of Los Angeles (SWRCB 1993);
  - Environmental Assessment (EA) for Hydropower License, Rush Creek FERC Project No. 1389-001, California (FERC 1992); and
  - Effects of Flow, Reservoir Storage, and Water Temperatures on Trout in Lower Rush and Lee Vining Creeks, Mono County, California (Shepard et al. 2009).

4.4.2 Water Quality Standards

The State of California has responsibility for maintaining water quality standards through implementation of the Federal Clean Water Act. The Regional Water Quality Control Board (RWQCB) has established water quality objectives for specific beneficial water uses in the Water Quality Control Plan for the Lahontan Region (Basin Plan). The water quality objectives include both numeric and narrative standards for surface water that are based on criteria that protect both human health and aquatic life. If water quality is maintained at levels consistent with these objectives, beneficial uses are considered to be protected. Applicable water quality objectives and standards in the Basin Plan are provided in Table 4.4-1 through Table 4.4-3 (CRWQCB 2019).

The Basin Plan for chemical constituents provides numeric water quality objectives that are derived from various sources. These objectives include references to maximum contaminant levels that are provided in Title 22 of the California Code of Regulations which sets standards for waters designated for domestic or municipal use. Additional, and often more stringent criteria are provided by the CTR “Water Quality Standards: Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California” (Federal Register, 65 FR 31682, EPA 2000) and the NTR Water Quality Standards: Establishment of Numeric Criteria for Priority Toxic Pollutants” (Federal Register, 57 FR 60848, EPA 1992) to protect aquatic life, and human health. The CTR and NTR pertinent toxicity standards are provided in Table 4.4-1.

4.4.3 Basin Overview

The Rush Creek Basin has very limited development and private land. The primary residential / commercial development is in the June Lake Village area within the Reversed Creek sub-basin and in the Silver Lake area. The majority of the Basin is composed of federal lands within the Inyo National Forest (INF), which is under the jurisdiction of the United States Forest Service (Forest Service). A portion of the Rush Creek Project, the Rush Creek Powerhouse, is located on a parcel of SCE-owned lands. Waugh and Gem lakes are located within the Ansel Adams Wilderness; Agnew Lake is located on INF land (see Section 4.2, River Basin). Recreation of various types (camping, hiking, fishing, and skiing) is a primary land use in the Basin. Because of the limited development in the Basin and the nature of the Rush Creek Project (high mountain storage reservoirs and hydropower generation), water quality is good and there is limited potential for water quality issues.

Sources of water pollution such as stormwater runoff or wastewater treatment are limited. The June Lake Public Utility District provides wastewater treatment for most of the commercial and residential development in the Basin (e.g., June Lake Village, Down-Canyon between the village and Silver Lake, and the Forest Service Silver Lake Tract). In addition, service is provided on a contract basis to Forest Service Campgrounds, several parking facilities, and Grant Lake Marina. All wastewater flows to the main trunkline along State Route 158 and then to the wastewater treatment plant below Grant Lake adjacent to U.S. Highway 395. The wastewater is treated in evaporation ponds and no water returns to Rush Creek.

4.4.4 Existing Water Quality

4.4.4.1 Data

Water Quality

Water quality data measured in the vicinity of the Project and made available by the USGS and the CEDEN are provided in Table 4.4-4 through Table 4.4-8, and Table 4.4-9 through Table 4.4-10, respectively. Historic water quality sampling locations, identified by agencies, are shown on Map 4.4-1.

Water quality sampling was performed by the USGS in 1994 at three locations on Rush Creek, one location on Reversed Creek, and three locations in Silver Lake. This sampling included measurements of discharge, pH, specific conductance, dissolved oxygen, hardness, dissolved solids, ammonia, nitrates, nitrites, orthophosphate, phosphorus, and a number of other general water quality parameters. Temperature, pH, dissolved oxygen, and specific conductance profiles were measured at 1-meter increments at each of the three Silver Lake locations in 1994 (Table 4.4-5 through Table 4.4-8 and Figure 4.4-1 through Figure 4.4-3).

Additional water quality sampling was performed as part of the Surface Water Ambient Monitoring Program Perennial Stream Surveys in 2000, 2001, and 2011 at three locations on Rush Creek. The water quality parameters measured in these studies included most of the same parameters that were listed for the USGS water quality monitoring (Table 4.4-9)

Escherichia coli (*E. coli*) and fecal coliform sampling was conducted as part of the Eastern Sierra Ambient Monitoring at three locations on Rush Creek in 2012 and 2013 (Table 4.4-10).

The Rush Creek EA (FERC 1992) reported water quality data measured in Waugh, Gem, and Agnew lakes between July 1986 and August 1987. Ranges of measured temperature, pH, dissolved oxygen, electrical conductivity, calcium, bicarbonate for each site are provided in Table 4.4-11. Original measurements are provided in Appendix 4.4-A (Lund 1988).

Additional historical water quality data was reported for the Grant Lake Reservoir Outlet in the Mono Basin EIR that was assembled for the Mono Basin Water Rights Hearings before the California State Water Resources Control Board (SWRCB 1993). The EIR reported the mean, minimum, and maximum of all data sampled by the Los Angeles Department of Water and Power (LADWP) from 1940 to 1990 and data recorded in 1991 by Jones & Stokes Associates (Table 4.4-12).

Water Temperature

Water temperature grab samples were available for the USGS, CEDEN, and Rush Creek EA water quality samples for Rush Creek, Reversed Creek, Silver Lake, Waugh Lake, Gem Lake, and Agnew Lake (Table 4.4-4 through Table 4.4-9, Table 4.4-11).

Continuous water temperature data were collected at four locations on Rush Creek downstream of Grant Lake between October 1999 and October 2008 (Map 4.4-2). These sites were monitored to support a total maximum daily loads (TMDL) study to determine whether or not Rush Creek should be placed on the section 303(d) list for water temperature (Shepard et al. 2009). The daily average temperature for each of these sites is plotted in Figure 4.4-4.

4.4.4.2 Summary

Water Quality

Existing information sources indicate that the physical and water chemistry conditions in the streams and lakes/reservoirs associated with the Project are of high quality and conform to regulatory water quality objectives and standards. No persistent, widespread water quality issues were found. There is no agriculture or water treatment plants that discharge into Rush Creek. Physical and water chemistry conditions in Rush Creek upstream and downstream of the Project is of high quality.

A review of the water quality data from sample locations on Rush Creek and Reversed Creek indicates that, in general, all of the constituents analyzed have complied with current regulatory standards, with the exception of dissolved oxygen (Table 4.4-4). Dissolved oxygen dropped below 8 mg/L in July and September of 1994 at all the measurement locations along Rush Creek and Reversed Creek. These lower dissolved oxygen measurements reflect the reduced capacity of water to naturally carry oxygen at higher temperatures and elevations, rather than a specific water quality concern. The percent saturation of oxygen remained within a range of 90% to 102% for all samples, including those that dropped below the 8 mg/L standard.

Water quality samples in Silver Lake downstream of the Rush Creek Powerhouse also generally complied with current regulatory standards, based on data collected by the USGS, with three exceptions. An elevated orthophosphate reading on July 28, 1994, was likely an error since all other measurements on that date and in all of Silver Lake showed orthophosphate levels to be below the detection limit. Water quality data profiles collected on July 28, 1994, at Site 1 also showed pH levels that dropped just slightly below the lower limit of 6.5. A pH of 6.4 was recorded for one site at two locations in the water column. The dissolved oxygen profiles collected in Silver Lake during the summer/fall period also showed values of less than 8 mg/L (Table 4.4-5 through Table 4.4-6). Silver Lake becomes thermally stratified by June or earlier and as is typical in stratified systems, little mixing occurs between the epilimnion and hypolimnion (Figure 4.4-1). This results in naturally reduced oxygen levels in the hypolimnion. Oxygen levels in the epilimnion, although below 8 mg/L, are at or close to full saturation (Table 4.4-5).

Water quality samples in Waugh, Gem, and Agnew lakes were also generally of high quality (Table 4.4-11). High measurements of electrical conductivity, calcium, and bicarbonate occurred during August 1987; however, no specific details are available to further diagnose the cause of these high measurements. Low dissolved oxygen measurements occurred deep in the water column, likely due to reduced mixing in the hypolimnion.

<u>Water Temperature</u>

Typically, water temperatures below 20 degrees Celsius (°C) are suitable for cold water salmonid fishes (example rainbow trout, brown trout). Water temperature grab samples from the USGS, CEDEN, and Rush Creek EA indicated that Rush Creek and the Project reservoirs (Waugh, Gem, and Agnew) all have water temperatures suitable for cold water salmonids.

In the farthest downstream portion of Rush Creek, approximately 6% of the continuous water temperature measured at four locations downstream of Grant Lake (525 of 8,822 samples) exceeded the temperature objective for the water body (13°C – 21°C based on Moyle [1976]). Since this did not exceed the allowable frequency listed in Table 3.2 of the Listing Policy (SWRCB 2004), it was determined by RWQCB staff that the water body-pollutant combination should not be placed on the section 303(d) list because applicable water quality standards are not being exceeded.

4.4.5 References

CEDEN (California Environmental Data Exchange Network). Online Database. Available at: http://www.ceden.org/

CRWQCB (California Regional Water Quality Control Board) Lahontan Region. 2019. Water Quality Control Plan for the Lahontan Region, North and South Basins (Basin Plan). Revised October 2019. Available at: https://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/references.html.

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TABLES

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Table 4.4-1. Applicable Water Quality Objectives and Standards

Analyte	Units	State and Federal Criteria		
		Basin Plan[1]	CA Toxic Rule[2]	National Toxics Rule[3]
In-Situ Measurements				
Oxygen, dissolved	mg/L	8.0 (5.0)[4]	NS	NS
Secchi Depth	Meter	NS	NS	NS
pH	unitless	Change < 0.5	NS	6.5 – 9.0
Water Temperature	Fahrenheit	No Change	NS	NS
Specific Conductance	µS/cm	NS	NS	NS
General Parameters and Metals				
Alkalinity (as $CaCO_3$)	mg/L	NS	NS	>20[5]
Aluminum	mg/L	NS	NS	NS
Ammonia as NH_3	mg/L	See Table 4.4-2	NS	NS
Antimony	µg/L	NS	14	14
Arsenic – Total	µg/L	NS	150/340[6]	150/340[6]
Benzene	µg/L	NS	1.2	1.2
Beryllium	µg/L	NS	NS	NS
Bicarbonate (as $CaCO_3$)		NS	NS	NS
Boron – Total		See Table 4.4-3[7]	NS	NS
Cadmium	µg/L	NS	Hardness Dependent[6,8]	Hardness Dependent[6,8]
Calcium		NS	NS	NS
Carbonate (as $CaCO_3$)		NS	NS	>20[5]
Chemical Oxygen Demand		NS	NS	NS
Chloride	mg/L	See Table 4.4-3[7]	NS	NS

Analyte	Units	State and Federal Criteria		
		Basin Plan[1]	CA Toxic Rule[2]	National Toxics Rule[3]
Chlorine	mg/L	0.002[9]	NS	NS
Chlorophyll-a		NS	NS	NS
Chromium - Total	µg/L	NS	NS	NS
Cobalt		NS	NS	NS
Color		NS[10]	NS	NS
Copper – Total	mg/L	NS	1.3[11] and Hardness Dependent[6,8]	1.3[11] and Hardness Dependent[6,8]
Cryptosporidium		NS	NS	NS
Cyanide	µg/L	NS	5.2/22[6]	5.2/22[6]
Ethylbenzene	µg/L	NS	3,100	3,100
Fecal Coliform (3x5)	MPN/ 100 mL	20/100[12]	NS	NS
Fecal Streptococci		NS	NS	NS
Fluoride	mg/L	See Table 4.4-3[7]	NS	NS
Foaming Agents	mg/L	NS	NS	NS
Giardia		NS	NS	NS
Hardness (as $CaCO_3$)		NS	NS	>20[5]
Iron – Total	mg/L	NS	NS	NS
Lead – Total	µg/L	NS	Hardness Dependent[6,8]	Hardness Dependent [6,8]
Magnesium		NS	NS	NS
Manganese – Total	µg/L	NS	NS	NS
Mercury – Total	µg/L	NS	0.05	0.77/1.4[9]
Methyl mercury	mg/Kg fish	NS		0.3[13]
Methyl-tertiary-butyl Ether (MtBE)	µg/L	NS	NS	NS

Analyte	Units	State and Federal Criteria		
		Basin Plan[1]	CA Toxic Rule[2]	National Toxics Rule[3]
Nickel	µg/L	NS	610[11]; 4,600[14] and Hardness Dependent [6,10]	610[11]; 4,600[14] and Hardness Dependent [6,8]
Nitrate (NO_3)	mg/L	See Table 4.4-3[7]	NS	NS
Nitrite (as nitrogen)	mg/L	NS	NS	NS
Nitrogen- Total Kjeldahl (TKN)		See Table 4.4-3[7]	NS	NS
Odor		See Note[15]	NS	NS
Organic Carbon		NS	NS	NS
Orthophosphate (o-PO_4-P)		See Table 4.4-3[7]	NS	NS
Phosphorus		NS	NS	NS
Potassium		NS	NS	NS
Selenium	µg/L	NS	5[9]	Confirm no 5/20 5[6]
Silica		NS	NS	NS
Silver	µg/L	NS	Hardness Dependent [6,8]	Hardness Dependent [6,8]
Sodium		NS	NS	NS
Sulfate (SO_4)	mg/L	See Table 4.4-3[7]	NS	NS
Thallium	µg/L	NS	1.7[11], 6.3[14]	1.7[11], 6.3[14]
Toluene	µg/L	NS	6800[11], 200000[14]	6800[11], 200000[14]
Total Coliform (3x5, 6 hr hold)		NS	NS	NS
Total Dissolved Solids	mg/L	See Table 4.4-3[7]	NS	250000
Total Petroleum Hydrocarbons (as gasoline and as diesel)		NS	NS	Narr[16]
Total Suspended Solids		NS	NS	NS

Analyte	Units	State and Federal Criteria		
		Basin Plan[1]	CA Toxic Rule[2]	National Toxics Rule[3]
Turbidity	NTU	Var[17]	Narr[18]	NS
Xylenes – Total	μg/L	NS	NS	NS
Zinc – Total	mg/L	NS	Hardness Dependent[6]	Hardness Dependent[6]

Sources: EPA 1976, 1992, 1996, 2000, 2001, and 2007.

Notes: NS - no standard available
Var – Standard varies within Project affected reaches and Project reservoirs or for different conditions (See Associated Note)

[1] 1995 Water Quality Control Plan for the Lahontan Region (Basin Plan) [with amendments through 10/29/2019] provides narrative and numerical water quality objectives which define the upper concentration or other limits that the Regional Board considers protective of beneficial uses (CRWQCB 2019).

[2] California Toxics Rules are based primarily on USEPA standards developed under the Clean Water Act for human consumption of water and aquatic organisms with an adult risk for carcinogens estimated to be one in one million as contained in the Integrated Risk Information System (IRIS) as of October 1, 1996.

[3] The National Toxics Rules are based on USEPA standards developed under the Clean Water Act for human consumption of water and aquatic organisms with an adult risk for carcinogens estimated to be one in one million as contained in the IRIS as of October 1, 1996. These criteria are to be applied to all states not complying with the Clean Water Act section 303(c)(2)(B).

[4] For water designated as COLD or SPWN 1 Day Minimum: 8.0 (5.0) and 7 Day Mean: 9.5 (6.5). Note: These are water column concentrations recommended to achieve the required intergravel dissolved oxygen concentrations shown in parentheses. For species that have early life stages exposed directly to the water column (SPWN), the figures in parentheses apply. (Table 3.6 Water Quality Control Plan for the Lahontan Region (Basin Plan) Chapter III: Water Quality Objectives, pg. 3-24 October 29, 2019).

[5] 20 mg/L or more as $CaCO_3$ for freshwater aquatic life except where natural concentrations are less (USEPA's 1976 'Red Book). The 'Red Book' also recommends that natural alkalinity not be reduced by more than 25%.

[6] Freshwater Aquatic Life Protection, continuous concentration (4-day average)/maximum concentration (1-hour average).

[7] Where available data were sufficient to define existing ambient levels of constituents, these levels were used in developing the numerical objectives for specific water bodies. By utilizing annual mean, 90th percentile values and flow-weighted values, the objectives are intended to be realistic within the variable conditions imposed by nature. (Water Quality Control Plan for the Lahontan Region (Basin Plan) Chapter III: Water Quality Objectives, pg. 3-2 October 29, 2019).

[8] Criteria is expressed as a function of hardness and decreases as hardness decreases. The actual criteria is calculated based in the hardness (as $CaCO_3$) of the sample water.

[9] Median values shall be based on daily measurements taken within any six-month period.

[10] Waters shall be free of coloration that causes nuisance or adversely affects the water for beneficial uses. (Water Quality Control Plan for the Lahontan Region (Basin Plan) Chapter III: Water Quality Objectives, pg. 3-4 October 29, 2019).

[11] CTR and NTR human health (30-day average); Drinking Water Sources (consumption of water an aquatic organisms).

[12] The fecal coliform concentration during any 30-day period shall not exceed a log mean of 20/100 ml, nor shall more than 10 percent of all samples collected during any 30-day period exceed 40/100 ml. The log mean shall ideally be based on a minimum of not less than five samples collected as evenly spaced as practicable during any 30-day period. However, a log mean concentration exceeding 20/100 ml for any 30-day period shall indicate violation of this objective even if fewer than five samples were collected. (Water Quality Control Plan for the Lahontan Region (Basin Plan) Chapter III: Water Quality Objectives, pg. 3-4 October 29, 2019).

[13] This value is an Ambient Water Quality Criteria (AWQC) for methylmercury and was published by the U.S. EPA in a document titled Water Quality Criterion for the Protection of Human Health: Methylmercury – Final (EPA – 823-R-01-001, January 2001). This AWQC replaces the AWQC for total mercury published in 1980 and partially updated in 1997.

[14] CTR human health (30-day average); Other Waters (aquatic organism consumption only).

[15] Waters shall not contain taste or odor-producing substances in concentrations that impart undesirable tastes or odors to fish or other edible products of aquatic origin, that cause nuisance, or that adversely affect the water for beneficial uses. For naturally high-quality waters, the taste and odor shall not be altered. (Water Quality Control Plan for the Lahontan Region (Basin Plan) Chapter III: Water Quality Objectives, pg. 3-5 October 29, 2019).

[16] From Compilation of Water Quality Goals – TPH-diesel: taste and odor threshold and USEPA SNARL = 100 ug/L. TPH-gasoline: taste and odor threshold and proposed USEPA SNARL = 5 mg/L.

[17] Waters shall be free of changes in turbidity that cause nuisance or adversely affect the water for beneficial uses. Increases in turbidity shall not exceed natural levels by more than 10 percent.

[18] Increases in turbidity attributable to controllable water quality factors shall not exceed the following limits: where natural turbidity is between 0 and 5 NTU's, increases shall not exceed 1 NTU. Where natural turbidity is between 5 and 50 NTU's, increases shall not exceed 20%. Where natural turbidity is between 50 and 100 NTU's, increases shall not exceed 10 NTU's. Finally, where natural turbidity is greater than 100 NTU's, increases shall not exceed 10%.

Table 4.4-2. Applicable Water Quality Objectives and Standards for Ammonia

ONE-HOUR AVERAGE CONCENTRATION FOR AMMONIA[1,2]

Waters Designated as COLD, COLD with SPWN, COLD with MIGR (Salmonids or other sensitive coldwater species present)

	Temperature, C						
pH	0	5	10	15	20	25	30
Un-ionized Ammonia (mg/liter NH_3)							
6.50	0.0091	0.0129	0.0182	0.026	0.036	0.036	0.036
6.75	0.0149	0.021	0.030	0.042	0.059	0.059	0.059
7.00	0.023	0.033	0.046	0.066	0.093	0.093	0.093
7.25	0.034	0.048	0.068	0.095	0.135	0.135	0.135
7.50	0.045	0.064	0.091	0.128	0.181	0.181	0.181
7.75	0.056	0.080	0.113	0.159	0.22	0.22	0.22
8.00	0.065	0.092	0.130	0.184	0.26	0.26	0.26
8.25	0.065	0.092	0.130	0.184	0.26	0.26	0.26
8.50	0.065	0.092	0.130	0.184	0.26	0.26	0.26
8.75	0.065	0.092	0.130	0.184	0.26	0.26	0.26
9.00	0.065	0.092	0.130	0.184	0.26	0.26	0.26
Total Ammonia (mg/liter NH_3)							
6.50	35	33	31	30	29	20	14.3
6.75	32	30	28	27	27	18.6	13.2
7.00	28	26	25	24	23	16.4	11.6
7.25	23	22	20	19.7	19.2	13.4	9.5
7.50	17.4	16.3	15.5	14.9	14.6	10.2	7.3
7.75	12.2	11.4	10.9	10.5	10.3	7.2	5.2
8.00	8.0	7.5	7.1	6.9	6.8	4.8	3.5
8.25	4.5	4.2	4.1	4.0	3.9	2.8	2.1
8.50	2.6	2.4	2.3	2.3	2.3	1.71	1.28
8.75	1.47	1.40	1.37	1.38	1.42	1.07	0.83
9.00	0.86	0.83	0.83	0.86	0.91	0.72	0.58

[1] To convert these values to mg/liter N, multiply by 0.822

[2] Source: U. S. Environmental Protection Agency. 1986. Quality criteria for water, 1986. EPA 440/5-86-001.

FOUR DAY AVERAGE CONCENTRATION FOR AMMONIA[1,2]

Waters Designated as COLD, COLD with SPWN, COLD with MIGR (Salmonids or other sensitive coldwater species present)

	Temperature, °C						
pH	0	5	10	15	20	25	30
Un-ionized Ammonia (mg/liter NH_3)							
6.50	0.0008	0.0011	0.0016	0.0022	0.0022	0.0022	0.0022
6.75	0.0014	0.0020	0.0028	0.0039	0.0039	0.0039	0.0039
7.00	0.0025	0.0035	0.0049	0.0070	0.0070	0.0070	0.0070
7.25	0.0044	0.0062	0.0088	0.0124	0.0124	0.0124	0.0124
7.50	0.0078	0.0111	0.0156	0.022	0.022	0.022	0.022
7.75	0.0129	0.0182	0.026	0.036	0.036	0.036	0.036
8.00	0.0149	0.021	0.030	0.042	0.042	0.042	0.042
8.25	0.0149	0.021	0.030	0.042	0.042	0.042	0.042
8.50	0.0149	0.021	0.030	0.042	0.042	0.042	0.042
8.75	0.0149	0.021	0.030	0.042	0.042	0.042	0.042
9.00	0.0149	0.021	0.030	0.042	0.042	0.042	0.042
Total Ammonia (mg/liter NH_3)							
6.50	3.0	2.8	2.7	2.5	1.76	1.23	0.87
6.75	3.0	2.8	2.7	2.6	1.76	1.23	0.87
7.00	3.0	2.8	2.7	2.6	1.76	1.23	0.87
7.25	3.0	2.8	2.7	2.6	1.77	1.24	0.88
7.50	3.0	2.8	2.7	2.6	1.78	1.25	0.89
7.75	2.8	2.6	2.5	2.4	1.66	1.17	0.84
8.00	1.82	1.70	1.62	1.57	1.10	0.78	0.56
8.25	1.03	0.97	0.93	0.90	0.64	0.46	0.33
8.50	0.58	0.55	0.53	0.53	0.38	0.28	0.21
8.75	0.34	0.32	0.31	0.31	0.23	0.173	0.135
9.00	0.195	0.189	0.189	0.195	0.148	0.116	0.094

[1] To convert these values to mg/liter N, multiply by 0.822.

[2] Source: U. S. Environmental Protection Agency. 1992. Revised tables for determining average freshwater ammonia concentrations. USEPA Office of Water Memorandum, July 30, 1992.

Notes: Top Table: One-Hour Average
Bottom Table: Four-Day Average]. Source: Water Quality Control Plan for the Lahontan Region (Basin Plan) Chapter III: Water Quality Objectives, pg. 3-21, 3-22 Table 3-3 and Table 3-4 October 29, 2019

Table 4.4-3. Applicable Water Quality Objectives for Certain Water Bodies in Mono Basin

WATER QUALITY OBJECTIVES FOR CERTAIN WATER BODIES
MONO HYDROLOGIC UNIT

See Fig. 3-9	Surface Waters	Objective (mg/L)[1,2]							
		TDS	Cl	SO_4	F	B	NO_3-N	Total N	PO_4
1	Mono Lake	76,000 80,700	17,700 18,000	11,000 12,000	48 52	348 355	37 47	-	66 75
2	June Lake	200 225	-	-	-	-	-	0.3 0.5	0.06 0.08
3	Reversed Creek (Gull Lake Inlet)	130 160	-	-	-	-	0.1 0.1	0.4 1.0	0.24 0.34
4	Gull Lake	120 140	-	-	-	-	-	0.3 0.8	0.11 0.17
5	Reversed Creek (Silver Lake inlet)	100 130	-	-	-	-	0.1 0.1	0.2 0.4	0.16 0.35
6	Rush Creek (S.C.E. inlet)	41 60	-	-	-	-	0.1 0.1	0.1 0.2	0.02 0.07
7	Silver Lake	45 60	-	-	-	-	-	0.1 0.2	0.06 0.09
8	Rush Creek (Grant Lake inlet)	58 70	-	-	-	-	0.1 0.1	0.2 0.2	0.07 0.09
9	Grant Lake	37 46	2.0 4.0	4.0 8.0	0.10 0.20	0.05 0.08	-	0.4 0.9	0.07 0.15

[1] Annual average value/90th Percentile Value

[2] Objectives are as mg/L and are defined as follows:

B	Boron
Cl	Chloride
F	Fluoride
N	Nitrogen, Total
NO_3-N	Nitrate as Nitrogen
SO_4	Sulfate
PO_4	Orthophosphate, Dissolved
TDS	Total Dissolved Solids (Total Filterable Residue)

Source: *Water Quality Control Plan for the Lahontan Region (Basin Plan) Chapter III: Water Quality Objectives, pg. 3-44, Table 3-16 October 29, 2019*

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Table 4.4-4. USGS Water Quality Monitoring in Rush Creek and Major Tributaries in the Vicinity of the Rush Creek Project

Sample Date	Temperature (deg C)	Discharge, cubic feet per second	pH, water, unfiltered, field, standard units	Specific conductance, water, unfiltered, microsiemens per centimeter at 25 degrees Celsius	Dissolved oxygen, water, unfiltered, milligrams per liter	Dissolved Oxygen, percent of saturation (Fresh water assuming barometric pressure of 750 mm Hg)	General Parameters: Ammonia, water, filtered, milligrams per liter as NH4	Bicarbonate, water, unfiltered, fixed endpoint (pH 4.5) titration, field, milligrams per liter	Calcium, water, filtered, milligrams per liter	Chloride, water, filtered, milligrams per liter	Fluoride, water, filtered, milligrams per liter	Hardness, water, milligrams per liter as calcium carbonate	Magnesium, water, filtered, milligrams per liter	Nitrate, water, filtered, milligrams per liter	Nitrite, water, filtered, milligrams per liter as nitrogen	Orthophosphate, water, filtered, milligrams per liter	Phosphorus, water, filtered, milligrams per liter as phosphorus	Potassium, water, filtered, milligrams per liter	Silica, water, filtered, milligrams per liter as SiO2	Sodium, water, filtered, milligrams per liter	Sulfate, water, filtered, milligrams per liter	Dissolved solids, water, filtered, sum of constituents, milligrams per liter	Trace Elements: Boron, water, filtered, micrograms per liter	Iron, water, filtered, micrograms per liter	Manganese, water, filtered, micrograms per liter
USGS 10287300 RUSH C PP TAILRACE NR JUNE LAKE CA																									
Applicable Water Quality Objective or Standard	NS	NS	6.5-9.0	NS	Meet or exceed 8.0	NS	Min 0.86	NS	NS	NA	NS	NS	NS	0.1	NS	0.02/0.07[1]	NS	NS	NS	NS	NS	41/58[1]	NS	NS	NS
4/26/1994	3	38	6.8	19	9.6	92%	0.01	15	1.9	0.7	0.1	5.61	0.21	0.05	0.01	0.031	0.01	0.3	3.7	0.9	1.1	16	10	13	9
6/7/1994	9.9	34	7.4	20	8.5	98%	0.02	8	2.2	0.6	0.1	6.4	0.22	0.05	0.01	0.031	0.01	0.3	5	0.9	1.1	14	10	3	9
7/27/1994	16	24	7.5	14	7.5	99%	0.03	7	1.5	0.3	0.1	4.4	0.16	0.05	0.01	0.031	0.01	0.2	3.1	0.7	0.7	10	10	8	1
7/27/1994	16	24	7.5	14	7.5	99%	0.02	7	1.5	0.3	0.1	4.36	0.15	0.05	0.01	0.031	0.01	0.2	3.1	0.7	0.7	10	10	15	1
9/6/1994	15	24	7.9	17	7	90%	0.01	7	1.6	0.4	0.1	4.65	0.16	0.05	0.01	0.031	0.01	0.3	3	0.7	0.6	10	10	8	1
9/6/1994	15	24	7.9	15	7	90%	0.01	7	1.6	0.3	0.1	4.61	0.15	0.05	0.01	0.031	0.01	0.3	3	0.7	0.6	10	10	4	1
10/11/1994	11	22	6.8	13	8.4	99%	0.02	5	1.4	0.3	0.1	4.07	0.14	0.05	0.01	0.031	0.01	0.2	2.6	0.7	0.7	9	10	4	1
USGS 374557119071401 RUSH C A HWY 158 NR JUNE LAKE CA																									
Applicable Water Quality Objective or Standard	NS	NS	6.5-9.0	NS	Meet or exceed 8.0	NS	Min 0.86	NS	NS	NA	NS	NS	NS	0.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
4/26/1994	1.5	1.9	8.2	174	10	92%	0.01	92	27	2.1	0.1	75.7	2	0.05	0.01	0.031	0.01	1.3	15	3	7.2	103	50	7	2
6/7/1994	8.7	1.3	8.5	211	8.9	99%	0.02	112	34	3.6	0.1	94.8	2.4	0.05	0.01	0.031	0.01	1.5	17	3.7	7.5	127	50	3	2
7/27/1994	20	0.06	8.2	273	6.8	96%	0.02	144	42	12	0.2	118	3.1	0.05	0.01	0.031	0.01	1.8	17	8.5	4.7	160	0	3	2
USGS 374553119070101 REVERSED C A DREAM MTN RD NR JUNE LAKE CA																									
Applicable Water Quality Objective or Standard	NS	NS	6.5-9.0	NS	Meet or exceed 8.0	NS	Min 0.86	NS	NS	NA	NS	NS	NS	0.1	NS	0.16/0.35[1]	NS	NS	NS	NS	NS	100/130[1]	NS	NS	NS
4/25/1994	4	6.2	7.8	91	9.4	93%	0.01	47	11	1.4	0.1	32.8	1.3	0.05	0.01	0.031	0.01	1.6	27	3.7	4.6	74	10	81	8
6/7/1994	5.2	NA	7.6	NA	9.6	98%	0.02	22	NA	NA	NA	NA	NA	0.05	0.01	0.031	0.01	NA	NA	NA	NA	NA	NA	NA	NA
6/7/1994	5.2	14	7.6	49	9.6	98%	0.02	22	6	0.3	0.1	17.9	0.71	0.05	0.01	0.031	0.01	0.8	17	1.8	3.6	41	10	23	4
7/27/1994	12	2.9	8	98	8.1	98%	0.02	52	13	0.5	0.1	39.1	1.6	0.056	0.01	0.031	0.01	1.2	31	3.4	5	82	10	30	3
9/6/1994	13	1.4	8	114	7.9	97%	0.02	61	16	0.7	0.2	47.4	1.8	0.055	0.01	0.061	0.01	1.7	36	4	4.9	96	10	36	4
10/11/1994	8.5	2.8	7.5	112	8.5	94%	0.02	58	16	0.7	0.1	47.8	1.9	0.05	0.01	0.031	0.01	1.7	35	4.2	6.8	95	10	50	5
USGS 10287400 RUSH C AB GRANT LK NR JUNE LK CA																									
Applicable Water Quality Objective or Standard	NS	NS	6.5-9.0	NS	Meet or exceed 8.0	NS	Min 0.86	NS	NS	NA	NS	NS	NS	0.1	NS	0.07/0.09[1]	NS	NS	NS	NS	NS	58/70[1]	NS	NS	NS
4/26/1994	8	60	7.6	53	9	98%	0.01	23	6.5	1.1	0.1	18.7	0.61	0.05	0.01	0.031	0.01	0.7	8.3	2	2.8	33	20	16	4
6/7/1994	13.8	78	8	48	8.1	102%	0.02	23	6.2	0.9	0.1	17.6	0.51	0.05	0.01	0.031	0.01	0.6	8	1.5	3.4	32	10	12	5
7/27/1994	22	30	7.9	39	6.5	97%	0.02	18	4.9	0.6	0.1	14	0.44	0.05	0.01	0.031	0.01	0.5	6.8	1.4	2.3	26	20	15	3
9/6/1994	19	25	7.8	41	7.3	102%	0.02	20	5.1	0.6	0.1	14.6	0.46	0.05	0.01	0.031	0.01	0.6	6.7	1.4	2	27	10	15	5
10/11/1994	14.8	31	7.2	41	8	103%	0.02	19	5.5	0.6	0.1	15.8	0.5	0.05	0.01	0.031	0.01	0.5	7.3	1.5	2.6	28	20	24	11

Notes: Green Highlight – Measurements that exceed the applicable water quality objective or standard

[1] Annual Average Value/90th Percentile Value

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Table 4.4-5. USGS Water Quality Monitoring in Silver Lake downstream of the Rush Creek Project

Sample Date	Sample Time	Temperature, water, degrees Celsius	Specific conductance, water, unfiltered, microsiemens per centimeter at 25 degrees Celsius	Sampling depth, meters	Dissolved oxygen, water, unfiltered, milligrams per liter	Dissolved oxygen, water, unfiltered, percent of saturation	pH, water, unfiltered, field, standard units	Acid neutralizing capacity, water, unfiltered, inflection-point titration method (incremental titration method), field, milligrams per liter as calcium carbonate	Bicarbonate, water, unfiltered, inflection-point titration method (incremental titration method), field, milligrams per liter	Total nitrogen [nitrate + nitrite + ammonia + organic-N], water, unfiltered, milligrams per liter	Total nitrogen [nitrate + nitrite + ammonia + organic-N], water, filtered, milligrams per liter	Organic nitrogen, water, unfiltered, milligrams per liter as nitrogen	Organic nitrogen, water, filtered, milligrams per liter as nitrogen	Ammonia (NH3 + NH4+), water, filtered, milligrams per liter as nitrogen	Nitrite, water, filtered, milligrams per liter as nitrogen	Nitrate, water, filtered, milligrams per liter as nitrogen	Nitrate plus nitrite, water, filtered, milligrams per liter as nitrogen	Orthophosphate, water, filtered, milligrams per liter as PO4	Phosphorus, water, unfiltered, milligrams per liter as phosphorus	Phosphorus, water, filtered, milligrams per liter as phosphorus	Hardness, water, milligrams per liter as calcium carbonate	Calcium, water, filtered, milligrams per liter	Magnesium, water, filtered, milligrams per liter	Sodium, water, filtered, milligrams per liter	Potassium, water, filtered, milligrams per liter	Chloride, water, filtered, milligrams per liter	Sulfate, water, filtered, milligrams per liter	Fluoride, water, filtered, milligrams per liter	Silica, water, filtered, milligrams per liter as SiO2	Boron, water, filtered, micrograms per liter	Iron, water, filtered, micrograms per liter	Manganese, water, filtered, micrograms per liter	Dissolved solids, water, filtered, sum of constituents, milligrams per liter	Chlorophyll a, phytoplankton, chromatographic-fluorometric method, micrograms per liter	Chlorophyll b, phytoplankton, chromatographic-fluorometric method, micrograms per liter
Applicable Water Quality Objective or Standard		NS	NS	-	8	NS	NS	NS	NS	NS	NS	NS	NS	0.83	NS	NS	NS	0.06/ 0.09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	45/60	NS	NS
Silver Lake Site 1 - USGS 374643119073701																																			
4/27/1994	15:10	6.5	42	1	9.6	103	6.9	18	22	< 0.75	< 0.25	0.68	< 0.18	0.02	< 0.010	< 0.050	< 0.050	< 0.031	0.03	< 0.01	16.8	5.8	0.57	1.9	0.6	1.1	2.5	< 0.10	7.3	20	5	2	31	0.9	< 0.1
4/27/1994	15:20	6.2	43	10	9.4	100	7	17	21	< 0.75	< 0.25	0.68	< 0.18	0.02	< 0.010	< 0.050	< 0.050	< 0.031	0.03	< 0.01	16.5	5.7	0.55	1.9	0.6	1.5	2.5	< 0.10	7.3	20	17	1	30		
6/9/1994	8:55	12.2	39	1	8.4	101	6.5	17	21	< 0.25	< 0.25	< 0.17	< 0.17	0.03	< 0.010	< 0.050	< 0.050	< 0.031	< 0.01	0.02	16	5.6	0.48	1.3	0.6	0.8	3.1	< 0.10	7.5	< 10	11	3	30	< 0.1	< 0.1
6/9/1994	9:01	10.7	39	6	8.7	101	6.8																											0.9	0.3
6/9/1994	9:11	8.3	42	13	7.7	85	6.9	18	22	< 0.25	< 0.25	< 0.17	< 0.17	0.03	< 0.010	< 0.050	< 0.050	< 0.031	< 0.01	< 0.01	16.6	5.8	0.51	1.4	0.6	1	3.1	< 0.10	7.8	< 10	9	< 1.00	31		
6/9/1994	9:20	12.2	39	1	8.4	101	6.5	17	21	< 0.25	< 0.25	< 0.18	< 0.18	0.02	< 0.010	< 0.050	< 0.050	< 0.031	< 0.01	< 0.01	15.9	5.6	0.46	1.2	0.6	0.9	3.1	< 0.10	7.3	10	10	3	30		
7/28/1994	9:39	18.7	29	1	6.9	96	6.4	13	15	< 0.55	< 0.25	0.47	0.17	0.03	< 0.010	< 0.050	< 0.050	0.153	0.09	0.06	11.2	3.9	0.36	1.2	0.4	0.5	1.8	< 0.10	5.6	10	6	< 1.00	21	0.2	< 0.1
7/28/1994	9:51	17.2	31	6	7.2	97	6.7																											0.5	< 0.1
7/28/1994	9:55	14.3	45	9	7.9	100	6.6	17	20	< 0.45	< 0.25	0.38	< 0.18	0.02	< 0.010	< 0.050	< 0.050	< 0.031	0.03	0.02	16.5	5.8	0.5	1.7	0.5	0.9	2.6	< 0.10	7	10	5	14	29	0.7	< 0.1
7/28/1994	10:04	10.8	44	13.5	2.3	27	6.4	18	22	< 0.25	< 0.25	< 0.18	< 0.18	0.02	< 0.010	< 0.050	< 0.050	< 0.031	0.01	0.01	17.4	6.1	0.52	1.7	0.4	0.9	2.7	< 0.10	8	10	40	170	31		
10/13/1994	14:59	10.9	32	1	7.6	90	7.7	14	16	< 0.25	< 0.25	< 0.18	< 0.18	0.02	< 0.010	< 0.050	< 0.050	< 0.031	< 0.01	< 0.01	13.3	4.6	0.44	1.4	0.4	0.6	2.1	< 0.10	6.1	< 10	28	33	24	0.4	0.1
10/13/1994	15:04	10.9	32	6	7.6	90	7.5																											0.4	< 0.1
10/13/1994	15:11	10.9	32	13	7.6	90	7.4	14	17	< 0.25	< 0.25	< 0.18	< 0.18	0.02	< 0.010	< 0.050	< 0.050	< 0.031	0.04	< 0.01	13	4.6	0.44	1.4	0.5	0.6	2.1	< 0.10	6.2	20	55	44	24		
Silver Lake Site 2 - USGS 374638119072101																																			
4/26/1994	16:05	6.5	41	1	9.7	104	6.9	17	20	< 0.25	< 0.25	< 0.20	< 0.20	< 0.010	< 0.010	< 0.050	< 0.050	< 0.031	< 0.01	< 0.01	16.5	5.7	0.55	1.9	0.6	1.5	2.5	< 0.10	7.3	20	12	2	30	1.9	< 0.1
4/26/1994	16:15	6.1	41	10	9.8	104	7.1	17	21	< 0.25	< 0.25	< 0.20	< 0.20	< 0.010	< 0.010	< 0.050	< 0.050	< 0.031	< 0.01	< 0.01	16.2	5.6	0.55	1.9	0.6	1	2.4	< 0.10	7.4	20	18	3	30		
6/9/1994	9:59	12.2	38	1	8.4	101	7.3	16	20	< 0.25	< 0.25	< 0.18	< 0.18	0.02	< 0.010	< 0.050	< 0.050	< 0.031	0.01	< 0.01	15.6	5.5	0.46	1.3	0.6	0.8	3	< 0.10	7.5	10	10	3	29	< 0.1	< 0.1
6/9/1994	10:12	8.2	42	13	7.7	85	7.1	17	21	< 0.25	< 0.25	< 0.17	< 0.17	0.03	< 0.010	< 0.050	< 0.050	< 0.031	< 0.01	< 0.01	16.6	5.8	0.52	1.5	0.6	1	3	< 0.10	7.9	10	9	< 1.00	31		
7/28/1994	12:12	19.2	29	1	7.1	100	7	12	15	< 0.25	< 0.25	< 0.19	< 0.19	0.01	< 0.010	< 0.050	< 0.050	< 0.031	< 0.01	0.02	10.9	3.8	0.35	1.2	0.4	0.5	1.7	< 0.10	5.6	10	9	4	21	0.2	< 0.1
7/28/1994	12:24	15.6	40	7	7.3	95	6.9	14	17	< 0.25	< 0.25	< 0.18	< 0.18	0.02	< 0.010	< 0.050	< 0.050	< 0.031	0.02	< 0.01	12.6	4.4	0.4	1.4	0.4	0.6	1.9	< 0.10	6.2	< 10	8	6	24	0.9	< 0.1
7/28/1994	12:32	13	42	11	5.5	68	6.7	16	20	< 0.25	< 0.25	< 0.18	< 0.18	0.02	< 0.010	< 0.050	< 0.050	< 0.031	0.03	< 0.01	16.5	5.8	0.5	1.6	0.8	0.9	2.7	< 0.10	7.5	10	9	62	30		
10/13/1994	15:51	10.9	31	1	7.7	92	7.2	14	17	< 0.25	< 0.25	< 0.18	< 0.18	0.02	< 0.010	< 0.050	< 0.05	< 0.031	< 0.01	< 0.01	13.3	4.6	0.44	1.4	0.4	0.6	2	< 0.10	6.2	< 10	23	34	24	0.4	0.1
10/13/1994	16:00	10.8	32	10	7.6	90	7.2	13	16	< 0.25	< 0.25	< 0.18	< 0.18	0.02	< 0.010	< 0.050	< 0.05	< 0.031	0.02	0.01	13	4.5	0.43	1.4	0.4	0.6	2.1	< 0.10	6.2	10	26	33	24		
Silver Lake Site 3 - USGS 374628119072801																																			
4/27/1994	16:25	6.8	43	1	9.9	107	6.8	21	26	< 0.25	< 0.25	0.2	0.2	< 0.01	< 0.01	< 0.05	< 0.05	< 0.031	< 0.01	< 0.01	18	6.2	0.61	2.1	0.6	1.6	2.3	< 0.1	7.3	20	10	3	34	1.1	< 0.1
4/27/1994	16:33	6	39	8.5	10	106	7	18	22	< 0.25	< 0.25	0.2	0.2	< 0.01	< 0.01	< 0.05	< 0.05	< 0.031	< 0.01	< 0.01	16.8	5.8	0.56	1.9	0.6	1.1	2.4	< 0.1	7.2	20	12	3	30		
6/9/1994	11:37	12.7	38	1	8.4	102	7.6	16	20	< 0.25	< 0.25	0.18	0.18	0.02	< 0.01	< 0.05	< 0.05	< 0.031	< 0.01	< 0.01	15.7	5.5	0.47	1.3	0.6	0.8	3	< 0.1	7.4	10	10	2	29	< 0.1	< 0.1
6/9/1994	11:46	10.1	42	10	8.4	96	7.3	17	21	< 0.25	< 0.25	0.17	0.17	0.03	< 0.01	< 0.05	< 0.05	< 0.031	< 0.01	< 0.01	16.6	5.8	0.51	1.5	0.6	1	3.2	< 0.1	7.8	10	9	2	31		
7/28/1994	15:36	19.2	29	1	7.2	101	7.1	12	15	< 0.25	< 0.25	0.19	0.19	0.01	< 0.01	< 0.05	< 0.05	< 0.031	< 0.01	< 0.01	11.5	4	0.37	1.3	0.4	0.5	1.7	< 0.1	5.6	10		3	21	0.3	< 0.1
7/28/1994	15:47	16.3	36	7	7.5	99	7	13	16	< 0.25	< 0.25	0.28	0.18	0.02	< 0.01	< 0.05	< 0.05	< 0.031	0.02	< 0.01	14	4.9	0.44	1.5	0.5	0.8	2.2	< 0.1	6.2	20	< 3	9	24	0.7	< 0.1
7/28/1994	15:52	13.4	43	9.5	6.1	76	6.8	17	21	< 0.25	< 0.25	0.19	0.19	0.01	< 0.01	< 0.05	< 0.05	< 0.031	0.02	< 0.01	16.5	5.8	0.5	1.6	0.5	0.9	2.7	< 0.1	7.3	10	8	33	30	0.8	< 0.1
7/28/1994	15:53	13.4	43	9.5	6.1	76	6.8	17	21	< 0.25	< 0.25	0.18	0.18	0.02	< 0.01	< 0.05	< 0.05	< 0.031	< 0.01	< 0.01	16.5	5.8	0.49	1.6	0.5	0.8	2.7	< 0.1	7.2	10	4	32	29		

Notes: Green Highlight – Measurements that exceed the applicable water quality objective or standard

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Table 4.4-6. USGS Water Quality Monitoring Profiles at Silver Lake Site 1

Depth (m)	Temperature, water, degrees Celsius			
	Date			
	4/27/1994	6/9/1994	7/28/1994	10/13/1994
0	6.6	12.3	18.9	10.8
1	6.5	12.2	18.7	10.9
2	6.5	11.9	18.6	10.9
3	6.4	11.3	18.4	10.9
4	6.4	11.1	18	10.9
5	6.4	10.8	17.7	10.9
6	6.3	10.7	17.2	10.9
7	6.3	10.5	16	10.9
8	6.2	10.2	15.1	10.9
9	6.2	10.1	14.3	10.9
10	6.2	9.8	13	10.9
11		9	11.8	10.9
12		8.5	11.3	10.9
13		8.3	11	10.9
14		8.3		10.8

Depth (m)	pH, water, unfiltered, field, standard units			
	Date			
	4/27/1994	6/9/1994	7/28/1994	10/13/1994
0	6.9	6.5	6.5	8
1	6.9	6.5	6.4	7.7
2	6.9	6.6	6.6	7.7
3	7	6.7	6.6	7.6
4	7	6.7	6.6	7.6
5	7	6.8	6.7	7.6
6	7	6.8	6.7	7.5
7	7	6.9	6.6	7.5
8	7	6.9	6.6	7.5
9	7	6.9	6.6	7.4
10	7	6.9	6.6	7.4
11		6.9	6.5	7.6
12		6.9	6.5	7.4
13		6.9	6.4	7.4
14		6.8		7.4

Depth (m)	Dissolved oxygen, water, unfiltered, milligrams per liter			
	Date			
	4/27/1994	6/9/1994	7/28/1994	10/13/1994
0	9.6	8.4	6.9	7.6
1	9.6	8.4	6.9	7.6
2	9.6	8.4	7	7.6
3	9.7	8.6	7	7.6
4	9.7	8.6	7	7.6
5	9.7	8.7	7	7.6
6	9.6	8.7	7.2	7.6
7	9.6	8.8	7.4	7.6
8	9.5	8.6	7.3	7.6
9	9.4	8.4	7.9	7.6
10	9.4	8.4	5.5	7.6
11		8	3.9	7.4
12		7.8	3.2	7.6
13		7.7	2.8	7.6
14		7.7		7.5

Depth (m)	Specific conductance, water, unfiltered, microsiemens per centimeter at 25°C			
	Date			
	4/27/1994	6/9/1994	7/28/1994	10/13/1994
0	42	39	29	32
1	42	39	29	32
2	42	39	29	32
3	42	39	29	32
4	42	38	30	32
5	42	39	29	32
6	42	39	31	32
7	42	38	42	32
8	42	39	45	32
9	42	40	45	32
10	43	40	43	32
11		42	43	32
12		42	43	32
13		42	44	32
14		42		32

Notes: Green Highlight – Measurements that exceed the applicable water quality objective or standard

Table 4.4-7. USGS Water Quality Monitoring Profiles at Silver Lake Site 2

Depth (m)	Temperature, water, degrees Celsius			
	Date			
	4/26/1994	6/9/1994	7/28/1994	10/13/1994
0	6.5	12.6	19.4	10.8
1	6.5	12.2	19.2	10.9
2	6.4	12	18.6	10.9
3	6.4	11.6	18.4	10.9
4	6.4	11.2	18.2	10.9
5	6.4	11	17.6	10.9
6	6.3	10.8	16.8	10.9
7	6.3	10.3	15.6	10.8
8	6.3	10	14.9	10.9
9	6.3	9.8	14.2	10.8
10	6.1	9.2	13.3	10.8
11		9	13	10.5
12		8.7		
13		8.2		
14		8.1		

Depth (m)	pH, water, unfiltered, field, standard units			
	Date			
	4/26/1994	6/9/1994	7/28/1994	10/13/1994
0	6.9	7.3	7	7.3
1	6.9	7.3	7	7.2
2	6.9	7.3	7	7.2
3	6.9	7.3	7	7.2
4	6.9	7.3	7	7.2
5	7	7.3	7	7.2
6	7	7.3	7	7.2
7	7	7.3	6.9	7.2
8	7	7.3	6.8	7.2
9	7.1	7.2	6.8	7.2
10	7.1	7.2	6.7	7.2
11		7.2	6.7	7.2
12		7.1		
13		7.1		
14		7		

Depth (m)	Dissolved oxygen, water, unfiltered, milligrams per liter			
	Date			
	4/26/1994	6/9/1994	7/28/1994	10/13/1994
0	9.7	8.5	7.1	7.7
1	9.7	8.4	7.1	7.7
2	9.7	8.4	7.1	7.7
3	9.8	8.4	7.1	7.7
4	9.7	8.5	6.8	7.7
5	9.7	8.5	7	7.6
6	9.7	8.6	7.1	7.6
7	9.8	8.7	7.3	7.6
8	9.8	8.4	7.1	7.6
9	9.8	8.4	6.8	7.6
10	9.8	8.1	5.8	7.6
11		8	5.5	7.8
12		8		
13		7.7		
14		7.6		

Depth (m)	Specific conductance, water, unfiltered, microsiemens per centimeter at 25°C			
	Date			
	4/26/1994	6/9/1994	7/28/1994	10/13/1994
0	41	38	29	31
1	41	38	29	31
2	41	38	29	32
3	42	37	29	32
4	41	38	29	32
5	42	38	29	32
6	41	38	30	32
7	41	38	40	32
8	41	39	42	32
9	41	39	42	32
10	41	41	42	32
11		41	42	31
12		42		
13		42		
14		42		

Notes: Green Highlight – Measurements that exceed the applicable water quality objective or standard

Table 4.4-8. USGS Water Quality Monitoring Profiles at Silver Lake Site 3

Depth (m)	Temperature, water, degrees Celsius		
	Date		
	4/27/1994	6/9/1994	7/28/1994
0	6.7	13.3	19.4
1	6.8	12.7	19.2
2	6.7	12	18.6
3	6.8	11.6	18.5
4	6.8	11.3	18.2
5	6.7	10.9	17.8
6	6.7	10.6	17.4
7	6.6	10.4	16.3
8	6.1	10.3	15
9		10.3	13.7
10		10.1	13.3
11		9.7	13
12		8.5	

Depth (m)	pH, water, unfiltered, field, standard units		
	Date		
	4/27/1994	6/9/1994	7/28/1994
0	6.6	7.7	7
1	6.8	7.6	7.1
2	6.8	7.5	7.1
3	6.8	7.5	7.1
4	6.8	7.5	7.1
5	6.8	7.5	7.1
6	6.9	7.5	7.1
7	6.9	7.5	7
8	7	7.5	6.9
9		7.4	6.8
10		7.3	
11		7.3	
12		7.2	

Depth (m)	Dissolved oxygen, water, unfiltered,		
	Date		
	4/27/1994	6/9/1994	7/28/1994
0	9.9	8.5	7.3
1	9.9	8.4	7.2
2	9.9	8.5	7.1
3	9.9	8.6	7.1
4	9.8	8.6	7.2
5	9.8	8.8	7.2
6	9.8	8.8	7.2
7	9.8	8.9	7.5
8	10	8.8	7.3
9		8.7	6.3
10		8.4	
11		8.2	
12		7.6	

Depth (m)	Specific conductance, water, unfiltered,		
	Date		
	4/27/1994	6/9/1994	7/28/1994
0	43	38	29
1	43	38	29
2	43	39	29
3	43	38	29
4	43	38	29
5	44	38	30
6	42	38	30
7	42	40	36
8	40	40	45
9		40	44
10		42	
11		42	
12		46	

Notes: Green Highlight – Measurements that exceed the applicable water quality objective or standard

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Table 4.4-9. CEDEN Water Quality Monitoring in the Vicinity of the Rush Creek Project

Sample Date	Temperature (deg C)	Dissolved oxygen, water, unfiltered, milligrams per liter	pH, water, unfiltered, field, standard units	Specific conductance, water, unfilitered, microsiemens per centimeter at 25 degrees Celsius	General Parameters																
					AFDM_Algae, Particulate, grams per meter squared	Alkalinity, water, filtered, inflection, milligrams per liter as calcium carbonate	Calcium, water, filtered, milligrams per liter	Chloride, water, filtered, milligrams per liter	Chlorophyll a, Particulate, milligrams per meter squared	Hardness, water, milligrams per liter as calcium carbonate	Magnesium, water, filtered, milligrams per liter	Nitrate + Nitrite as N, water, filtered, milligrams per liter	Nitrogen, Total, milligrams per liter	Organic carbon, water, filtered, milligrams per liter	Orthophosphate, water, filtered, milligrams per liter	Phosphorus Total, water, filtered, milligrams per liter as phosphorus	Silica Dissolved, water, filtered, milligrams per liter as SiO2	Sulfate, water, filtered, milligrams per liter	Dissolved solids, water, filtered, sum of constituents, milligrams per liter	Suspended solids concentration, milligrams per liter	Trubidity, Total , NTU
Applicable Water Quality Objective or Standard	NS	Meet or exceed 5.0 for WARM; 7.0 for COLD	6.5-9.0	NS	NS	>20	NS	NS	NS	NS	NS	45	0.1/0.2	NS	0.02-0.07	NS	NS	NS	41-58	NS	NS
Rush Creek ~0.4mi below Walker Cr. (601PS0057) - Surface Water Ambient Monitoring Program (SWAMP Perennial Stream Surveys) - Statewide Perennial Streams Assessment 2011																					
9/14/2011	12.6	8.4			1.97			0.65	3.75	17.3		0.0067	0.108	0.84	0.0114	0.0249	10.8	4.21		1.5	0.5
Rush Cr, above HWY 395 (601RSH002) - SWAMP RWB6 Monitoring																					
7/26/2001	17.2	8.5	7.8	59.8		34	7		0.094	20	0.68	0.002	0.104		0.001	0.006	3.1	2.7			0.34
8/4/2010					2.50				2.59												
8/10/2010	17.5	7.2	7.7	44.6		28		0.98				0.005	0.098	0.79	0.003	0.009	9.04	2.7	28		0.44
Rush Cr, bottomlands (601RSH001) - SWAMP RWB6 Monitoring																					
8/2/2000	15	8.2	6.54	59		44	75		0.566	215	6.8	0.29				0.06	5.8	5.4			0.35

Notes: Green Highlight – Measurements that exceed the applicable water quality objective or standard

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Table 4.4-10. CEDEN *E. coli* and Fecal Coliform Monitoring in the Vicinity of the Rush Creek Project

Sample Date	E. coli (cfu/100mL)	Coliform, Fecal (cfu/100mL)
Applicable Water Quality Objective or Standard	NS	100
Rush Ck at Test Station Rd (RUS.80) - Eastern Sierra Ambient Monitoring		
9/26/2012	7	7
4/24/2013	2	2
5/30/2013	4	4
7/7/2013	8	10
7/30/2013	30	43
9/17/2013	6	6
Rush Ck at Hwy 395 (RUS.70) - Eastern Sierra Ambient Monitoring		
9/26/2012	9	37
7/7/2013	10	11
7/30/2013	4	6
9/17/2013	5	6
10/17/2013	1	1
Rush Ck at USGS gauge above Grant Reservoir (RUS.50) - Eastern Sierra Ambient Monitoring		
4/24/2013	1	1
5/30/2013	3	3
7/7/2013	3	4
7/30/2013	9	10
9/17/2013	6	6
10/17/2013	2	2

Notes: Green Highlight – Measurements that exceed the applicable water quality objective or standard

Table 4.4-11. Selected Water Quality Parameters for the Three Rush Creek Project Reservoirs, Measured between July 1986 and August 1987

Reservoir	Temperature (°C, range)	pH (range)	Dissolved Oxygen (% saturation, range)	Electrical Conductivity (µScM, range)	Calcium (CA) (µEg/L, range)	Bicarbonate (µEg/L, range)
Waugh Lake	6.2-15.7	6.2-7.5	22*-112	4.7-10.1	21-28.8	19-50
Gem Lake	0.3-16.4	6.4-7.5	25*-113	7.5-17.3	39.6-83.5	46-95
Agnew Lake	4.6-15.5	6.0-7.6	3*-120	16.1-219.1**	87.7-1,320.0**	101-2,034**

Source: Lund 1988; This table is a reproduction of Table 2 of FERC Environmental Assessment of Rush Creek, 1992 (FERC 1992)

Notes: Green Highlight – Measurements that exceed the applicable water quality objective or standard

* Low dissolved levels observed at deepest lake measurement during winter and late summer

** High observed during August 1987

Table 4.4-12. Water Quality Summary of Grant Lake Reservoir Outlet (1940–1991) Collected by LADWP and Jones & Stokes Associates

		Samples		Mean		Minimum		Maximum	
Variable	Units	LADWP	JSA	LADWP	JSA	LADWP	JSA	LADWP	JSA
Specific conductance	FS/cm	354	10	59	61	40	58	165	63
Total organic carbon	mg/l	2	10	0.9	2	0.8	ND	0.9	4
Color	units	351	10	6	5	0	ND	38	15
Turbidity	NTU	351	10	3.0	1	0.0	1	28	3
Total suspended solids	mg/l	0	10		4		ND		10
Total dissolved solids	mg/l	0	10		37		31		47
Alkalinity (as CaCo$_3$)	mg/l	353	10	18	22	10	20	31	26
Hardness (as CaCo$_3$)	mg/l	354	10	21	24	12	20	41	38
Calcium	mg/l	354	10	6.6	8	0.0	7	12	9
Magnesium	mg/l	353	10	1.0	1	0.0	1	5	1
Sodium	mg/l	354	10	2.7	2	0.0	2	10	3
Potassium	mg/l	345	10	0.7	1	0.0	1	4	1
Sulfate	mg/l	353	10	4.8	4	0.0	3	18	4
Chloride	mg/l	354	10	1.8	2	0.0	1	9.2	2
Silica	mg/l	352	10	6	6	1	5	20	7
Boron	mg/l	210	10	0.04	0	0.00	ND	0.33	0
Fluoride	mg/l	354	5	0.05	0	0.00	ND	0.40	ND
Bromide	mg/l	0	3		0		ND		ND
Ammonia (as N)	mg/l	0	10		0		ND		0
Total Kjeldahl nitrogen	mg/l	350	10	0.22	0	0.02	ND	0.96	ND
Nitrate (as N)	mg/l	342	10	0.06	0	0.00	ND	0.45	ND
Total phosphate	mg/l	0	10		0		ND		0
Dissolved phosphate	mg/l	174	0	0.025		0.000		0.490	
Silver	Fg/l	0	6		0		ND		ND
Aluminum	Fg/l	0	6		92		ND		230
Arsenic	Fg/l	90	6	10	ND	10	ND	20	ND
Barium	Fg/l	0	6		ND		ND		ND
Cadmium	Fg/l	0	6		0		ND		0
Chromium	Fg/l	0	6		ND		ND		ND
Copper	Fg/l	0	10		ND		ND		ND
Iron	Fg/l	353	10	38	45	0	ND	300	230
Mercury	Fg/l	0	6		ND		ND		ND
Manganese	Fg/l	0	10		13		ND		39
Lead	Fg/l	0	6		ND		ND		ND
Selenium	Fg/l	0	6		ND		ND		ND
Zinc	Fg/l	0	10		ND		ND		ND

Notes: LADWP sampling 1940-1990. Jones & Stokes Associates (JSA) sampling 1991.

Source: SWRCB 1993

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FIGURES

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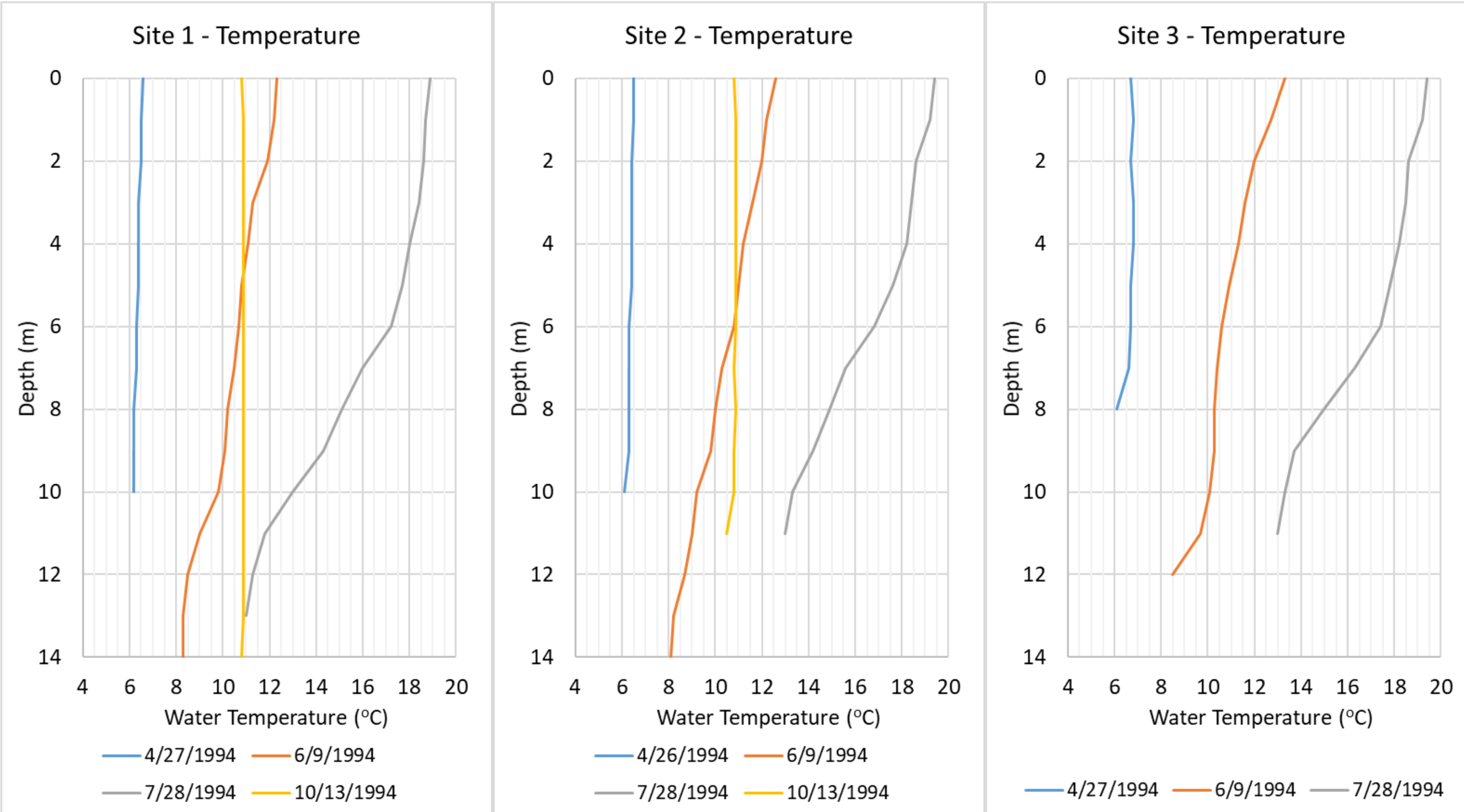

Figure 4.4-1. USGS Temperature Monitoring Profiles at Silver Lake Sites 1, 2 and 3

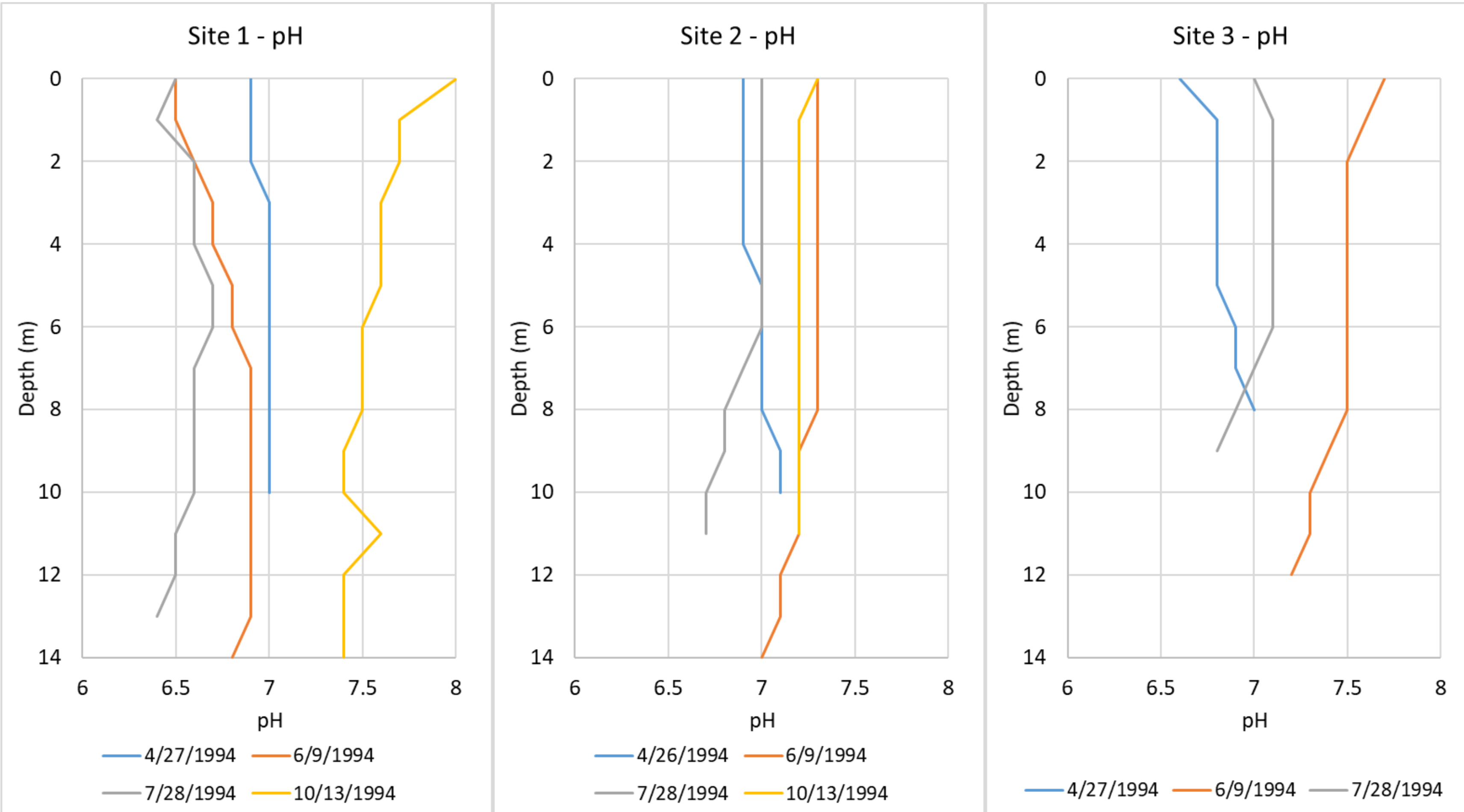

Figure 4.4-2. USGS pH Monitoring Profiles at Silver Lake Sites 1, 2 and 3

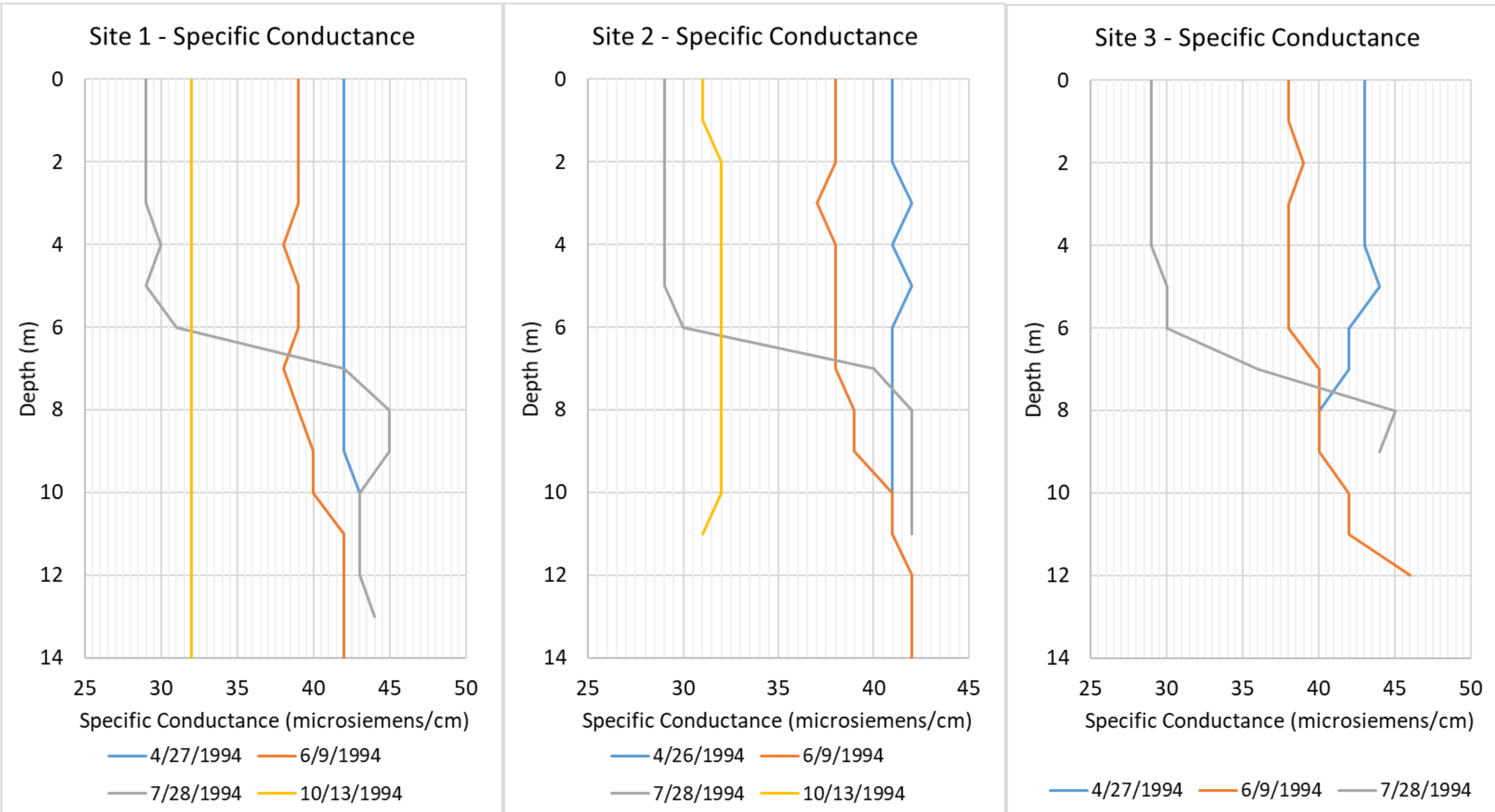

Figure 4.4-3. USGS Specific Conductance Monitoring Profiles at Silver Lake Sites 1, 2 and 3

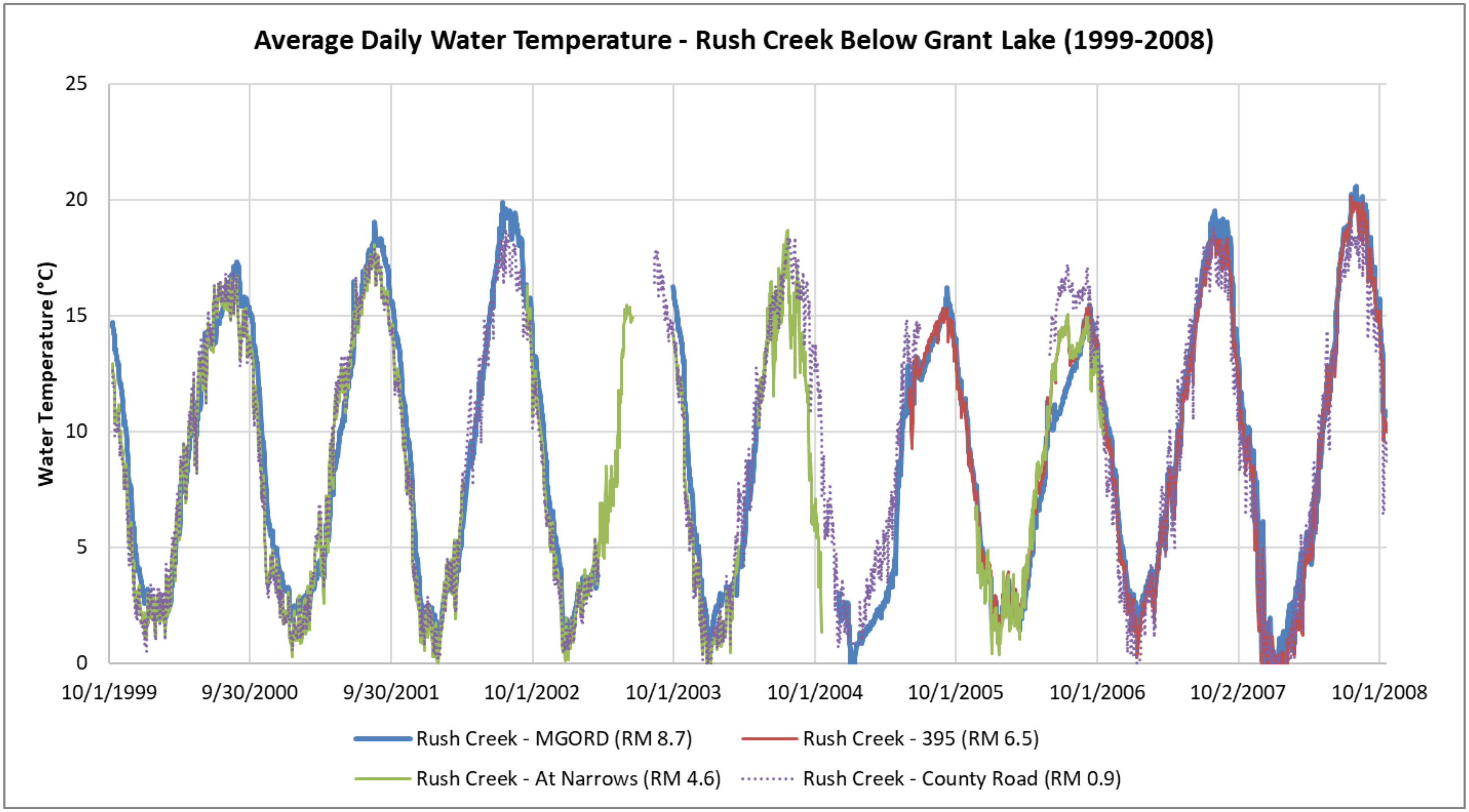

Figure 4.4-4. Daily average water temperatures measured at four locations on Rush Creek downstream of Grant Lake (1999–2008)

MAPS

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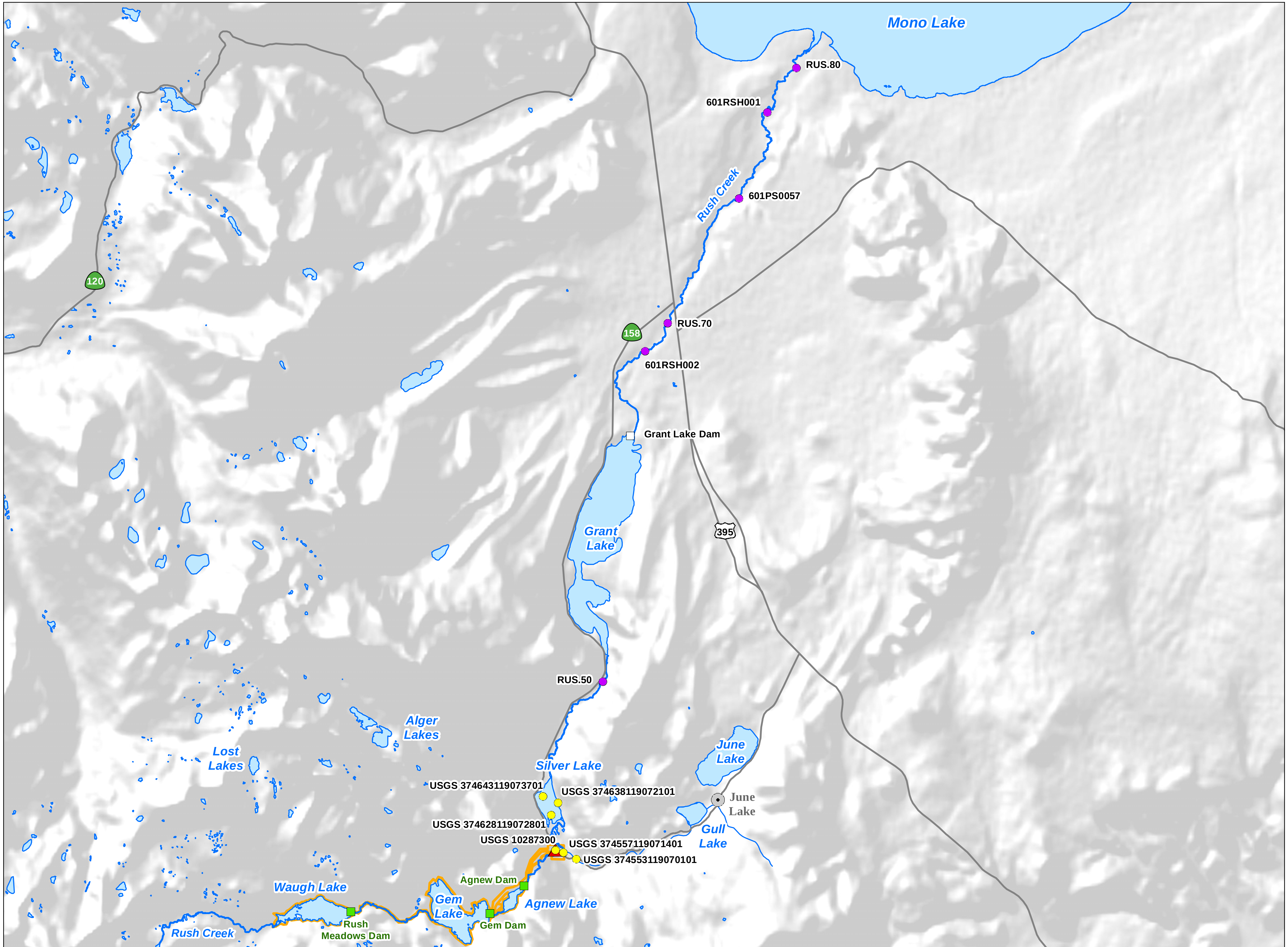

SCE Facilities

- Dam
- Powerhouse
- FERC Boundary

Other Features

- Other Dam
- City/Town
- Highway
- River/Stream
- Lake

Water Quality Monitoring Sites

- CDEN
- USGS

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Rush Creek Project (FERC 1389)

Map 4.4-1

Water Quality Monitoring Sites in the Vicinity of the Rush Creek Project

Date: 4/27/2021

0 0.5 1 Miles

Projection: UTM Zone 11
Datum: NAD 83

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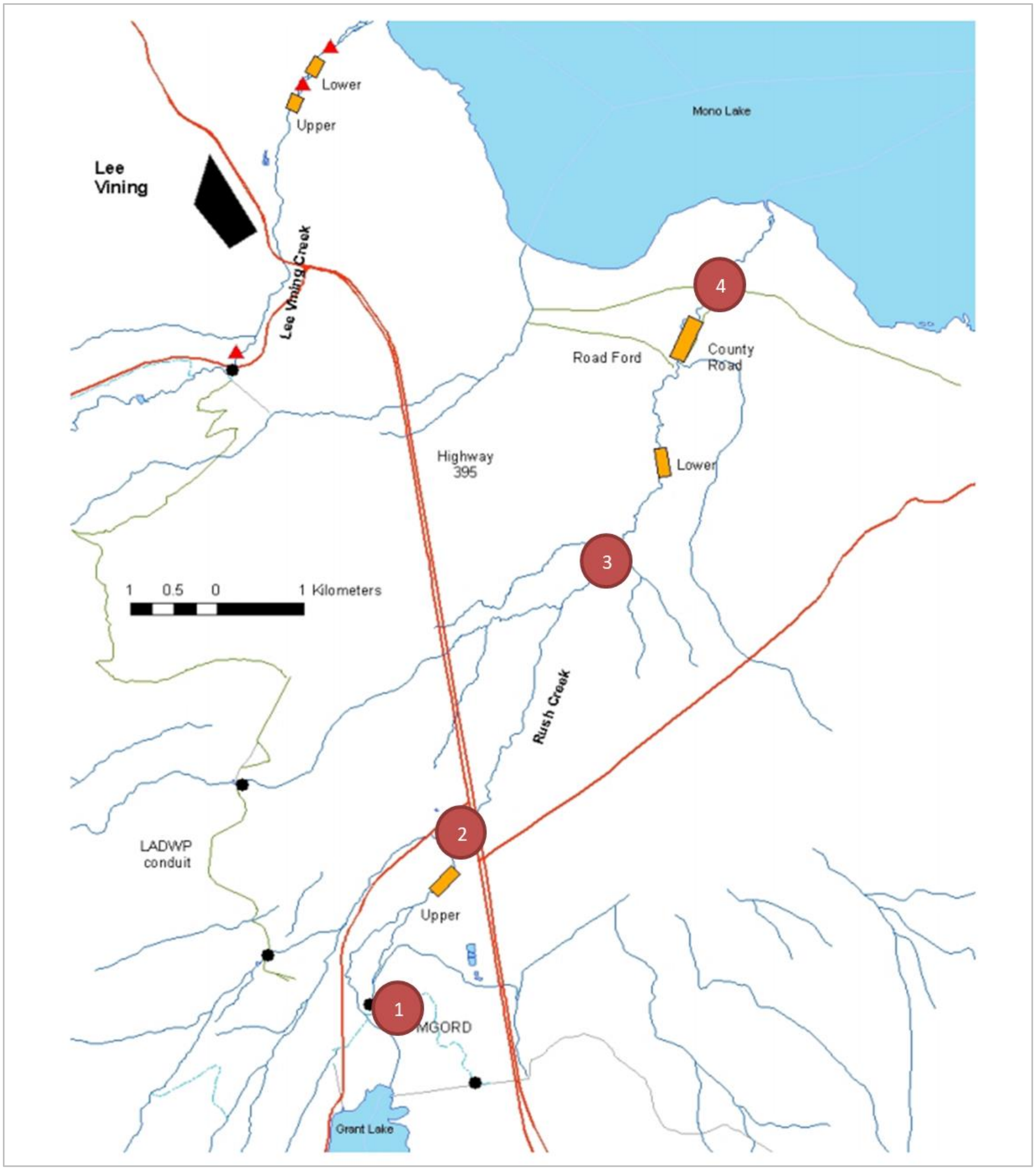

Source: Shepard et. al 2009

Map 4.4-2. Locations of Continuous Temperature Monitoring on Rush Creek Downstream of Grant Lake

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APPENDIX 4.4-A

Water Quality Data for Agnew, Gem and Waugh (1986–1987) (Lund 1988)

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Table A-1. Location of lakes and stream samples in this study (Lund 1988). (Originally Table 1)

DRAINAGE	LAKE	ELEVATION FT	LOCATION
Bishop Creek	South	9,751	118°34'W 37°10'N
	Sabrina	9,132	118°37'W 37°12'N
	Intake #2	8,099	118°35'W 37°15'N
Bishop Creek	Stream Tansect		
Rush Creek	Waugh	9,410	119°12'W 37°45'N
	Gem	9,048	119°09'W 37°45'N
	Agnew	8,492	119°08'W 37°45'N
Lee Vining Creek	Saddlebag	10,090	119°16'W 37°58'N
	Tioga	9,653	119°15'W 37°56'N
	Ellery	9,499	119°14'W 37°56'N
Mill Creek	Lundy	7,803	119°14'W 38°02'N

Table A-2. Field data for Agnew for five sampling dates in 1986 and 1987 (Lund 1988). (Originally Tables 3 and 4)

DATE	DEPTH M	TEMP C	PH	DISSOLVED OXYGEN MG/L	DISSOLVED OXYGEN % SAT
07/08/86	0.5	11.66	6.76	8.53	106.3
	3.5	11.41	7.09	8.42	104.4
	6.5	11.25	7.07	8.39	103.7
	9.5	11.05	7.12	8.39	103.2
	12.5	10.82	6.92	8.32	101.8
	15.5	10.76	6.89	8.29	101.3
	18.5	10.70	6.74	8.27	101.0
	21.5	4.58	6.06	3.71	39.6
	23.5	4.63	6.15	3.35	35.8
08/26/86	0.5	15.47	6.45	7.31	99.0
	3.5	15.16	6.80	7.27	97.8
	6.5	14.80	7.01	7.35	98.1
	9.5	14.56	6.88	7.45	99.0
	12.5	12.71	6.41	8.15	104.0
	15.5	11.85	6.30	7.46	93.4
	18.5	10.63	6.18	6.29	76.7
	21.5	7.51	5.95	3.68	41.9
	23.5	5.50	6.03	0.54	5.9
	24.3	5.29	6.15	0.27	2.9
10/08/86	0.5	7.77	6.87	8.77	100.4
	3.5	7.39	6.85	8.86	100.6
	6.5	7.14	6.84	8.47	95.7
	9.5	7.07	6.84	8.37	94.4
	12.5	7.03	6.84	8.27	93.2
	15.5	7.00	6.80	8.22	92.6
	18.5	6.96	6.77	8.18	92.0
	21.5	6.95	6.74	8.12	91.3
	23.6	6.95	6.69	8.01	90.1
06/29/87	0.0	14.9	--*	7.59	105
	0.5	14.7	--	7.51	103
	1.5	14.6	--	7.61	104
	2.5	14.6	--	7.50	103
	3.5	14.5	--	7.48	102
	4.5	14.5	--	7.53	103
	5.5	13.7	--	7.58	102
	6.5	12.5	--	8.17	107
	7.5	11.8	--	8.45	108
	8.5	11.4	--	8.66	110
	9.5	9.1	--	9.98	120
08/25/87	0.5	14.97	6.98	5.25	72
	2.5	14.57	7.12	4.30	59
	4.5	14.21	7.15	3.73	51
	6.5	14.04	7.21	3.35	45
	8.5	13.96	7.24	3.06	41
	10.5	13.82	7.25	2.82	38
	12.5	10.29	6.94	4.32	53
	14.5	7.59	6.75	5.56	64
	16.5	6.42	6.65	5.04	56
	18.5	5.66	6.57	4.73	52
	20.5	5.19	6.49	4.50	47
	22.5	4.98	6.42	3.91	42
	24.4	4.89	6.40	3.46	37

* Field instrument not operational.

Table A-3. Field data for Gem for six sampling dates in 1986 and 1987 (Lund 1988). (Originally Tables 7 and 8)

DATE	DEPTH	TEMP	PH	DISSOLVED OXYGEN	
	M	C		MG/L	% SAT
07/08/86	0.5	11.67	6.78	8.66	109.3
	3.5	10.79	6.90	8.67	107.4
	6.5	10.60	7.05	8.73	107.7
	9.5	10.19	7.01	8.91	108.9
	12.5	9.53	6.99	9.14	110.1
	15.5	8.11	7.04	9.65	112.7
	18.5	6.31	7.04	9.70	108.9
	21.5	5.02	6.93	9.47	103.4
	24.5	4.42	6.88	9.09	98.0
	28.4	4.08	6.82	8.90	95.2
08/26/86	0.5	16.44	6.45	7.62	106.8
	3.5	15.99	6.59	7.42	103.0
	6.5	15.92	6.64	7.34	101.7
	9.5	15.82	6.69	7.34	101.5
	12.5	15.64	6.70	7.38	101.6
	15.5	13.53	6.74	8.30	109.1
	18.5	6.67	6.77	9.72	110.0
	21.5	5.39	6.75	9.66	106.3
	24.5	4.77	6.68	9.26	100.6
	29.1	4.16	6.63	8.62	92.4
10/08/86	0.5	8.89	7.15	8.25	98.0
	1.0	8.88	7.15	8.20	97.4
	1.5	8.88	7.18	8.19	97.3
	2.0	8.87	7.17	8.20	97.4
	2.5	8.86	7.14	8.15	96.8
	3.0	8.82	7.13	8.18	97.0
	3.5	8.77	7.14	8.14	96.5
	4.0	8.74	7.13	8.16	96.6
	4.5	8.73	7.11	8.16	96.6
	5.0	8.71	7.10	8.06	95.4
	5.5	8.71	7.10	8.06	95.4
	6.0	8.67	7.10	8.14	96.3
	6.5	8.65	7.10	8.09	95.6
	7.0	8.64	7.09	8.15	96.3
	7.5	8.61	7.10	8.17	96.5
	8.0	8.59	7.09	8.07	95.3
	8.5	8.57	7.08	8.19	96.6
	9.0	8.53	7.08	8.20	96.7
	9.5	8.51	7.07	8.16	96.2
	10.0	8.48	7.06	8.18	96.3
	10.5	8.45	7.06	8.19	96.4
	11.0	8.38	7.05	8.11	95.3
	11.5	8.33	7.05	8.20	96.2
	12.0	8.28	7.04	8.22	96.4
	15.0	8.00	7.02	8.42	98.1
	18.0	7.05	6.95	8.98	102.5
	21.0	5.14	6.89	9.51	104.1
	24.0	4.25	6.85	9.38	100.7
	27.0	3.92	6.80	8.84	94.2
	27.9	3.88	6.76	8.14	86.7
03/25/87	0.5	0.40	--*	9.20	88
	1.0	0.30	--	9.40	90
	4.0	2.30	--	8.60	88
	7.0	2.60	--	8.40	86
	10.0	2.90	--	8.00	83
	13.0	3.30	--	7.70	81
	16.0	3.50	--	7.50	79
	19.0	3.60	--	7.40	78
	22.0	3.60	--	7.30	77
	25.0	3.70	--	7.00	74
	28.0	3.70	--	6.80	72
	31.0	3.70	--	6.30	67
	34.0	3.70	--	6.00	64
	37.0	3.70	--	4.10	44
	40.0	3.70	--	3.90	41
	43.0	3.70	--	3.20	34
	46.0	3.70	--	2.90	31
06/29/87	0.0	15.10	--	6.98	99
	0.5	15.00	--	6.85	97
	4.5	14.30	--	6.94	97
	8.5	13.30	--	7.61	103
	12.5	9.60	--	8.94	111
	16.5	6.80	--	9.36	108
	20.5	5.00	--	8.42	93
	24.5	4.30	--	7.87	85
	28.5	4.10	--	7.42	80
	32.5	4.00	--	7.32	78
	35.0	4.00	--	7.26	78
08/25/87	0.5	15.69	7.16	2.51	36
	2.5	15.39	7.12	1.95	28
	4.5	15.23	7.16	1.94	28
	6.5	15.16	7.20	1.84	26
	8.5	15.10	7.22	1.74	25
	10.5	11.27	7.40	6.27	81
	12.5	7.82	7.44	6.12	73
	14.5	6.22	7.46	6.26	71
	16.5	5.26	7.40	6.35	70
	18.5	4.66	7.34	6.24	68
	20.5	4.32	7.26	6.68	72
	22.5	4.02	7.22	5.19	56
	24.5	3.94	7.04	5.66	61
	26.5	3.92	6.97	4.82	51
	28.5	3.86	6.90	4.70	50

* Field instrument not operational.

Table A-4. Field data for Waugh for five sampling dates in 1986 and 1987 (Lund 1988). (Originally Tables 21 & 22)

DATE	DEPTH	TEMP	PH	DISSOLVED OXYGEN	
	M	C		MG/L	% SAT
07/08/86	0.5	11.23	6.22	8.58	109.7
	3.5	11.08	6.54	8.52	108.6
	6.5	7.06	6.72	9.44	110.2
08/26/86	0.5	15.70	6.42	7.51	105.9
	2.5	15.69	6.76	7.42	104.6
	4.5	15.07	6.71	8.07	112.2
	6.5	14.39	6.71	8.16	111.8
10/08/86	0.5	6.41	7.49	8.65	99.6
	1.0	6.30	7.30	8.67	99.6
	1.5	6.28	7.24	8.62	99.0
	2.0	6.26	7.24	8.55	98.1
	2.5	6.21	7.24	8.51	97.5
	3.0	6.21	7.25	8.52	97.7
	3.5	6.19	7.23	8.52	97.6
	4.0	6.22	7.25	8.44	96.8
	4.5	6.21	7.23	8.45	96.9
	5.0	6.21	7.24	8.46	97.0
	5.5	6.21	7.24	8.46	97.0
	6.0	6.22	7.23	8.44	96.8
	6.2	6.18	7.22	8.47	97.0
06/29/87	0.0	14.7	--*	6.83	97
	0.5	14.4	--	6.83	96
	2.5	14.0	--	6.76	95
	4.5	12.6	--	7.30	99
	6.5	11.0	--	6.16	80
	8.5	9.8	--	4.90	62
	10.5	9.8	--	3.67	47
	12.5	9.7	--	2.90	37
	14.5	9.7	--	3.02	38
	16.5	9.7	--	3.36	42
	18.5	9.7	--	3.78	48
	20.5	9.7	--	4.02	51
	22.5	9.7	--	4.09	52
	9.6	9.7	--	4.13	52
	26.5	9.7	--	4.14	52
	28.5	9.8	--	4.13	52
08/25/87	0.5	15.18	7.42	1.80	26
	2.5	15.13	7.31	1.66	24
	4.5	15.09	7.36	1.74	25
	6.5	15.04	7.24	1.67	24
	8.5	15.00	7.24	1.64	23
	10.5	14.97	7.23	1.61	23
	11.0	14.97	7.22	1.57	22

* Field instrument not operational.

Table A-5. Selected laboratory data for Agnew for five sampling dates in 1986 and 1987 (Lund 1988). (Originally Tables 23 and 24)

DATE	DEPTH M	PH	ANC uEq/L	ELEC COND uS/cm	DISS INORG C uEq/L	DISS ORG C ppm(C)
07/08/86	[illegible]	6.71	109	16.1	197	0.64
	5.5	6.71	110	16.2	180	0.76
	10.5	6.72	101	15.2	197	0.64
	15.5	6.63	118	16.6	209	0.47
	20.5	6.63	129	17.7	226	0.53
08/26/86	0.5	6.83	233	30.3	307	0.64
	6.5	6.88	233	30.6	307	0.65
	12.5	6.77	245	31.1	307	0.68
	18.5	6.12	311	43.7	680	0.73
	24.0	6.17	539	177.6	>538	0.77
10/08/86	0.5	7.08	463	61.9	556	0.68
	6.0	7.00	470	63.2	523	0.72
	11.5	7.02	476	58.8	726	0.69
	17.0	6.94	481	65.0	540	0.47
	22.5	6.93	479	64.1	512	2.40
06/29/87	0.5	7.55	1068	129.6	880	0.82
	2.5	7.57	1071	131.5	939	0.71
	4.5	7.57	1073	131.9	911	0.60
	6.5	7.46	1069	132.6	945	0.68
	8.5	7.11	1114	138.0	961	0.66
08/25/87	0.5	7.48	971	136.5	827	0.38
	6.0	7.40	966	136.9	847	0.45
	12.0	6.93	1111	153.3	1029	0.36
	18.0	6.61	1578	219.1	1361	nd
	24.0	6.44	2034	>	1579	0.07

Table A-6. Selected laboratory data for Gem for five sampling dates in 1986 and 1987 (Lund 1988). (Originally Tables 27 and 28)

DATE	DEPTH M	PH	ANC uEq/L	ELEC COND uS/cm	DISS INORG C uEq/L	DISS ORG C ppm(C)
07/08/86	0.5	6.86	61	8.5	75	0.47
	7.5	6.95	50	8.9	77	0.47
	14.5	6.97	55	9.1	82	0.58
	21.5	6.78	74	11.5	118	0.53
	28.5	6.60	82	13.1	156	0.58
08/26/86	0.5	6.82	57	7.7	64	0.54
	7.5	6.88	63	7.5	57	0.42
	14.5	6.83	56	7.5	57	0.51
	21.5	6.79	82	12.0	91	0.83
	28.5	6.55	88	13.4	127	0.77
10/08/86	0.5	6.85	46	9.0	28	0.39
	7.0	6.91	53	8.7	82	0.37
	13.5	6.89	56	8.9	88	0.46
	20.0	6.81	73	11.6	121	0.53
	26.5	6.78	52	13.4	148	0.50
03/25/87	0.5	6.71	99	12.7	113	
	8.0	6.65	86	12.7	123	0.37
	15.5	6.54	92	12.0	144	0.43
	23.0	6.57	83	12.7	141	0.32
	37.0	6.47	97	14.1	195	0.22
06/29/87	0.5	6.88	73	11.7	92	0.64
	8.5	6.89	66	11.5	80	0.96
	16.5	6.71	81	13.6	122	0.51
	24.5	6.50	77	14.6	173	0.40
	32.5	6.37	95	17.3	229	0.21
08/25/87	0.5	7.23	77	11.9	83	0.82
	7.0	7.13	87	10.3	92	1.31
	14.0	7.18	69	12.9	84	0.74
	21.0	6.66	88	14.5	133	0.35
	28.0	6.53	88	15.2	205	0.33

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Table A-7. Selected laboratory data for Waugh for five sampling dates in 1986 and 1987 (Lund 1988). (Originally Tables 41 and 42)

DATE	DEPTH M	PH	ANC uEq/L	ELEC COND uS/cm	DISS INORG C uEq/L	DISS ORG C ppm(C)
07/08/86	0.5	6.56	22	5.2	49	0.30
	1.5	6.64	27	5.4	42	0.41
	2.5	6.52	21	5.0	44	0.30
	3.5	6.67	19	5.8	44	0.30
	5.0	6.57	20	5.5	44	0.30
08/26/86	0.5	6.45	22	4.7	57	0.32
	2.5	6.50	28	4.9	44	0.25
	4.5	6.39	22	4.9	39	0.32
	6.0	6.48	24	4.9	35	0.15
10/08/86	0.5	6.59	22	5.5	58	0.20
	2.0	6.60	22	5.6	60	0.93
	3.5	6.58	26	5.0	11	0.24
	5.0	6.59	23	5.4	8	0.29
	6.0	6.60	28	4.9	55	nd
06/29/87	0.5	6.61	35	10.1	54	0.83
	3.5	6.41	28	7.7	56	0.58
	6.5	6.37	23	7.2	47	0.46
	9.5	6.39	26	7.3	56	0.52
	12.5	6.33	35	7.1	64	0.47
08/25/87	0.5	6.70	50	5.6	40	0.43
	3.0	6.68	27	5.0	37	1.07
	5.5	6.66	20	5.8	41	0.46
	8.0	6.79	19	6.0	38	0.70
	10.5	6.68	45	6.0	41	0.36

Table A-8. Cation and anion data for Waugh for five sampling dates in 1986 and 1987 (Lund 1988). (Originally Tables 43 and 44)

DATE	DEPTH M	CA	MG	NA	K	ANC	CL	NO_3-N	SO_4-S
		uEq/L							
07/08/86	0.5	87.65	17.93	29.78	7.47	109	13.75	0.79	13.06
	5.5	88.25	18.10	28.52	7.11	110	12.90	0.79	13.19
	10.5	88.20	18.18	28.70	7.03	101	14.31	0.79	14.75
	15.5	93.90	19.33	31.39	7.14	118	18.06	0.86	13.56
	20.5	97.40	21.80	33.17	7.21	129	18.14	0.93	13.31
08/26/86	0.5	182.00	41.13	57.91	11.38	233	42.59	nd	15.31
	6.5	187.00	41.63	58.17	11.59	233	42.42	nd	15.44
	12.5	189.00	42.61	59.39	11.36	245	42.59	nd	15.75
	18.5	241.00	58.90	97.48	15.19	311	86.45	nd	16.75
10/08/86	0.5	366.00	91.97	141.13	20.46	463	126.31	nd	29.56
	6.0	365.00	91.56	140.22	20.08	470	121.15	nd	20.63
	11.5	365.50	91.48	141.48	20.61	476	128.59	nd	19.94
	17.0	374.00	92.14	143.35	20.87	481	131.94	nd	27.50
	22.5	371.50	92.46	146.26	20.90	479	134.14	nd	26.81

DATE	DEPTH M	CA	MG	NA	K	ANC	CL	NO_3-N	SO_4-S
		uEq/L							
06/29/87	0.5	810.0	203.3	370.4	17.3	1068	332.0	nd	42.0
	2.5	800.0	204.1	362.2	16.7	1071	231.0	nd	30.9
	4.5	810.0	204.1	369.1	17.9	1073	328.0	nd	41.6
	6.5	810.0	204.1	371.7	18.1	1069	336.0	nd	41.8
	8.5	840.0	210.7	389.6	18.7	1114	347.0	nd	42.2
08/25/87	0.5	700.0	184.4	420.0	10.1	971	313.0	nd	40.3
	6.0	705.0	186.8	419.6	9.9	966	311.0	nd	38.7
	12.0	780.0	208.2	491.3	12.6	1111	370.0	nd	40.7
	18.0	1025.0	275.7	695.7	17.8	1578	547.0	nd	48.5
	24.0	1320.0	363.0	991.3	25.5	2034	710.0	0.6	49.7

Table A-9. Cation and anion data for Gem for five sampling dates in 1986 and 1987 (Lund 1988). (Originally Tables 47 and 48)

DATE	DEPTH M	CA	MG	NA	K	ANC	CL	NO_3-N	SO_4-S
		uEq/L							
07/08/86	0.5	46.70	7.24	14.57	3.71	61	3.38	1.29	11.63
	7.5	46.70	7.24	14.57	4.53	50	3.41	1.14	10.94
	14.5	48.10	7.90	15.65	3.71	55	3.86	1.14	11.13
	21.5	63.50	10.69	20.26	4.68	74	6.39	1.43	13.06
	28.5	69.55	14.64	23.22	4.99	82	7.94	2.79	14.75
08/26/86	0.5	39.60	7.57	12.96	3.71	57	2.42	nd	10.44
	7.5	41.65	6.93	13.17	5.24	63	2.14	nd	10.19
	14.5	40.55	6.42	13.00	3.48	56	2.25	nd	10.50
	21.5	70.15	11.35	21.65	4.86	82	7.30	0.86	13.75
	28.5	72.25	12.67	24.43	4.73	88	9.21	2.57	15.25
10/08/86	0.5	49.70	6.99	14.65	3.48	46	3.24	nd	10.75
	7.0	48.90	7.07	14.39	3.91	53	3.24	nd	11.06
	13.5	49.65	6.91	14.70	3.89	54	3.38	nd	11.00
	20.0	64.55	11.93	20.22	4.48	73	6.76	0.71	13.19
	26.5	71.95	12.26	22.30	4.45	52	8.37	1.21	14.38

DATE	DEPTH M	CA	MG	NA	K	ANC	CL	NO_3-N	SO_4-S
		uEq/L							
03/25/87	0.5	76.5	15.1	36.5	2.8	99	13.6	1.8	14.9
	8.0	75.5	14.2	38.4	2.7	86	11.2	1.9	14.4
	15.5	74.0	13.3	33.3	3.9	92	11.0	2.3	14.1
	23.0	77.0	13.8	38.1	4.2	83	12.0	2.6	14.4
	37.0	82.0	15.3	41.2	3.7	97	13.8	2.9	14.9
06/29/87	0.5	59.5	11.9	25.0	6.8	73	8.0	0.4	14.5
	8.5	58.5	11.9	25.6	7.1	66	7.3	0.4	14.5
	16.5	69.5	14.5	20.4	5.0	81	11.1	0.4	15.5
	24.5	75.5	15.4	27.0	5.1	77	13.1	2.0	16.0
	32.5	83.5	17.3	25.1	5.2	95	16.7	3.4	16.8
08/25/87	0.5	48.6	11.1	19.0	4.4	77	7.5	nd	13.3
	7.0	49.0	11.2	11.2	1.7	87	7.1	nd	13.0
	14.0	62.0	13.6	21.1	1.8	69	10.5	nd	14.9
	21.0	62.0	14.2	17.4	1.4	88	12.3	nd	15.3
	28.0	69.0	15.1	22.0	0.7	88	14.2	2.4	15.7

Table A-10. Cation and anion data for Waugh for five sampling dates in 1986 and 1987 (Lund 1988). (Originally Tables 61 and 62)

DATE	DEPTH M	CA	MG	NA	K	ANC	CL	NO_3-N	SO_4-S
		uEq/L							
07/08/86	0.5	23.65	4.29	9.39	1.92	22	1.18	1.43	5.88
	1.5	24.15	3.63	9.70	1.89	27	1.18	1.36	5.81
	2.5	23.70	3.38	9.57	2.46	21	1.07	1.36	6.00
	3.5	24.35	3.22	9.39	2.79	19	1.21	1.36	5.88
	5.0	21.35	2.72	8.39	1.84	20	1.01	1.64	5.81
08/26/86	0.5	21.00	2.56	8.87	3.73	22	1.21	1.07	7.19
	2.5	21.95	2.56	9.09	3.89	28	1.35	1.00	7.19
	4.5	22.30	2.47	9.00	3.40	22	1.21	1.00	7.25
	6.0	22.00	3.88	8.70	3.02	24	1.18	0.93	7.19
10/08/86	0.5	24.00	3.05	10.00	4.45	22	2.03	nd	9.81
	2.0	23.60	2.89	10.09	3.96	22	1.55	nd	8.19
	3.5	24.35	2.80	9.83	3.71	26	1.53	nd	9.63
	5.0	24.00	2.80	9.96	3.07	23	1.32	nd	8.81
	6.0	23.40	2.72	9.87	3.02	28	1.72	nd	9.75

DATE	DEPTH M	CA	MG	NA	K	ANC	CL	NO_3-N	SO_4-S
		uEq/L							
06/29/87	0.5	28.8	5.1	7.6	2.8	35	3.3	2.5	9.7
	3.5	28.8	5.1	9.1	3.1	28	3.4	2.6	9.6
	6.5	27.6	4.5	7.4	2.6	23	3.0	3.1	9.4
	9.5	27.5	4.7	7.7	3.6	26	3.0	3.1	9.1
	12.5	27.7	5.8	8.7	4.2	35	3.1	3.0	9.1
08/25/87	0.5	24.8	4.3	2.3	1.0	50	2.9	nd	9.0
	3.0	25.5	4.3	0.0	0.3	27	2.9	nd	9.1
	5.5	24.2	4.4	1.7	3.3	20	2.8	nd	9.1
	8.0	22.3	4.3	0.0	3.5	19	2.7	nd	9.1
	10.5	27.2	6.2	5.3	4 7	45	2.8	nd	9.1

Table A-11. Concentration of selected elements in samples from Agnew for five sampling dates in 1986 and 1987 (Lund 1988). (Originally Tables 63 and 64)

DATE	DEPTH	SI	B	BA	AL	FE	MN
	M	UMOL/L					
7-08-86	0.5	48.7	nd	0.02	nd	0.78	0.17
	5.5	47.3	nd	0.01	nd	0.34	0.15
	10.5	47.0	nd	0.01	nd	0.30	0.14
	15.5	48.0	nd	0.01	nd	0.36	0.18
	20.5	48.0	nd	0.01	nd	0.35	0.19
8-26-86	0.5	69.7	2.04	0.02	nd	0.44	0.28
	6.5	70.5	1.45	0.02	nd	0.40	0.29
	12.5	72.6	2.24	0.02	nd	0.58	0.32
	18.5	64.8	4.16	0.04	nd	1.35	0.49
	24.0	189.7	25.11	0.21	3.77	24.99	12.96
10-08-86	0.5	88.6	6.05	0.04	nd	5.17	1.08
	6.0	89.3	5.48	0.05	nd	5.11	1.10
	11.5	90.8	6.34	0.06	0.43	5.31	1.13
	17.5	91.1	6.18	0.05	nd	5.51	1.15
	22.5	91.1	6.29	0.06	4.21	5.65	1.17
06/29/87	0.5	156.3	14.62	0.09	nd	0.57	0.36
	2.5	156.7	14.25	0.07	nd	0.37	0.31
	4.5	157.7	14.62	0.09	nd	0.50	0.33
	6.5	158.8	14.34	0.08	nd	0.55	0.36
	8.5	158.1	15.26	0.09	nd	0.93	0.50
08/25/87	0.5	147.1	13.41	0.09	nd	0.78	0.51
	6.0	147.8	13.60	0.08	nd	0.81	0.54
	12.0	153.8	17.67	0.11	nd	1.10	1.08
	18.0	177.3	23.03	0.18	nd	1.02	2.29
	24.0	212.2	32.65	2.94	nd	12.80	12.72

Table A-12. Concentration of selected elements in samples from Gem for six sampling dates in 1986 and 1987 (Lund 1988). (Originally Tables 67 and 68)

DATE	DEPTH	SI	B	BA	AL	FE	MN
	M	UMOL/L					
7-08-86	0.5	36.0	nd	nd	nd	0.17	0.03
	7.5	36.7	nd	nd	nd	0.16	0.03
	14.5	38.1	0.19	0.01	0.15	0.22	0.06
	21.5	43.1	nd	0.01	nd	0.26	0.10
	28.5	44.9	nd	0.02	nd	0.36	0.12
8-26-86	0.5	36.7	1.03	0.01	1.52	0.16	nd
	7.5	37.0	0.61	nd	6.19	0.15	0.02
	14.5	38.1	1.17	nd	0.42	0.14	nd
	21.5	50.9	0.88	0.01	1.11	0.17	0.02
	28.5	55.2	1.20	0.02	1.09	0.26	0.09
10-08-86	0.5	37.7	1.21	0.01	2.70	0.20	nd
	7.5	37.7	0.89	0.01	2.27	0.19	0.02
	13.5	37.0	0.34	nd	nd	0.15	nd
	20.5	43.4	0.75	nd	0.92	0.23	nd
	26.5	52.0	nd	0.01	0.47	0.12	nd
03/25/87	0.5	45.2	0.64	nd	nd	0.35	0.21
	8.0	44.2	0.82	nd	nd	0.32	0.19
	15.5	43.8	0.87	nd	nd	0.25	0.19
	23.0	44.5	0.70	0.05	0.28	0.27	0.24
	37.0	37.0	0.70	0.05	0.28	1.01	0.49
06/29/87	0.5	46.6	0.48	nd	0.26	0.40	nd
	8.5	56.7	0.13	nd	0.64	0.15	nd
	16.5	57.7	0.37	nd	nd	0.30	0.10
	24.5	58.8	0.34	0.08	1.41	0.45	0.19
	32.5	58.1	0.59	nd	nd	0.99	0.44
08/25/87	0.5	42.7	nd	nd	nd	nd	nd
	7.0	42.0	nd	nd	nd	nd	nd
	14.0	45.2	nd	nd	nd	nd	nd
	21.0	46.3	nd	nd	nd	nd	nd
	28.0	47.7	nd	nd	nd	nd	nd

Table A-13. Concentration of selected elements in samples from Waugh for five sampling dates in 1986 and 1987 (Lund 1988). (Originally Tables 81 and 82)

DATE	DEPTH	SI	B	BA	AL	FE	MN
	M	UMOL/L					
7-08-86	0.5	26.0	nd	0.01	nd	0.14	0.03
	1.5	25.6	nd	nd	nd	0.07	0.02
	2.5	25.5	nd	nd	nd	0.04	nd
	3.5	24.7	nd	nd	nd	nd	nd
	5.0	22.5	nd	nd	nd	0.06	nd
8-26-86	0.5	23.8	nd	nd	4.28	0.35	0.03
	2.5	23.6	nd	nd	nd	0.27	0.03
	4.5	22.6	nd	nd	nd	0.07	nd
	6.5	23.0	nd	nd	0.18	0.12	0.02
10-08-86	0.5	21.6	nd	nd	5.02	0.50	0.03
	2.0	21.1	nd	nd	nd	0.29	0.03
	3.5	20.3	nd	nd	nd	0.17	nd
	5.5	20.8	nd	nd	nd	0.23	0.03
	6.5	20.9	nd	nd	0.48	0.26	0.03
06/29/87	0.5	36.0	0.00	nd	nd	0.23	nd
	3.5	34.4	0.00	nd	0.92	0.14	nd
	6.5	31.3	0.36	nd	0.66	0.20	nd
	9.5	32.5	0.37	nd	nd	0.24	nd
	12.5	35.6	nd	nd	1.86	0.89	nd
08/25/87	0.5	24.5	nd	nd	nd	0.38	nd
	3.0	24.4	nd	nd	0.59	0.35	nd
	5.5	25.3	nd	nd	nd	0.53	nd
	8.0	24.6	nd	nd	nd	0.28	nd
	10.5	32.9	nd	nd	nd	nd	nd

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LIST OF ACRONYMS

°C	degrees Celsius
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CEDEN	California Data Exchange Network
CFR	Code of Federal Regulations
cfs	cubic feet per second
CNDDB	California Natural Diversity Database
FERC	Federal Energy Regulatory Commission
Forest Service	United States Forest Service
g	gram(s)
IFIM	Instream Flow Incremental Methodology
INF	Inyo National Forest
IPaC	Information for Planning, and Conservation
lbs	pounds
mm	millimeter(s)
msl	mean sea level
NRIS	Natural Resource Information System
Project	Rush Creek Project

RM	river mile
SCE	Southern California Edison Company
SNYLF	Sierra Nevada yellow-legged frog
SWRCB	California State Water Resources Control Board
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
Watershed	Rush Creek Watershed
WUA	weighted usable area
YT	Yosemite toad

4.5 FISH AND AQUATIC RESOURCES

This section describes aquatic physical habitat and fish and aquatic resources in Rush Creek Watershed (Watershed), including Project-affected reaches (Table 4.5-1), as they pertain to Southern California Edison Company's (SCE) Rush Creek Project (Project). The Federal Energy Regulatory Commission's (FERC) content requirements for this section are specified in Title 18 of the Code of Federal Regulations (CFR) Chapter I § 5.6(d)(3)(iv).

In addition, this section describes rare, threatened, and endangered aquatic resources in the vicinity of the Project and Appendix 4.5-A provides life history information for special-status aquatic species. The FERC content requirements for this information are specified in 18 CFR Chapter I § 5.6(d)(3)(vii). A description of terrestrial resources associated with the Project, including rare, threatened and endangered terrestrial species is included in Section 4.6, Botanical and Wildlife Resources.

4.5.1 Information Sources

This section was developed using existing information available from the following sources:

- Natural Resource Information System (NRIS) data from United States Forest Service (Forest Service) Region 5 (Forest Service 2017).
- Inyo National Forest (INF) lists of species of Conservation Concern (Forest Service 2019a).
- Forest Service Final Environmental Impact Statement for Revision of the Inyo National Forest Land Management Plan (Forest Service 2019b).
- United States Fish and Wildlife Service (USFWS) Information for Planning, and Conservation System (IPaC) website was queried to generate a list of federal endangered and threatened species (USFWS 2020).
- California Department of Fish and Wildlife (CDFW) Habitat Management Land Rush Creek Management Unit, Herps Dataset. October 10, 2016 (CDFW 2016).
- California Natural Diversity Database Rarefind (CNDDB), Version 5.0. Online Database. California Department of Fish and Wildlife, Version 5.1.1 (CNDDB 2020).
- FERC's Environmental Assessment, Rush Creek Project (FERC Project No. 1389) (FERC 1992).
- FERC's Order Issuing New License, Rush Creek Project (FERC 1997).

- FERC Relicensing Studies (EA Engineering, Science, and Technology, Inc. 1986, 1987a, 1987b; Lund 1988) related to instream flows, fish entrainment mortality, fish sampling, and reservoir water quality.

- FERC Monitoring Studies (Sada 2001a, 2001b, 2003; SCE 2002; Read and Sada 2012) related to fish monitoring studies, entrainment mortality, and reservoir water quality.

- Inland fishes of California. University of California Press, Berkeley. 502 pp (Moyle 2002).

4.5.2 Overview of Aquatic Species

Fish and aquatic resources in the vicinity of the Project, including those in the Project reservoirs (Waugh, Gem, and Agnew lakes) and the Project-affected stream reaches, are shown in Table 4.5-1. The Project-affected stream reaches include Rush Creek from Waugh Lake downstream to Grant Lake. Map 4.2-2 (seven sheets) shows the Rush Creek stream reaches and river miles.

Rush Creek is part of the Mono Lake Basin historical fishless area. "The fishes that once inhabited the streams flowing into highly alkaline Mono Lake presumably were wiped out by volcanism during the past million years, up to and including historic times" (Moyle 2002). In recent times, resident fish species have been intentionally or accidentally introduced to the Watershed including rainbow trout, golden trout, Lahontan cutthroat trout, brown trout, brook trout, and threespine stickleback (Jones and Stokes Associates 1993; Salamunovich 2017). The aquatic species of primary management concern in the vicinity of the Project include those that are Federal- and/or State-listed species, Species of Special Concern, and species that are recreationally, commercially, or tribally important. Table 4.5-2 shows the introduced fish and the native amphibian species in the vicinity of the Project, their regulatory status, the water body where each species is anticipated to occur, and if Critical Habitat has been designated for the species. There are no anadromous, catadromous, or migratory species in the vicinity of the Project. There are no fish species Critical Habitat or Magnuson-Stevens Fishery Conservation and Management Act habitat in the vicinity of the Project. The introduced fish species are resident, and there are no large-scale migrations or movement of the species. There are no invasive fish species identified in the vicinity of the Project.

The only special-status aquatic species are native amphibians, Sierra Nevada yellow-legged frog (SNYLF) and Yosemite toad (YT). Critical habitat exists within the FERC Project boundary for both of these species. These species are addressed in Section 4.5.6.

4.5.3 Aquatic Physical Environment

The aquatic physical environment in the vicinity of the Project is discussed in relation to the following ecological factors:

- Stream water temperature, gradient, channel geometry, riparian vegetation, hydrology, instream flow habitat, and fish barriers.
- Reservoir hydrology (pool volume/storage and release timing), water temperature, and entrainment.

The ecological setting of Rush Creek is strongly influenced by the Sierra Nevada mountain geology and climate and, in some cases, the Project reservoirs and diversions, which in combination, determine the water temperature, gradient/channel geometry, riparian vegetation, hydrology, instream flow habitat, and fish barriers.

4.5.3.1 Water Temperature

The high elevation in the vicinity of the Project results in water temperatures (typically below 20 degrees Celsius [°C]) that are suitable for cold water salmonid fishes (i.e., rainbow trout, brown trout). Water temperature grab samples from the United States Geological Survey (USGS), the California Environmental Data Exchange Network (CEDEN), and Rush Creek EA Engineering, Science, and Technology, Inc. indicated that Rush Creek and the Project reservoirs (Waugh, Gem, and Agnew) all have water temperatures suitable for cold water salmonids (see Section 4.4, Water Quality).

In the farthest downstream portion of Rush Creek, beyond the influence of the Project, approximately 6% of the continuous water temperature measured at four locations downstream of Grant Lake (525 of 8,822 samples) exceeded the temperature objective for the water body (13°C to 21°C based on Moyle [1976]). Since this did not exceed the allowable frequency listed in Table 3.2 of the Listing Policy (SWRCB 2004), it was determined by Regional Water Quality Control Board staff that the water body-pollutant combination should not be placed on the Clean Water Act Section 303(d) list because applicable water quality standards are not being exceeded (see Section 4.4, Water Quality).

In Project reservoirs, historical water temperature collected by Lund (1988) in 1986 in July, August, and October showed that the warmest water temperature measured in the surface layers of Waugh, Gem, and Agnew lakes was 61.5 degrees Fahrenheit and that water lower in the water column(s) was cooler.

4.5.3.2 Gradient, Channel Geometry, and Riparian Vegetation

The Watershed geology dictates the Rush Creek gradient, channel geometry, and riparian vegetation. The upper watershed in the vicinity of the Project is characterized by glacially formed, steep gradient (bedrock dominated), high-elevation sub-basins (Rush Creek upstream of the Rush Creek Powerhouse and upstream of the confluence with Reversed Creek). The lower watershed is comprised of lower gradient, low elevation valley floor sub-basins (Rush Creek below the powerhouse and confluence with Reversed

Creek). The elevation ranges from 9,400 feet mean sea level (msl) at Waugh Lake to 7,200 feet msl at the Rush Creek Powerhouse Tailrace (6.2 miles; average 6.9% gradient) and 6,400 feet msl at Mono Lake (17.6 miles; average 0.9% gradient).

Table 4.5-1 and Figure 4.5-1 show the different sections of Rush Creek and the steep gradient from the powerhouse upstream to Waugh Lake (6.9%) and lower gradient from the powerhouse downstream to Mono Lake (0.9%), including sub-reaches within the longer overall reaches. The lower-gradient sub-sections are less confined and support a broader floodplain. The steeper-gradient sub-sections are confined within bedrock and have a very narrow floodplain. The steepest stream sections are dominated by bedrock and plunge pool channels with limited riparian development (e.g., gradient typically >4%). The lower gradient sections have adjustable alluvial channels and well developed riparian vegetation (see Section 4.8, Geomorphology and Section 4.9, Wetlands, Riparian, and Littoral Habitats).

4.5.3.3 Fish Barriers

The steep gradients in Rush Creek generally create natural upstream barriers for fish and the Project dams add some additional barriers. Known fish barriers and reaches with potentially numerous barriers due to their steep gradients are identified in Table 4.5-3.

4.5.3.4 Hydrology and Instream Flow Habitat

The hydrology of Project reservoirs (Waugh Lake, Gem Lake, and Agnew Lake) and Rush Creek is discussed in detail in Section 4.3, Water Use and Hydrology. The section includes graphics/tables related to seasonal reservoir operations and Rush Creek flows, both with the current FERC seismic restrictions on the reservoirs and historically prior to the restrictions (pre-2012) (Table 4.5-4). The section also includes unimpaired Rush Creek flows. The unimpaired hydrology establishes the seasonal pattern and amount of flow available in Rush Creek, which is modified to some extent by Project operations. The unimpaired hydrology generally sets the base flow in the different reaches while Project operations only minimally/moderately affect high flows due to limited storage. For example, Table 4.5-5 shows that unimpaired flows below Agnew Dam are lowest in September – November, with median (50% exceedance) flows less than 5 cubic feet per second (cfs) and 95% exceedance about 1 cfs. May and June flows are the highest, with a median peak flow of 157 to 176 cfs (see details by reach below).

A synopsis of Section 4.3, Water Use and Hydrology existing hydrology conditions (with the reservoir seismic restrictions in place), and unimpaired hydrology by reach is provided below. The hydrology data for Project reservoirs is from Section 4.3.4.1 and the data for Project-affected stream reaches is from Section 4.3.4.3.

- Waugh Lake under existing conditions varies from a lentic water body (water stored) to riverine annually, with seismically restricted storage occurring in the late spring/summer when the dam low level outlet is closed. Riverine conditions occur in the fall/early spring when the low level outlet is open.

- Rush Creek below Rush Meadows Dam under existing conditions has a FERC-required minimum flow of 10 cfs or natural flows (whichever is less). Natural flows can be very low (<1 cfs). Typically, high flows occur during spring/early summer (e.g., >100 cfs), as a result of spills and intermediate flows can occur in the fall as storage is released. Unimpaired flows (Figure 4.5-2; Table 4.5-5) show that median flows in September – November are 3 cfs or less and 95% exceedance flows are less than 1 cfs.

- Gem Lake under existing conditions typically fills in the spring and remains full until after Labor Day, after which, storage is released for power generation and the reservoir reaches its lowest elevation prior to spring refill.

- Rush Creek below Gem Dam under existing conditions has a FERC-required minimum flow of 1 cfs, or natural flows (if less) when the reservoir is below the dam face. In the spring/early summer there are spills from the reservoir, but they do not show up in the minimum flow gage data as the gage only measures the minimum flows. Unimpaired flows, shown in Figure 4.5-3 and Table 4.5-5, show median flows in September – November are 4.4 cfs or less and 95% exceedance flows are less than 1 cfs.

- Agnew Lake under existing conditions is now maintained at the natural historical lake level; flows pass through the notches recently cut (2017) in the bottom of the dam).

- Rush Creek below Agnew Dam under existing conditions has a FERC-required minimum flow of 1 cfs or natural flow if less, but higher flows occur during spring high flow season due to runoff and spills from Gem Lake). Flows in this reach, downstream of Horsetail Falls, split at a natural bifurcation part way down the mountain and some flow goes into the ungagged South Rush Creek channel. Unimpaired flows, shown in Figure 4.5-4 and Table 4.5-5 show median flows in September – November are 4.7 cfs or less and 95% exceedance flows are 1 cfs.

- Rush Creek below the Rush Creek Powerhouse include the powerhouse releases; flows from Agnew Dam and flow from Reversed Creek; and flows from other small tributaries (e.g., Algers Creek). The existing flows are relatively similar to historical unimpaired flows, except for some increase in flow during the typical baseflow season and some decrease in flows during the high flow season. This is due to storage capture and release, primarily at Gem Lake (Figure 4.5-5 and Figure 4.5-6). Unimpaired flows downstream of Silver Lake, shown in Figure 4.5-7 and Table 4.5-5, show median flows in September – November are 13.6 cfs or less and 95% exceedance flows are 5.4 cfs or less.

An instream flow study was conducted as part of the previous relicensing (FERC 1992; EA Engineering, Science, and Technology, Inc. 1986, 1987a) below Rush Meadows Dam to evaluate the effects of various Project releases from Waugh Lake on trout habitat for all life stages of rainbow and brook trout at flows ranging from 0 to over 200 cfs. The instream flow analysis indicated that maximum weighted usable area (WUA) for adult and juvenile brook and rainbow trout was achieved at 5 cfs (see Table 3 and Figure 4 in FERC 1992; Table 4.5-6, Figure 4.5-8). At 7 cfs, usable habitat for adult and juvenile rainbow trout decreases to 99% of maximum and adult and juvenile brook trout habitat declined to 98% and 89% of maximum, respectively (FERC 1992).

At 10 cfs (the current FERC-required minimum flow releases), usable habitat for adult and juvenile rainbow trout decreased to 96% and 94% of maximum, respectively, and adult and juvenile brook trout habitat decreased to 92% and 80% of maximum, respectively (see Table 3 and Figure 4 in FERC 1992; Table 4.5-5; Figure 4.5-8). Flows above 10 cfs further reduce habitat for the juvenile and adult life stages of both species (FERC 1992).

Maximum spawning habitat for both brook and rainbow trout occurred between 90 and 100 cfs. Mean monthly flow data for upper Rush Creek indicate flows that meet or exceed 90 cfs occur over about 2 to 2.5 months of the year during early spring and summer (see Figure 3 in FERC 1992; Table 4.5-5). Therefore, the optimal WUA for spawning rainbow and brook trout was met under existing Project operation during portions of the year (FERC 1992).

In the previous relicensing, California Department of Fish and Game (CDFG) and the Forest Service recommended, and SCE agreed, to a minimum instream flow in the section of Rush Creek below Rush Meadows Dam of 10 cfs or the natural flow, whichever was less, would ensure aquatic resource protection and enhancement. The CDFG and Forest Service based their 10 cfs minimum flow recommendation on:

- The aesthetic values of a full stream channel within a wilderness area; and
- The ability of trout to avoid strong recreational fishing pressure and predation with additional deep watercover available at higher flows.

Agency personnel reported that both these objectives were achieved at 10 cfs, which was 67% higher than the existing calculated mean monthly minimum flow in late summer, fall, and winter (6 cfs, see Figure 3 in FERC 1992 Table 4.5-5) (FERC 1992).

4.5.4 General Aquatic Community

4.5.4.1 Reservoirs

Waugh Lake

CDFW management direction for Waugh Lake is for a self-sustaining fishery. Stocking was discontinued in 1965 largely because of the drawdown of the reservoir every winter (personal communication, D. Wong, Fisheries Biologist, CDFG, Bishop, California, January 21, 1992, as cited in FERC 1992). Brook trout and rainbow trout residing in Rush Creek upstream of Waugh Lake may move into the lake during spring runoff when the reservoir is filling. Because of the lack of overwintering habitat and the absence of seasonal fish plants by CDFG, trout populations in the lake during spring, summer, and fall are low relative to other stocked reservoirs and natural lakes in the area (personal communication, D. Wong, Fisheries Biologist, CDFG, Bishop, California, December 30, 1991, and January 21,1992, as cited in FERC 1992). The historical stocking data for Waugh Lake is listed in Table 4.5-7.

Gillnet sampling by CDFW in July of 2002 (a single 5 panel net for 8 hours) captured 18 brook trout and 1 rainbow trout. The largest fish was 240 mm (136 g) (Table 4.5-8). Visual encounter surveys looking for SNYLF found one sub-adult Pacific tree frog (CDFW High Mountain Lakes Survey Data, personal communication, Alyssa Marquez, CDFW 2021).

GEM LAKE

CDFW management direction for Gem Lake is for a stocked “put and grow” fishery; aerially planting of fingerling rainbow trout. The stocking allotment is 100 pounds (lbs)/10,000 fish (rainbow trout-fingerlings), annually. The first available stocking records in the 1930s were brook trout. Most other stockings have been rainbow trout. Historically, Eagle Lake trout have also been stocked (Table 4.5-9). A self-sustaining population of brook trout occurs in Gem Lake.

Gillnet sampling by CDFW in July of 2002 (a single 5 panel net for 8 hours) captured 3 brook trout and 2 rainbow trout. The largest fish was 246 millimeters (mm) (125 grams [g]) (Table 4.5-8). Visual encounter surveys looking for SNYLF found one sub-adult Pacific tree frog (CDFW High Mountain Lakes Survey Data, personal communication, Alyssa Marquez, CDFW 2021).

Agnew Lake

CDFW management direction for Agnew Lake is for a stocked “put and grow” fishery; aerially planting of fingerling rainbow trout. The stocking allotment is 50 lbs./5,000 fish (rainbow trout-fingerlings), annually. The first available stocking records for the 1930s – 1940s were for brook trout. Most other stockings have been rainbow trout. Historically, Eagle Lake trout have also been stocked (Table 4.5-10). A self-sustaining population of brook trout occurs in Agnew Lake.

Gillnet sampling by CDFW in July of 2002 (a single 5 panel net for 13 hours 24 minutes) captured 25 brook trout and 6 rainbow trout. The largest fish was 233 mm (109 g) (Table 4.5-8). Visual encounter surveys looking for SNYLF found no amphibians (CDFW High Mountain Lakes Survey Data, personal communication, Alyssa Marquez, CDFW 2021).

4.5.4.2 Stream Reaches

Benthic Algae and Macroinvertebrates

Information related to benthic algae and macroinvertebrates in Rush Creek was not found.

Fish

RUSH CREEK -UPSTREAM AND WITHIN WAUGH LAKE

Rush Creek upstream of Waugh Lake and within the footprint of Waugh Lake (when the reservoir is drawn down in the fall/winter) contains both brook and rainbow trout (Erdman 2012). No know fish density/size/condition information is available for the two reaches. The reach within the reservoir footprint varies temporally from riverine (lotic) in the fall/winter to reservoir (lentic) during the spring/summer when storage occurs up to the current seismic restriction level. The productivity and carrying capacity for fish, while unknown, is likely low due to the variable lotic/lentic regime that does not allow stabilization of either a river-based algae/benthic macroinvertebrate community or reservoir-based algae (phytoplankton, periphyton)/zooplankton community.

RUSH CREEK – RUSH MEADOWS DAM TO GEM LAKE

The reach of Rush Creek between Rush Meadows Dam and Gem Lake has a self-sustaining population of brook trout and rainbow trout. Between 1985 and 1987 (Table 4.5-11; Map 4.5-1), rainbow and brook trout density ranged from 413 to 669 fish per mile and 7 to 21 lbs per acre (EA Engineering, Science, and Technology, Inc. 1988). This was below average compared to other eastern Sierra streams (Gerstung 1973; Platts and McHenry 1988). The creek supports a moderate to good recreational fishery (personal communication, S. Chubb, Biologist, Forest Service, Bishop, California, January 22, 1992, as cited in FERC 1992). The condition of the fish is good. Average Fulton condition factors ranged from 1.06 to 1.16 (Table 4.5-11).

Sampling has occurred in this reach since the past relicensing studies as part of monitoring studies (1999, 2000, 2001, 2002 and 2010) (Table 4.5-12, Table 4.5-13, and Table 4.5-14; Map 4.5-1) (Read and Sada 2012; Sada 2001b, 2003). Fish and habitat surveys were conducted during spring, summer, and autumn from 1999 into 2002 to quantify baseline conditions prior to implementation of the new FERC license conditions. Post-implementation surveys were to be conducted every 5 years over a 30-year period to determine any change in response to implementation of the new license conditions.

The Rush Creek fish assemblage included brook trout and rainbow trout that were mostly *Oncorhynchus mykiss gairdneri* (rainbow trout) X *O. m. aguabonita* (golden trout) hybrids. Fish abundance was low in Reach 1 (see Map 4.5-1) and brook trout were usually more abundant than rainbow in baseline surveys and subsequent surveys in 2010. The mean brook trout density for all years ranged from 0.0 fish/square mile (m^2) – 0.1 fish/m^2 or 128 fish/mile – 784 fish/mile and rainbow trout density ranged 0.01 fish/m^2 – 0.05 fish/m^2 or 64 fish/mile – 384 fish/mile (Table 4.5-12). The abundance of both species in 2010 was within ranges that were observed during baseline studies (Read and Sada 2012; Sada 2001b, 2003). Rainbow trout in 2010 were more abundant than brook trout in Reach 2 (see Map 4.5-1) during the spring, but they were equally abundant during summer. Mean brook density ranged for all years from 0.0 fish/m^2 – 0.02 fish/m^2 or 16 fish/mile – 264 fish/mile and rainbow trout density ranged from 0.01 fish/m^2 – 0.07 fish/m^2 or 80 fish/mile – 800 fish/mile during spring and summer (Table 4.5-12). The abundance of both species was within the range observed during baseline population studies (Read and Sada 2012; Sada 2001b, 2003).

Young-of-the-year fish were a small portion of all populations during the 2010 surveys. This is similar to observations by Sada (2003), who concluded that spawning and recruitment are minimal in this reach of stream because of naturally low base flow during winter (that limits spawning success) and high spring time discharge that washes young fish downstream. These conditions appear to make this portion of Rush Creek a harsh environment for trout (Read and Sada 2012).

RUSH CREEK - GEM DAM TO AGNEW LAKE

Brook trout and rainbow trout exist (Erdman 2012) in this extremely steep gradient reach, but no quantitative data are available.

RUSH CREEK - AGNEW DAM TO VALLEY FLOOR (RUSH CREEK POWERHOUSE)

Brook trout and rainbow trout exist (Erdman 2012) in this extremely steep gradient reach, but no quantitative data are available.

RUSH CREEK - RUSH CREEK POWERHOUSE TO SILVER LAKE

Erdman (2012) indicates that brown trout and rainbow trout are present. No quantitative data are available.

RUSH CREEK - SILVER LAKE TO GRANT LAKE

Likely rainbow trout and brown trout.

4.5.5 Entrainment and Associated Mitigation

Sada (2001) assessed trout mortality caused by entrainment at the Gem and Agnew Lake intakes through the Rush Creek Powerhouse turbines during 11 consecutive months in 1998/1999, and six consecutive months in 2000. A total of 156 brook trout and 35 rainbow trout were captured during 2208 hours of sampling in 1998/1999. The high mortality and the large size of fish suggested that fish had free access into the Gem Lake Intake. Inspections during March 1999 revealed a large, V-shaped gap in the intake “screen” (debris barrier) that covered the intake structure in Gem Lake. The gap measured approximately 3 feet across its widest point and allowed fish unimpeded access into the penstock. The gap was repaired during April 2000 and another set of trials was conducted from May through October 2000 (1008 sampling hours). During that period, a total of 21 brook trout and one rainbow trout mortalities were recorded. Calibration trials found that fyke nets captured 98% of the fish passing through Rush Creek Powerhouse turbines.

The annual estimated mortality during 1998 and 1999 was 857.4 fish (694.5 brook trout and 160.3 rainbow trout). After intake “screen” were repaired, estimated annual mortality in 2000 was 194.9 fish (183.7 brook trout and 8.7 rainbow trout). Differences in mortality observed before and after the repair indicated that the barrier substantially reduce fish entrainment.

To mitigate for lost trout due to turbine mortality, SCE agreed to stock six hundred catchable-sized (0.5 to 1.0 pound each) rainbow trout into nearby Silver Lake in 2004, to mitigate for 200 fish lost in each of the next 3 years of Rush Creek Project operation (2002–2004). SCE also agreed to stock 1,000 catchable-sized (0.5 to 1.0 pound each) rainbow trout into Silver Lake in 2009 and every 5 years thereafter (for the life of the FERC license) (SCE 2002).

4.5.6 Special-Status Aquatic Species

4.5.6.1 Sierra Nevada Yellow-Legged Frog

In general, habitat for SNYLF includes streams, lakes, and ponds in montane riparian, lodgepole pine, subalpine conifer, and wet meadow habitats. They breed in shallow water in low gradient perennial streams and lakes. They are known to inhabit elevations ranging from 4,500 to 12,000 feet. Presence or absence is inversely correlated with the presence or absence of predatory fish (e.g., trout).

There are five known breeding populations of SNYLF within 1 mile of the FERC Project boundary (CDFW 2016) (Map 4.5-2 [confidential]) These populations are upstream of Waugh Lake in tributary streams free of predatory fish populations. The populations are known to be positive for Chytrid fungus (*Batrachochytrium dendrobatidis*), but nevertheless are persisting, and CDFW monitors these populations on a 3- to 5-year schedule (CDFW 2016).

The CNDDB (2020) query yielded four records within 1 mile of the FERC Project boundary:

- A 1993 record approximately 0.5 mile east of the Rush Creek Powerhouse in the Reversed Peak Study Area. Revisited in 2003, but no individuals were found.
- A 2010 record approximately 1 mile west of the western point of Waugh Lake in a small tributary stream.
- A 2010 record approximately 0.25 mile south of Waugh Lake in a small tributary stream.
- A 2013 record approximately 1 mile south of Waugh Lake in a small tributary stream and associated alpine lakes.

The NRIS (Forest Service 2017) query yielded 98 records within 1 mile of the FERC Project boundary between 2000 and 2010 (Forest Service 2017). These records are located in the same general vicinity as the CNDDB records.

Map 4.5-2 (confidential) shows the location of all SNYLF observations and known breeding populations.

The FERC Project boundary overlaps Critical Habitat Unit 3/Subunit 3B for SNYLF. Critical Habitat encompasses Waugh Lake and Gem Lake (and Rush Creek between the two lakes) (Map 4.5-3).

4.5.6.2 Yosemite Toad

In general, habitat for YT includes montane meadows and forest borders; breeds in shallow pools, at lake margins, or in pools of quiet streams at elevations ranging from 6,400 to 11,300 feet. YT presence could potentially be negatively correlated with the presence of predatory fish (e.g., trout).

YT are known to occur within 1 mile of the FERC Project boundary but there are no known breeding populations (CDFW 2016) (Map 4.5-2 [confidential]).

The NRIS (Forest Service 2017) query yielded three records within 1 mile of the FERC Project boundary:

- A 2002 record from adjacent to a small tributary stream upstream of the western Waugh Lake.
- Two 2003 records approximately 1 mile south of Waugh Lake within a large meadow system.

The FERC Project boundary overlaps Critical Habitat Unit 5 (Tuolumne Meadows/Cathedral) for YT (USFWS 2016). Critical Habitat encompasses Waugh Lake and Rush Creek downstream of Rush Meadows Dam (Map 4.5-3).

4.5.7 References

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TABLES

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Table 4.5-1. Project-affected Stream and Lake Reaches.

Reach Name	Reach Length (miles) / River Mile (RM)	Elevation Range (feet) (% gradient)	Description
Rush Creek			
Waugh Lake	1.51 (RM 22.24–23.75)	9,376.4–9,444 (0.85%)	Project Reservoir
Rush Creek Below Rush Meadow Dam	1.83 (RM 20.41–22.24)	9,036–9,376.4 (3.52%)	Moderate Gradient Mountain Stream
Gem Lake	0.93 (RM 19.48–20.41)	9,008–9,036 (0.57%)	Project Reservoir
Rush Creek Below Gem Dam	0.30 (RM 19.18–19.48)	8,539.2–9,008 (29.60%)	Steep Mountain Stream
Agnew Lake	0.58 (RM 18.60–19.18)	8,460–8,539.2 (2.59%)	Project Reservoir
Rush Creek Below Agnew Dam	0.40 (RM 18.2–18.60)	8,214–8,460 (11.65%)	Steep Mountain Stream
Rush Creek Horsetail Falls	0.54 (RM 17.66–18.2)	7,306.8–8,214 (31.82%)	Steep Mountain Stream
Rush Creek Above Silver Lake	0.94 (RM 16.72–17.66)	7,216.2–7,306.8 (1.83%)	Low-Gradient Meadow Stream*
Silver Lake	0.83 (RM 15.89–16.72)	7,214.7–7,216.2 (0.03%)	Natural Lake
Rush Creek Below Silver Lake	2.69 (RM 13.20–15.89)	7,131–7,214.7 (0.59%)	Low-Gradient Stream
South Rush Creek			
South Rush Creek	0.46 (RM 0.0–0.46)	7,221–7,551.7 (13.62%)	Steep Mountain Stream*

*This stream reach has some very low gradient and some steeper-gradient sections

Table 4.5-2. Primary Management Fish Species and Special-Status Species in the Vicinity of the Project.

Species Common and Scientific Name	Status			Location										
	Federal Status	State Status	Recreational/ Commercial/ Tribal Importance	Rush Creek Above Waugh Lake	Waugh Lake	Rush Creek–Rush Meadows Dam to Gem Lake	Gem Lake	Rush Creek – Gem Dam to Agnew Lake	Agnew Lake	Rush Creek – Agnew Dam to Silver Lake	Silver Lake	Rush Creek – Silver Lake Outflow to Grant Lake	Grant Lake	Rush Creek – Grant Dam to Mono Lake
Special-Status Species														
Sierra Nevada yellow-legged frog *Rana sierrae*	E	T	N	See Section 4.5.6 for known locations and Critical Habitat maps. The species is known to occur, or Critical Habitat is Present, in or within 1 mile of the FERC Project Boundary. There is Potential (P) for occurrence in the Rush Creek reaches or lakes listed above, but there are no known occurrences (Section 5.5.6).										
Yosemite toad *Anaxyrus canorus*	T	SSC	N	See Section 4.5.6 for known locations and Critical Habitat maps. The species is known to occur, or Critical Habitat is Present, in or within 1 mile of the FERC Project Boundary. There is Potential (P) for occurrence in the Rush Creek reaches or lakes listed above, but there are no known occurrences (Section 5.5.6).										
Unlisted Species of Recreational, Commercial, and/or Tribal Importance														
Rainbow Trout *Oncorhynchus mykiss*	--	--	Y	K	K	K	K	K	K	K	K	K	K	K
Rainbow Trout/Golden Trout *Oncorhynchus mykiss/aguabonita*	--	--	Y	K	K	K	P	P	P	--	--	--	--	--

Species Common and Scientific Name	Status			Location										
	Federal Status	State Status	Recreational/ Commercial/ Tribal Importance	Rush Creek Above Waugh Lake	Waugh Lake	Rush Creek–Rush Meadows Dam to Gem Lake	Gem Lake	Rush Creek – Gem Dam to Agnew Lake	Agnew Lake	Rush Creek – Agnew Dam to Silver Lake	Silver Lake	Rush Creek – Silver Lake Outflow to Grant Lake	Grant Lake	Rush Creek – Grant Dam to Mono Lake
Brook Trout *Salvelinus fontinalis*	--	--	Y	K	K	K	K	K	K	K	K	K	K	K
Brown Trout *Salmo trutta*	--	--	Y	--	--	--	--	--	--	P	K	K	K	K
Lahontan Cutthroat Trout *Oncorhynchus clarkii henshawi*	--	--	Y	--	--	--	--	--	--	--	P	--	K	--

[1.] Juveniles have been documented using the Lower American River and Feather Rivers for non-natal rearing.

Notes:
CDFW = California Department of Fish and Wildlife
E = Federal or State Endangered
K = Known to occur
P = Potential for occurrence in appropriate habitat
SSC = California Species of Special Concern
T = Federal or State Threatened
U = Unlikely to occur (outside of known geographic or elevation range of species, but could be present in vicinity)

Table 4.5-3. Known and Potential Barriers to Upstream Migration in the Vicinity of the Project.

Reach/Barrier Name	Barrier Location (river mile)	Elevation Range (feet) (% gradient)	Type of Barriers	Recent Modification
Rush Creek				
Rush Meadow Dam	RM 22.24	9,392	Dam – no fish migration	—
Rush Creek Below Rush Meadow Dam	RM 20.4 to 20.7 and RM 21.15 to 21.6	7.95% and 4.04%	Potential barriers throughout reach due to steep gradients	—
Gem Dam	RM 19.48	9,027.5	Dam – no fish migration	—
Rush Creek Below Gem Dam	RM 19.18–19.48	8539.2–9,008 (29.60%)	Potential barriers throughout reach due to steep gradients	—
Agnew Dam	RM 18.60	8,470	Dam – no fish migration	New notch in bottom of the dam potentially allows fish migration through the dam; however, the natural bedrock terrain immediately downstream of the dam may not allow fish migration.
Rush Creek Below Agnew Dam	RM 18.2–18.60	8,214–8,460 (11.65%)	Potential barriers throughout reach due to steep gradients	—
Rush Creek Horsetail Falls	RM 17.66–18.2	7,306.8–8,214 (31.82%)	Potential barriers throughout reach due to steep gradients	—
Grant Lake Dam	RM 9.32	7,131	Dam – no fish migration	—

Table 4.5-4. FERC Elevation Requirements for Waugh, Gem, and Agnew Lakes, Including Current Seismic Restrictions

Reservoir	Current License Elevation Requirement (but Superseded by Current Seismic Restrictions)	Seismic Restrictions (Maximum Elevation, Feet)
Waugh Lake		
Regular Water Years	Within 2 feet of spillway elevation (9,416 feet) July 1 to the Tuesday following Labor Day weekend[1]	9,392.1 feet
Low Water Years (<75% of the April 1 snow water equivalent for the Mono Basin)	Within 3 feet of spillway elevation (9,416 feet) July 1 to the Tuesday following Labor Day weekend[2]	
Gem Lake		
Regular Water Years	Within 2 feet of spillway elevation (9,052 feet) July 1 to the Tuesday following Labor Day weekend[1]	9,027.5 feet
Low Water Years (<75% of the April 1 snow water equivalent for the Mono Basin)	Within 6 feet elevation (9,052 feet) July 1 to the Tuesday following Labor Day weekend[2]	
Agnew Lake		
All Water Years	Within 15 feet of spillway elevation (8,496 feet) July 1 to the Tuesday following Labor Day weekend	Completely Drained (8,470.0 feet)

Notes:

[1] Licensee may maintain reduced lake levels when necessary to avoid the spill of water from Gem Lake at potentially damaging volumes. In such event, Licensee shall cause the water level in Waugh and Gem Lakes to reach 2 feet below the spillway elevations as soon as practicable after July 1.

[2] To the extent sufficient water is available to meet (i) minimum stream flow requirements required in Condition No. 5, and (ii) a target 14 cfs release from the project powerhouse, based on plant operational minimums.

Table 4.5-5. Unimpaired Flow Statistics (WY 1990-2019) for Rush Creek Below Rush Meadows Dam, Gem Dam, Agnew Dam, and Silver Lake.

Exceedance or Average	Unimpaired Flow (cfs)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rush Creek Below Rush Meadows Dam												
95%	0.6	0.9	2.3	6.8	30.9	24.0	7.6	2.2	0.6	0.6	0.6	0.7
90%	0.7	1.7	3.5	9.4	41.2	33.0	10.9	3.3	0.7	0.6	0.6	1.0
75%	2.0	2.9	4.9	14.9	66.9	60.6	18.3	5.5	1.4	1.0	1.1	1.9
50% Median	4.4	5.4	7.9	25.4	100.7	112.8	41.3	10.6	2.9	2.2	3.0	3.6
Average	7.3	6.4	10.2	36.2	116.1	142.4	80.1	21.3	6.6	5.7	4.9	5.0
25%	8.5	8.8	13.3	45.3	151.9	209.8	113.9	24.8	8.2	6.5	6.7	6.1
10%	13.1	13.1	20.7	80.2	218.6	283.6	229.6	48.9	16.3	10.9	9.9	9.8
5%	18.8	14.9	26.8	103.1	253.2	325.5	276.1	75.9	23.8	15.0	14.2	13.3
Rush Creek Below Gem Dam												
95%	0.9	1.3	3.4	10.0	45.7	35.5	11.2	3.3	0.9	0.9	0.9	1.0
90%	1.0	2.6	5.2	14.0	60.9	48.8	16.1	4.9	1.0	0.9	0.9	1.5
75%	2.9	4.3	7.3	22.1	98.9	89.6	27.1	8.1	2.0	1.4	1.7	2.9
50% Median	6.5	8.0	11.7	37.6	148.8	166.8	61.0	15.6	4.3	3.2	4.4	5.3
Average	10.8	9.4	15.1	53.5	171.6	210.6	118.5	31.5	9.8	8.5	7.3	7.4
25%	12.6	13.0	19.6	67.0	224.5	310.2	168.4	36.6	12.1	9.5	9.9	9.0
10%	19.4	19.4	30.6	118.6	323.3	419.4	339.4	72.3	24.2	16.1	14.6	14.5
5%	27.9	22.0	39.6	152.4	374.4	481.3	408.3	112.3	35.2	22.1	21.0	19.6

Exceedance or Average	Unimpaired Flow (cfs)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rush Creek Below Agnew Dam												
95%	1.0	1.4	3.6	10.6	48.3	37.6	11.9	3.4	1.0	1.0	1.0	1.0
90%	1.1	2.7	5.5	14.8	64.4	51.6	17.1	5.2	1.1	1.0	1.0	1.6
75%	3.1	4.5	7.7	23.4	104.6	94.7	28.6	8.6	2.1	1.5	1.8	3.0
50% Median	6.9	8.5	12.4	39.7	157.4	176.3	64.5	16.5	4.5	3.4	4.7	5.6
Average	11.4	10.0	16.0	56.5	181.4	222.7	125.2	33.2	10.3	8.9	7.7	7.8
25%	13.3	13.8	20.7	70.9	237.4	328.0	178.1	38.5	12.7	10.1	10.5	9.5
10%	20.5	20.5	32.3	125.4	341.8	443.4	358.9	76.7	25.5	17.1	15.5	15.4
5%	29.4	23.3	41.9	161.2	395.9	508.8	431.6	118.7	36.7	23.4	22.2	20.8
Rush Creek Below Silver Lake												
95%	6.6	8.4	14.8	25.8	80.5	51.7	20.4	9.1	5.4	5.2	5.3	5.7
90%	7.7	10.9	16.9	30.2	99.2	69.1	26.6	10.8	6.1	5.7	6.2	7.9
75%	11.2	14.5	20.9	45.4	137.7	127.0	41.9	15.3	7.3	6.7	8.7	10.4
50% Median	15.9	19.0	26.7	65.5	199.4	237.6	88.7	26.4	11.2	11.5	13.6	14.5
Average	23.3	22.3	32.5	81.4	236.7	293.2	163.5	48.4	19.0	16.2	16.1	17.1
25%	25.0	26.5	38.8	99.5	297.2	435.9	235.2	56.5	22.3	17.7	19.4	20.3
10%	34.9	35.4	54.8	156.9	450.4	573.4	442.5	105.4	41.9	26.6	27.8	28.7
5%	52.7	42.2	73.0	193.4	520.0	663.1	552.2	170.5	58.8	32.3	37.2	35.6

Table 4.5-6. Percent of Maximum WUA for Adult and Juvenile Rainbow and Brook Trout at various Flow Releases from Waugh Lake to upper Rush Creek, and Magnitude and Cumulative Change in WUA Between Flows.

Flow (cfs)	Percent of Maximum WUA				Magnitude of Change in Percent Maximum WUA Between Flows				Cumulative Change in Percent Maximum WUA Between Flows			
	Rainbow Trout		Brook Trout		Rainbow Trout		Brook Trout		Rainbow Trout		Brook Trout	
	Adult	Juvenile	Adult	Juvenile	Adult	Juvenile	Adult	Juvenile	Adult	Juvenile	Adult	Juvenile
5	100	100	100	100	0	0	0	0	0	0	0	0
7	98.7	98.7	97.3	89.7	-1.3	-1.3	-2.7	-10.3	-1.3	-1.3	-2.7	-13.3
10	95.8	93.5	91.8	80	-2.9	-5.2	-5.5	-9.7	-4.2	-6.5	-8.2	-20
12	93.6	89.7	88.1	75.2	-2.2	-3.8	-3.7	-4.8	-6.4	-10.3	-11.9	-24.8
15	89.9	84.1	83.1	69.2	-3.7	-5.6	-5	-6	-10.1	-15.9	-16.9	-30.8
20	84.3	75.6	75.7	61.8	-5.6	-8.5	-7.4	-7.4	-15.7	-24.4	-24.3	-38.2
25	79.4	68.5	69.3	56.3	-4.9	-7.1	-6.4	-5.5	-20.6	-31.5	-30.7	-43.7
30	75.1	62.8	63.4	51.7	-4.3	-5.7	-5.9	-4.6	-24.9	-37.2	-36.6	-48.3

Source: Table 3 in FERC 1992

Table 4.5-7. CDFW Historical Fish Stocking Data for Waugh Lake.

Year	Species	Number	Year	Species	Number
1965	RT	4500	1952	RT	5000
1963	RT	5400	1951	RT	Unknown
1962	RT	5040	1950	RT	Unknown
1961	RT	4800	1949	RT	Unknown
1960	RT	4800	1948	RT	Unknown
1959	RT	5120	1947	RT	Unknown
1958	RT	5016	1946	RT	Unknown
1957	RT	5025	1945	RT	Unknown
1956	RT	5040	1944	RT	Unknown
1955	RT	5025	1943	RT	Unknown
1954	RT	5000	1942	RT	Unknown

Source: CDFW pers. comm

Table 4.5-8. Waugh, Gem, and Agnew Lake Gillnet Sampling Data.

Lake	Survey Date	Species	ID	Count	Length (mm)			Weight (g)		
					Avg	Min	Max	Avg	Min	Max
Waugh Lake	July 28, 2002	Brook trout	BK	18	155	90	240	49	7	136
		Rainbow trout	RT	1	111	111	111	13	13	13
Gem Lake	July 31, 2002	Brook trout	BK	3	154	97	246	49	8	125
		Rainbow trout	RT	2	166	117	215	56	13	98
Agnew Lake	July 30, 2002	Brook trout	BK	25	190	150	233	65	33	109
		Rainbow trout	RT	6	191	123	261	76	16	158

Source: CDFW

Notes:
g = grams
mm = millimeters

Table 4.5-9. Gem Lake Historical Fish Stocking.

Year	Species	Number	Year	Species	Number	Year	Species	Number
2014	ELT	10000	1983	RT	6250	1961	RT	10000
2013	RT	10000	1982	RT	10000	1960	RT	10500
2012	RT	10000	1981	RT	8000	1959	RT	10240
2011	RT	10000	1980	RT	9600	1958	RT	10032
2009	RT	10000	1978	RT	9000	1957	RT	10000
2007	RT	10000	1977	RT	10000	1956	RT	10080
2006	RT	10000	1976	RT	10000	1955	RT	10000
2005	RT	10000	1975	RT	10000	1954	RT	10000
2003	RT	9000	1974	RT	10000	1953	RT	7920
2000	RT	10000	1973	RT	9600	1952	RT	15000
1999	RT	10000	1972	RT	10000	1951	RT	8000
1998	RT	10000	1971	RT	9600	1950	RT	4900
1997	RT	10000	1970	RT	10080	1939	BK	30020
1996	RT	10000	1969	RT	10050	1937	BK	15015
1995	RT	10000	1968	RT	10000	1934	BK	45030
1994	RT	10000	1967	RT	10000	1934	BK	19998
1993	RT	10000	1966	RT	10200	1933	BK	20000
1992	RT	10000	1965	RT	9000	1932	BK	24000
1991	RT	10000	1963	RT	10500	1931	BK	20000
1990	RT	10000	1962	RT	10080	1930	BK	20000

Source: CDFW pers. comm.

Table 4.5-10. Agnew Lake Historical Fish Stocking.

Year	Species	Number	Year	Species	Number	Year	Species	Number
2014	ELT	5000	1983	RT	3750	1960	RT	4800
2013	RT	5000	1982	RT	5000	1959	RT	5120
2012	RT	5000	1981	RT	Unknown	1958	RT	5016
2011	RT	5000	1978	RT	5000	1957	RT	5025
2009	RT	5000	1977	RT	5000	1956	RT	5040
2007	RT	5000	1976	RT	2500	1955	RT	5025
2006	RT	5000	1975	RT	5000	1954	RT	5000
2005	RT	5000	1974	RT	4800	1953	RT	9360
2003	RT	5000	1973	RT	4800	1952	RT	5000
2000	RT	5000	1972	RT	4800	1951	RT	5000
1999	RT	5000	1971	RT	5120	1950	RT	2100
1998	RT	5000	1970	RT	5040	1949	RT	4800
1997	RT	5000	1969	RT	5000	1948	BK	Unknown
1996	RT	5000	1968	RT	5100	1947	BK	Unknown
1995	RT	5000	1967	RT	5000	1942	BK	Unknown
1994	RT	5000	1966	RT	5100	1941	BK	Unknown
1993	RT	5000	1965	RT	4500	1940	BK	Unknown
1992	RT	5000	1964	RT	4200	1939	BK	10033
1991	RT	5000	1962	RT	5040	1938	BK	10044
1990	RT	5000	1961	RT	4800	1937	BK	6000

Source: CDFW pers. comm.

Table 4.5-11. Rush Creek (Rush Meadows Dam to Gem Lake) Fish Sampling Data 1985 and 1986.

RM/Site Name	Sample Date	Fish (lbs/acre)	Fish (lbs/mile)	Fish/ Mile	Avg Fulton Condition Factor	Species	Sample Length (ft)
RM 21.3 Upper Area IFIM and Fish	1985	21	46	669	1.06	RBT 79% BT 21%	369
	1986	7	18	413	1.16	RBT 79% BT 21%	
RM 20.6 Gorge Area IFIM and Fish	1985	12	23	514	1.12	RBT 24% BT 76%	350
	1986	8	22	543	1.08	RBT 67% BT 33%	

Notes:
ft = feet
IFIM = Instream Flow Incremental Methodology
lbs = pounds
RM = river mile

Table 4.5-12. Average Abundance and Standing Crop of Brook Trout and Rainbow Trout x Golden Trout Hybrids Occurring in 5-20 m Long Sections of Rush Creek, Reach 1 (RM 22.02) during Spring, Summer and Autumn Samples in 1999, 2000, 2001, 2002, and 2010.

Species / Metric	Samples										
	1999		2000			2001			2002	2010	
	Aug 23-24	Oct 21-22	May 17-18	Aug 6-8	Oct 19-20	May 12-13	Aug 9-10	Oct 25-26	May 12-13	Jun 27-30	Oct 16-23
Brook Trout											
Population Estimate (fish/20 m)	1.6 (0.4)	8.2 (1.4)	2.8 (0.7)	3.4 (0.4)	8.8 (1.4)	5.5 (0.2)	9.8 (0.9)	6.8 (0.8)	7.3 (0.6)	7	4.2
Standing Crop (g/20 m)	54.9 (13.6)	271.5 (59.0)	78.4 (22.0)	181.3 (21.3)	424.7 (48.6)	123.2 (21.5)	380.5 (44.0)	272.4 (49.4)	180.8 (15.3)	218.4	157.5
Population Density (fish/m2)	0.01 (0.0)	0.1 (0.0)	0.0 (0.01)	0.02 (0.0)	0.1 (0.03)	0.04 (0.00)	0.09 (.01)	0.08 (0.01)	0.06 (0.00)	0.05 (0.02)	0.03 (0.02)
Biomass Density (g/m2)	0.4 (0.1)	3.3 (0.7)	0.6 (0.2)	0.8 (0.2)	3.9 (1.2)	0.9 (0.1)	3.4 (0.5)	3.3 (0.8)	1.4 (0.1)	1.67	1.52
Fish / Mile*	128	656	224	272	704	440	784	544	584	563.3	334.0
Rainbow Trout											
Population Estimate (fish/20 m)	1.2 (0.5)	1.6 (0.4)	0.8 (0.5)	1.2 (0.4)	3.8 (1.3)	4.0 (0.4)	4.8 (1.0)	3.5 (0.8)	4.0 (0.6)	3.8	1.8
Standing Crop (g/20 m)	54.7 (14.0)	81.3 20.5)	17.5 (11.8)	55.6 (14.2)	221.4 (80.0)	128.5 (28.1)	321.4 (61.9)	258.1 (59.6)	191.6 (47.5)	175.18	73.98
Population Density (fish/m2)	0.01 (0.0)	0.02 (0.0)	0.01 (0.01)	0.01 (0.0)	0.05 (0.02)	0.03 (0.00)	0.05 (0.01)	0.05 (0.01)	0.03 (0.00)	0.03 (0.01)	0.01 (0.0)
Biomass Density (g/m2)	0.4 (0.1)	1.1 (0.4)	0.1 (0.1)	0.4 (0.1)	2.6 (1.0)	1.0 (0.3)	3.2 (0.6)	3.9 (0.9)	1.5 (0.3)	1.64	0.55
Fish / Mile*	96	128	64	96	304	320	384	280	320	305.8	144.8
Discharge (cfs)	28.9	2.4	34.8	47	2.11	48.4	14.7	3.57	38.2	28.6	18.5

* Calclulated from population estimate data above; not exact due to rounding of the population estimate data

Table 4.5-13. Mean abundance and Standing Crop of Brook Trout and Rainbow Trout X Golden Trout Hybrids Occurring in 5-20 m Long Sections of Rush Creek, Reach 2 (RM 21.65) during Spring, Summer, and Autumn Samples in 1999, 2000, 2001, 2002, and 2010.

Species / Metric	Samples										
	1999		2000			2001			2002	2010	
	Aug 23-24	Oct 21-22	May 17-18	Aug 6-8	Oct 19-20	May 12-13	Aug 9-10	Oct 25-26	May 12-13	Jun 27-30	Oct 16-23
Brook Trout											
Population Estimate (fish/20 m)	1.0 (0.5)	3.1 (1.3)	0.4 (0.2)	1.6 (0.6)	2.8 (0.6)	3.3 (0.6)	2.5 (0.6)	2.5 (0.6)	3.0 (0.4)	0.2	1.4
Standing Crop (g/20 m)	32.9 (17.6)	126.9 (46.2)	15.8 (11.2)	3.8 (23.9)	229.2 (114.7)	40.7 (8.1)	120.7 (36.0)	56.3 (11.1)	52.3 (11.4)	6.24	52.5
Population Density (fish/m2)	0.01 (0.0)	0.03 (0.0)	0.0 (0.0)	0.01 (0.0)	0.02 (0.01)	0.02 (0.0)	0.02 (0.0)	0.02 (0.00)	0.02 (0.00)	0.0 (0.0)	0.01 (0.0)
Biomass Density (g/m2)	0.2 (0.1)	1.0 (0.4)	0.09 (0.06)	0.22 (0.1)	1.6 (0.7)	0.2 (0.1)	0.8 (0.3)	0.4 (0.1)	0.3 (0.1)	0.02	0.17
Fish / Mile*	80	248	32	128	224	264	200	200	240	16.1	112.7
Rainbow Trout											
Population Estimate (fish/20 m)	1.4 (0.7)	3.6 (1.5)	1.0 (0.3)	1.4 (0.5)	10.2 (3.0)	4.8 (0.5)	4.5 (0.8)	6.5 (1.3)	5.5 (0.2)	1.6	1.4
Standing Crop (g/20 m)	61.0 (31.7)	196.8 (81.2)	38.7 (18.9)	74.4 (31.4)	430.2 (202.1)	198.9 (13.9)	218.2 (37.8)	414.8 (75.6)	302.6 (31.0)	73.76	57.54
Population Density (fish/m2)	0.01 (0.0)	0.03 (0.0)	0.01 (0.00)	0.01 (0.0)	0.07 (0.03)	0.03 (0.01)	0.03 (0.01)	0.05 (0.01)	0.03 (0.00)	0.01 (0.0)	0.01 (0.0)
Biomass Density (g/m2)	0.3 (0.2)	1.6 (0.7)	0.4 (0.2)	0.3 (0.2)	3.4 (1.9)	1.1 (0.1)	1.5 (0.3)	2.9 (0.7)	1.6 (0.2)	0.41	0.023
Fish / Mile*	112	288	80	112	800	384	360	520	440	305.8	144.8
Discharge (cfs)	28.9	2.4	34.8	47	2.11	48.4	14.7	3.57	38.2	38.5	14.9

* Calclulated from population estimate data above; not exact due to rounding of the population estimate data

Table 4.5-14. Average (± 1 SD) and Range of Fork Lengths (mm) and Weight (g) of all Rainbow Trout x Golden Trout Hybrids and Brook Trout Captured in Two Reaches during Population Surveys in Upper Rush Creek during 1999, 2000, 2001, 2002, and 2010.

Year	Brook Trout						Rainbow Trout x Golden Trout Hybrids				
	Date	Average Length (mm)	Length Range (mm)	Average Weight (g)	Weight Range (g)	Number	Average Length (mm)	Length Range (mm)	Average Weight (g)	Weight Range (g)	Number
1999	Aug 23-24	151.8 (28.7)	93- 194	35.0 (18.5)	8.1 - 70.9	13	155.4 (33.4)	110 - 208	43.1 (2O.O)	16.7 - 71.9	12
	Oct 21-22	141.4 (30.7)	78- 215	33.9 (17.8)	6.0- 87.9	46	158.3 (42.7)	88- 238	54.9 (39.1)	8.1 - 147.9 '	26
2000	May 17-18	143.5 (30.0)	82 - 205	31.1 (17.1)	5.9 - 69.1	13	150. 5 (22.4)	123-180	37.0 (16.1)	18.2- 65.1	9
	Aug 6-8	147.0 (22.6)	94- 203	36.1 (13.8)	9.9- 73.2	12	164.5 (29.0)	128 - 212	47.0 (20.4)	25.3 - 90.9	14
	Oct 19-20	153.6 (34.6)	68- 270	41.5 (21.3)	3.6 - 119.5	61	1 46.5 (53.1)	41- 230	43.5 (29.6)	0.6-130.9	69
2001	May 12-13	144.5 (32.3)	82- 207	17.8 (10.2)	3.4 - 40.0	40	142.7 (20.7)	38- 120	36.7 (18.5)	20.6-112.4	38
	Aug 9-10	160.3 (28.0)	103- 225	40.7 (18.2)	12.2 - 115.5	51	178.3 (35.6)	105 - 225	59.7 (28.5)	10.0- 119.6	42
	Oct 25-26	149.1 (26.9)	70- 218	36.0 (17.7)	3.9 - 93.1	48	152.4 (24.5)	117 - 221	64.9 (31.7)	28.6- 175.0	44
2002	May 12-13	146.8 (32.1)	83 - 218	21.9 (12.8)	4.0- 59.0	48	142.3 (19.0)	119 - 193	48.7 (20.6)	26.8 -112.0	47
2010	Jun 27-30	151.7	94-194	31.2	10.3-62.5	32	159.5	92-235	46.1	9.1-127.1	25
	Oct 16-23	151.5	84-204	37.5	7.3-88.6	36	148.7	79-235	41.1	5.9-135.5	21

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FIGURES

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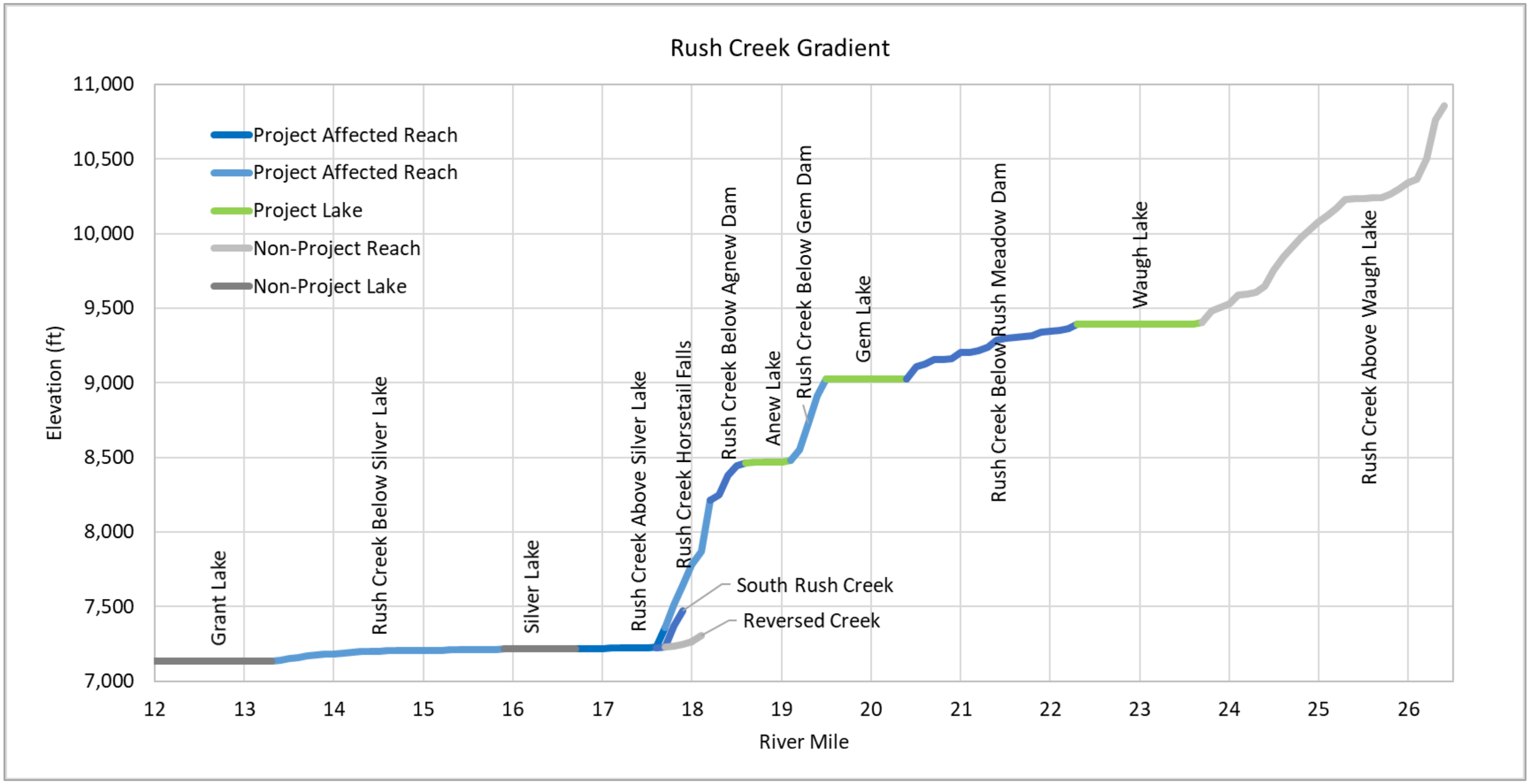


Figure 4.5-1. Rush Creek Stream and Lake Reaches.

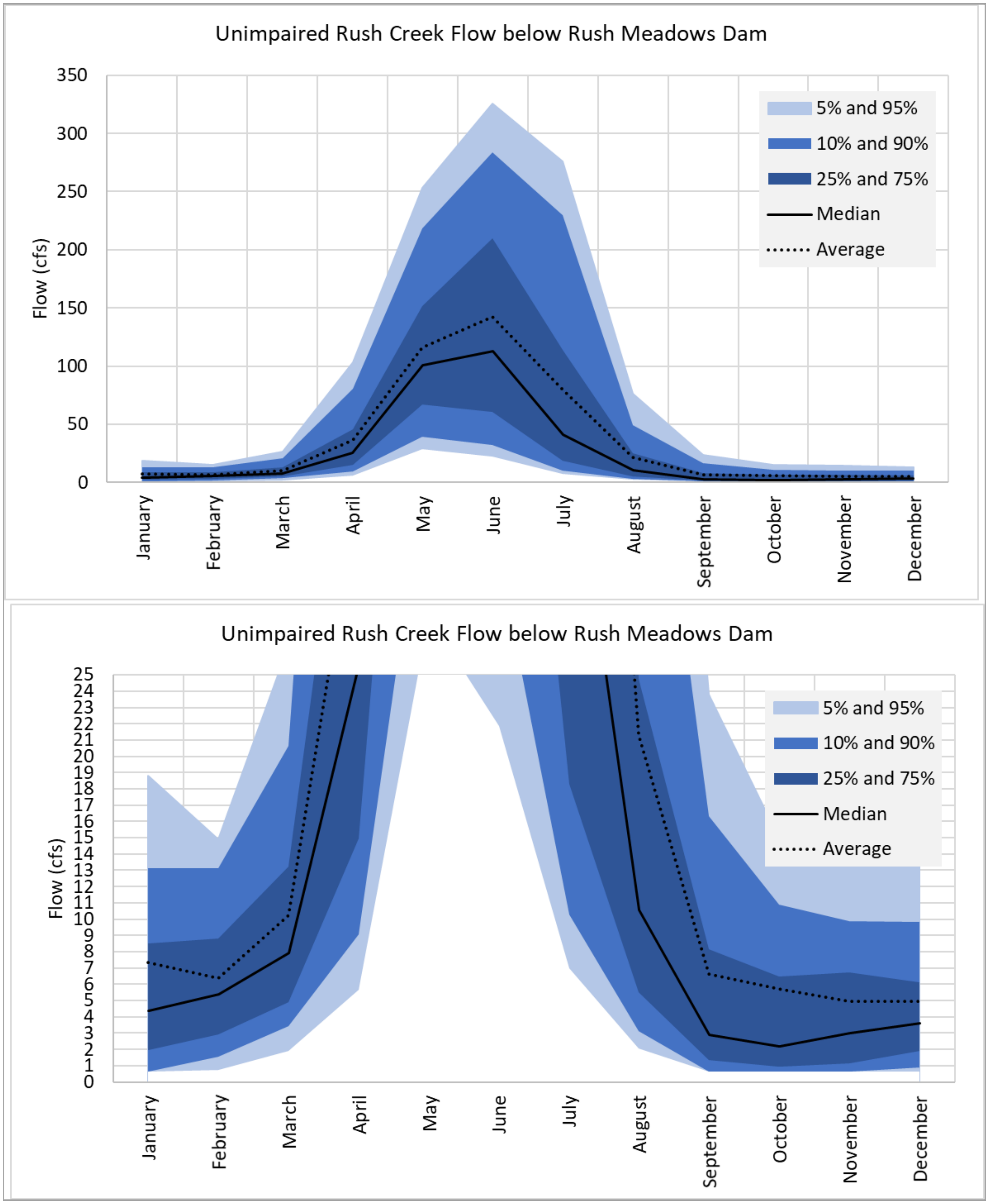


Figure 4.5-2. Rush Creek Unimpaired Flow Below Rush Meadows (Waugh Lake) Dam (WY 1990–2019).

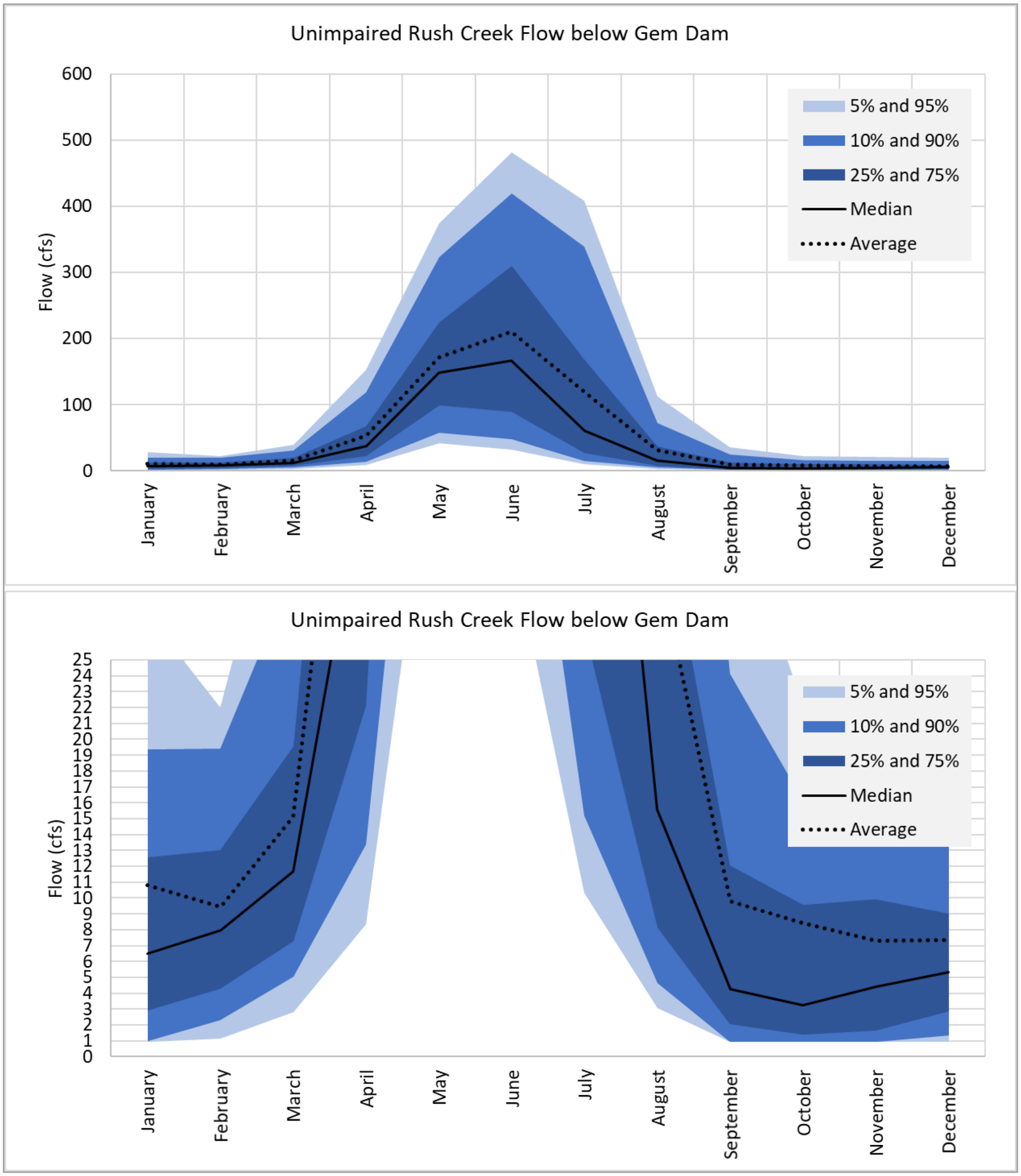


Figure 4.5-3. Rush Creek Unimpaired Flow Below Gem Lake Dam (WY 1990–2019).

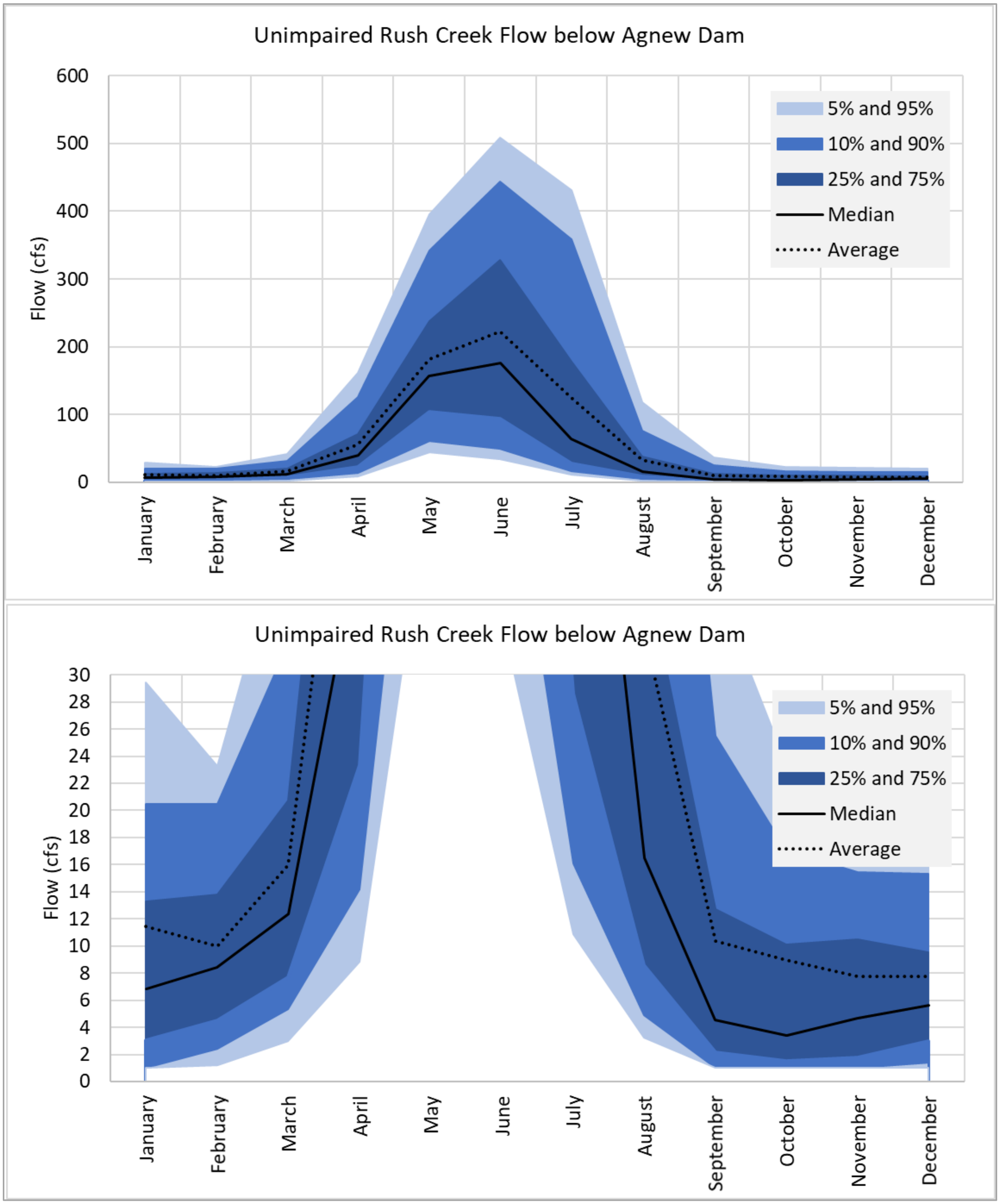


Figure 4.5-4. Rush Creek Unimpaired Flow Below Agnew Lake (WY 1990–2019).

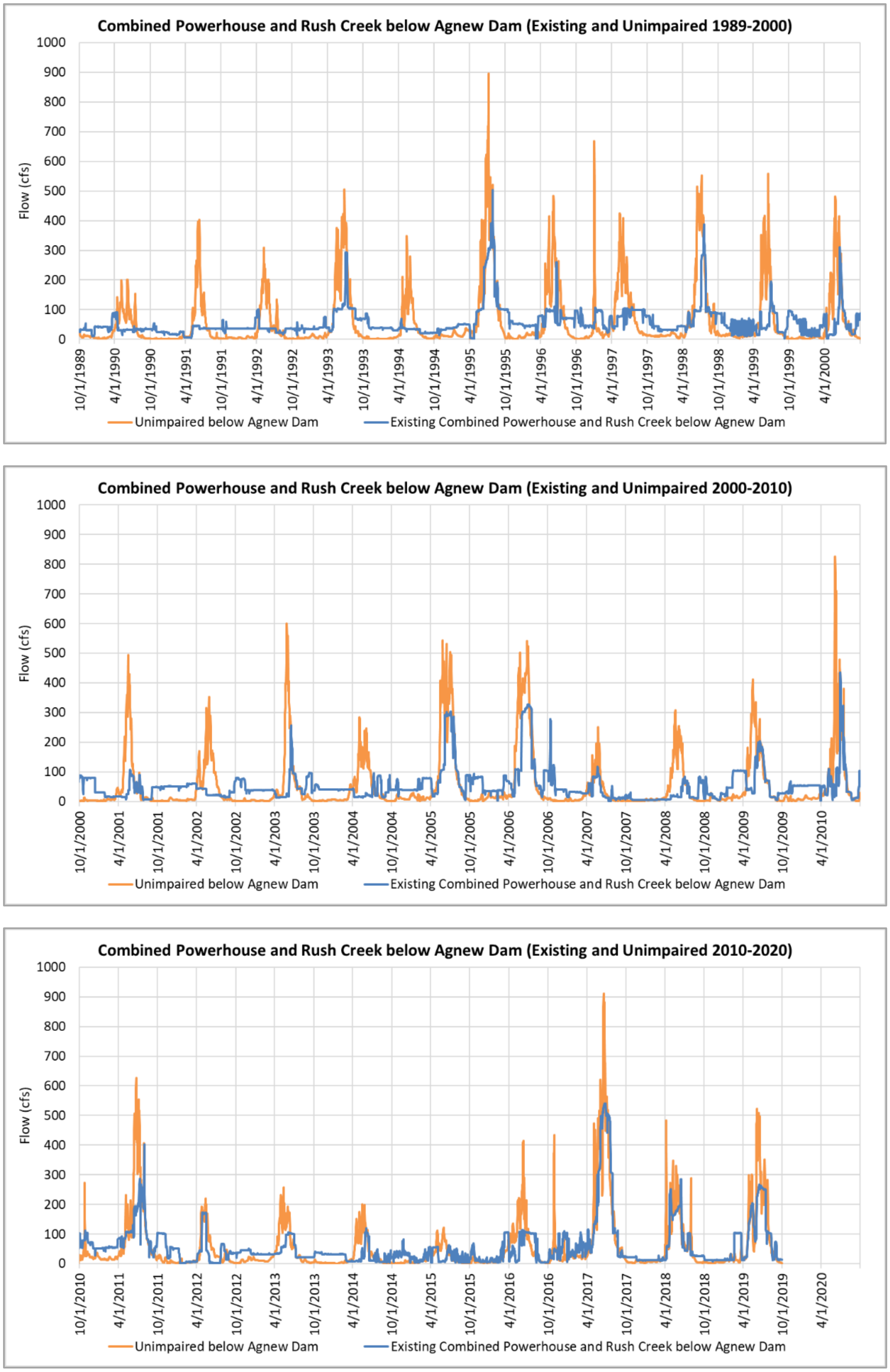


Figure 4.5-5. Historical Mean Daily Flows (WY 1990–2019) and Unimpaired Flows for the Combined Powerhouse and Rush Creek below Agnew Dam Location (SCE 357/USGS 10287289 and SCE 367/USGS 10287300).

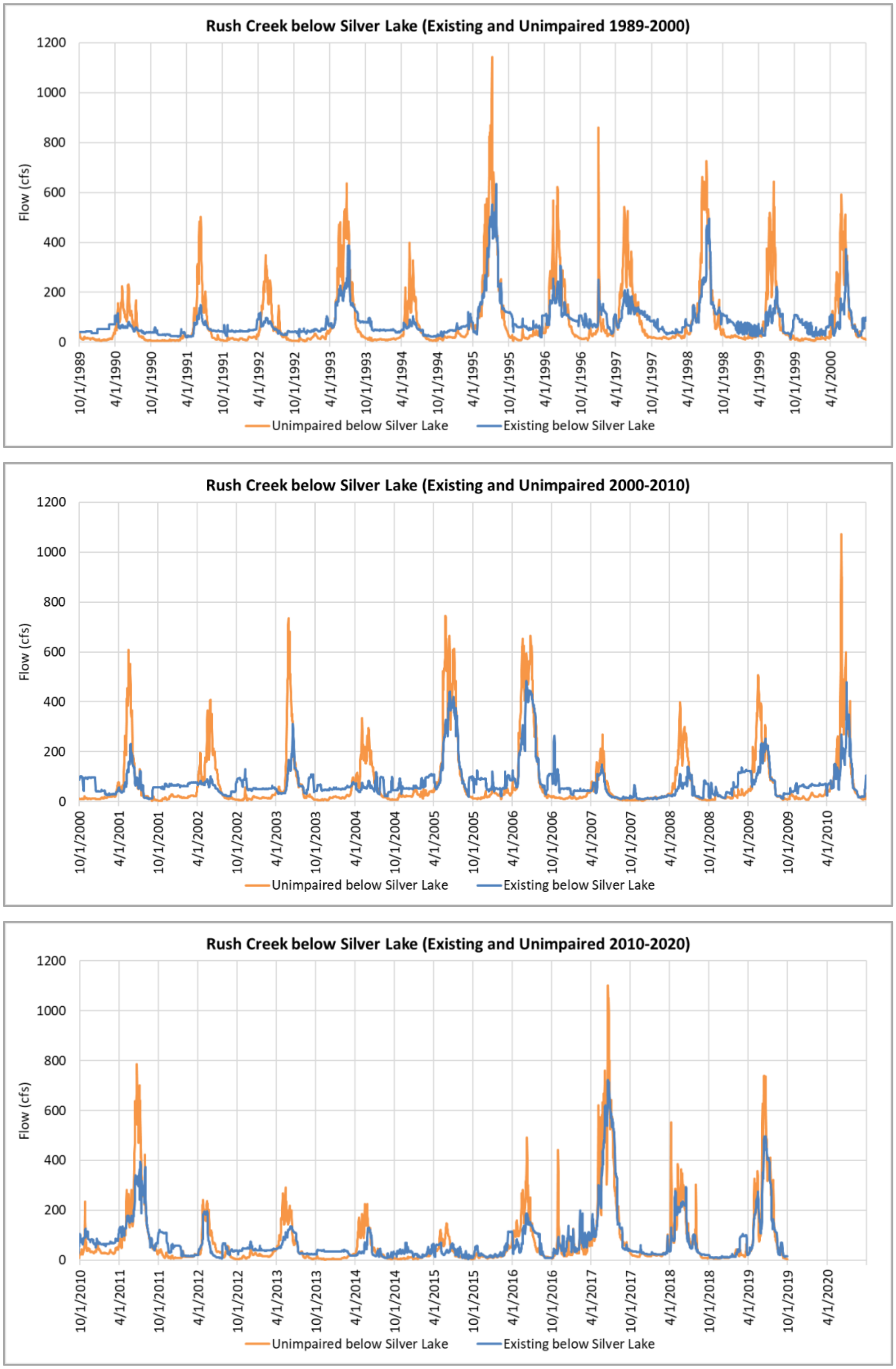


Figure 4.5-6. Historical Mean Daily Flows (WY 1990–2019) and Unimpaired Flows for Rush Creek below Silver Lake (LADWP MS 5013 / USGS 10287400).

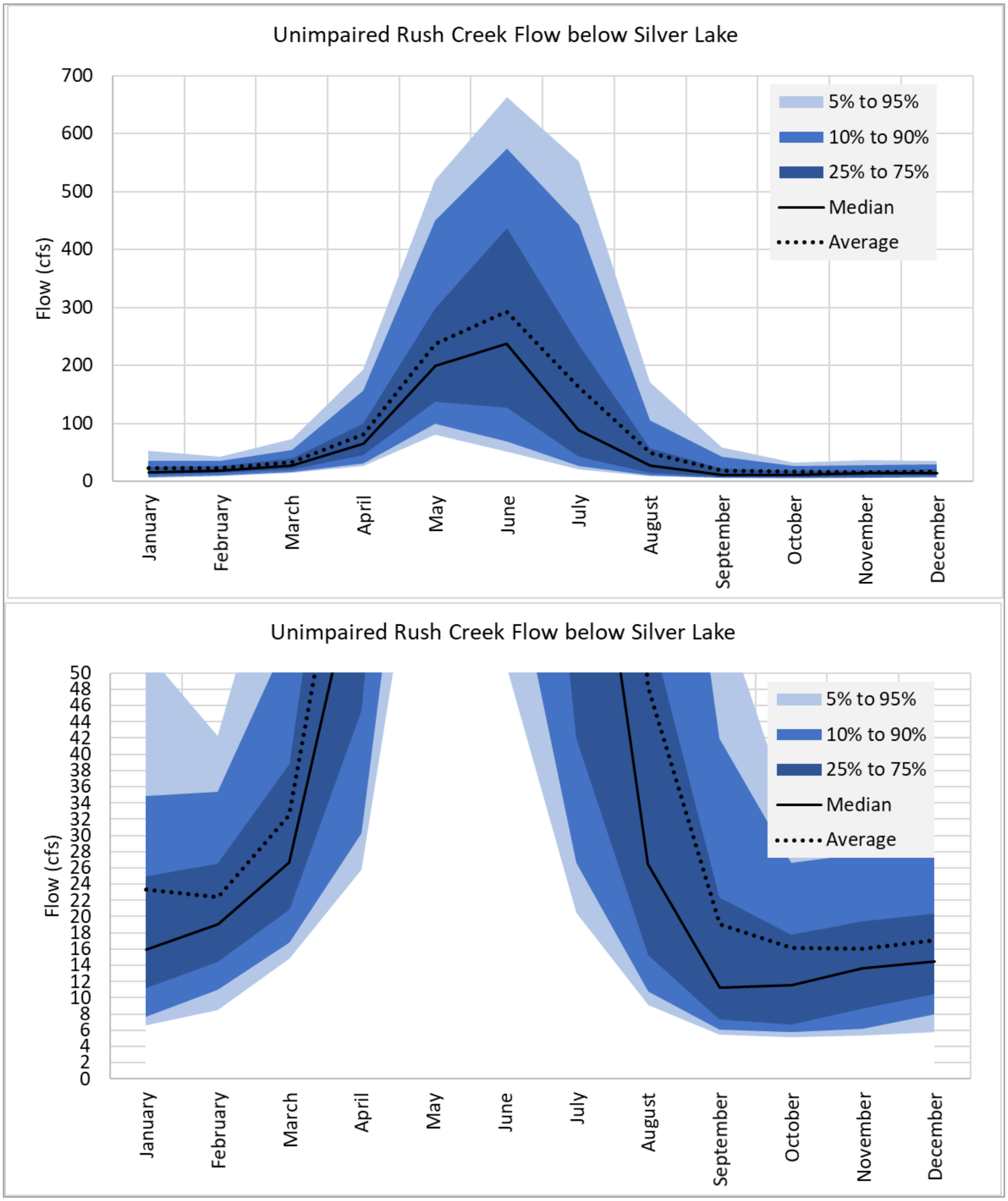
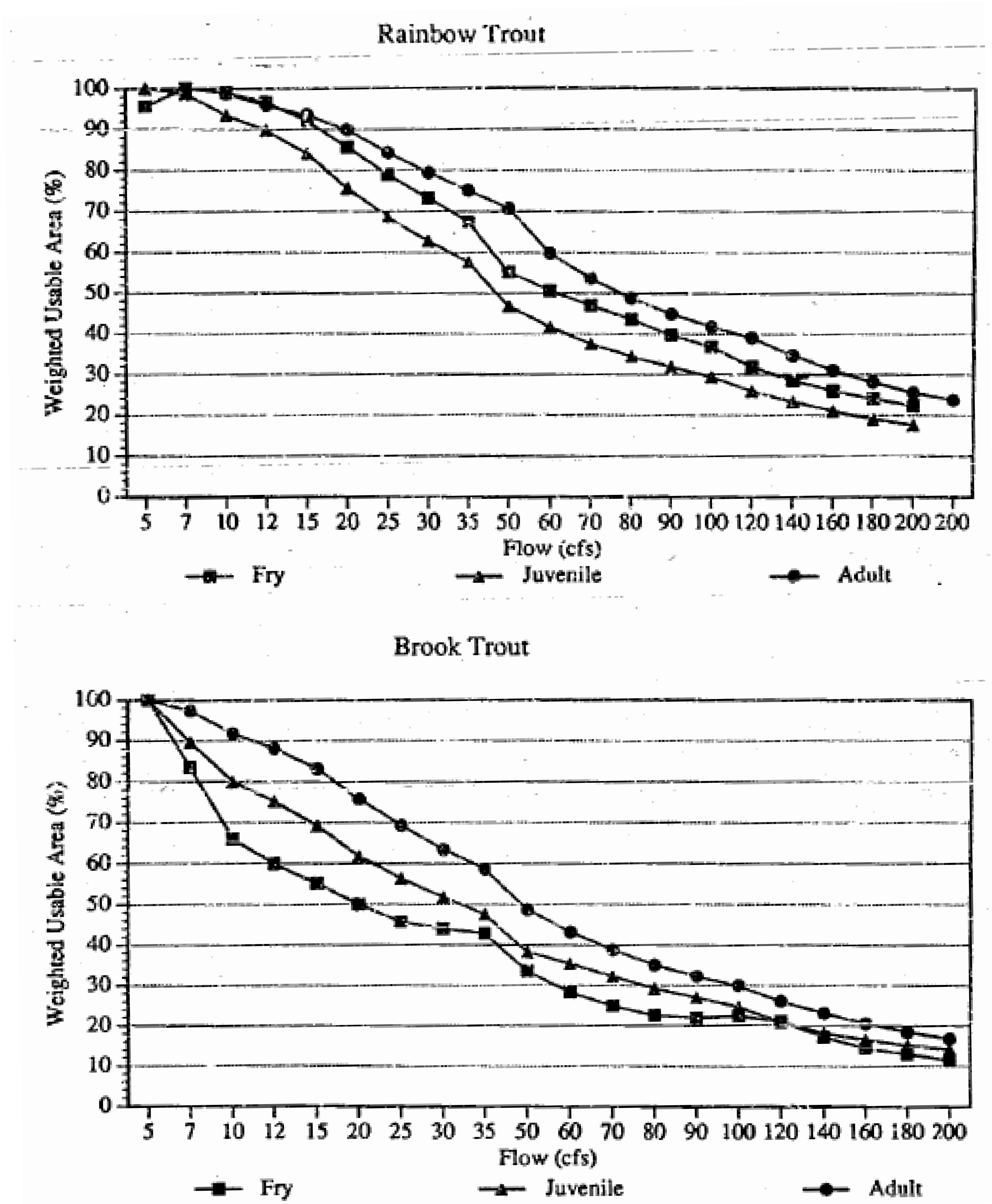


Figure 4.5-7. Rush Creek Unimpaired Flow Below Silver Lake (WY 1990–2019).



Source: Figure 4 in FERC 1992

Figure 4.5-8. Percent of Maximum WUA for fry, adult and juvenile rainbow and brook trout at various flow releases from Waugh Lake to upper Rush Creek.

MAPS

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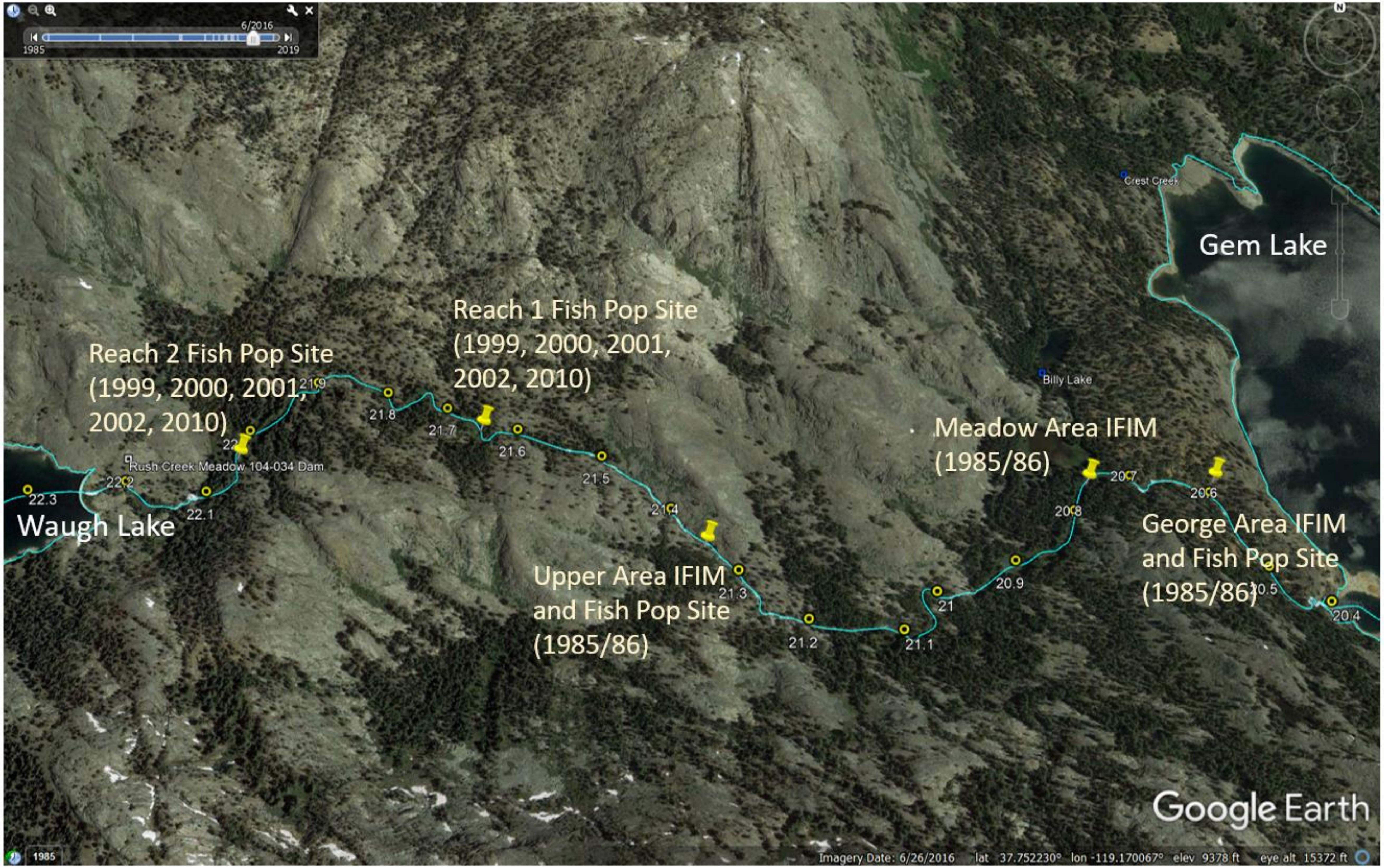

Map 4.5-1. Rush Creek Instream Flow Incremental Methodology and Fish Population Sites

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CONFIDENTIAL INFORMATION

The following map is being withheld from public disclosure in accordance with applicable regulations. It contains details on the locations of special-status biological resources and qualifies as Confidential Information (18 CFR § 385.1112). Disclosure of such information could be harmful to these resources. To further understand FERC's regulations regarding confidential filings visit: https://www.ferc.gov/enforcement-legal/foia.

Map 4.5-2 Occurrences of SNYLF and YT within 1 Mile of the FERC Project Boundary (Confidential)

Map 4.5-2 will not be distributed to the general public. Documents containing Confidential Information may be requested by entities and organizations with jurisdiction over these resources. To request copies, please contact Matthew Woodhall, SCE Relicensing Project Manager at (909) 362-1764 or matthew.woodhall@sce.com.

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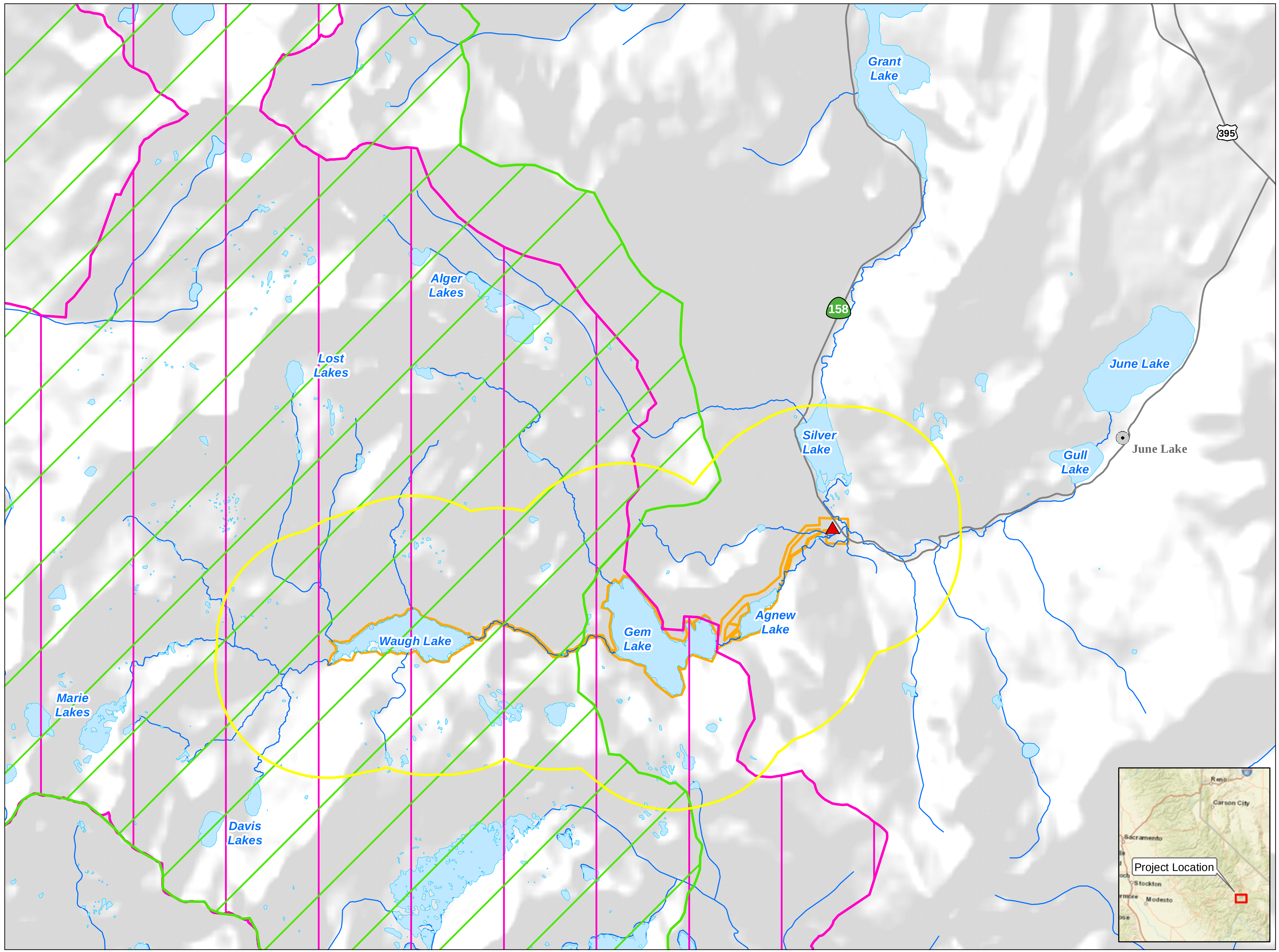

Map 4.5-3

Location of SNYLF and YT Critical Habitat within 1 Mile of the FERC Project Boundary

C:\GIS\Cardno\30735240_SCE_EasternHydro\map\Rush Creek\AquaticMaps\SCE_RUSH_CREEK_SNYLF_YT_Critical_Habitat_1mile_Buff_17i11i_01.mxd

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APPENDIX 4.5-A

Life History Information for Special-status Aquatic Species

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KNOWN TO OCCUR IN RUSH CREEK/VICINITY OF THE PROJECT

Sierra Nevada yellow-legged frog (*Rana sierrae*) – Federal Endangered (FE), State Threatened (ST)

Sierra Nevada yellow-legged frog are found from around 4,500 feet to over 12,000 feet elevation, and inhabit ponds, lakes, and streams of sufficient depth for overwintering (Jennings and Hayes 1994). This species is highly aquatic, typically utilizing only the immediate bank and emergent rocks and logs. Their preferred aquatic habitat consists of stream or lakes with a gentle slope such that at the shore there is shallow warm water. Historically, the densest populations were associated with streams with a bank of less than 10 inches in vertical height with a moderately rocky, sparsely vegetated bank (Mullally and Cunningham 1956). Site fidelity is high for breeding, foraging and overwintering for this species (Matthews and Preisler 2010).

Sierra Nevada yellow-legged frog primarily feed on aquatic and terrestrial invertebrates along the shoreline and on the water surface (Vredenburg et al. 2005), while larvae feed on benthic algae and detritus (Knapp et al. 2003). Pope and Matthews (2001) noted that seasonal movements appeared to be correlated to the abundance of Pacific tree frog larvae, a prey species of adult yellow-legged frogs. Pope and Matthews (2002) found that abundance of tree frog larvae in a water body as a source of prey positively influenced the condition of yellow-legged frogs, especially important leading into winter. Pope and Matthews (2002) also analyzed species occurrence data of lakes across the John Muir Wilderness and Kings Canyon National Park, and found that adult yellow-legged frogs were more abundant in lakes with other frog species than in lakes with no other frog species, and suggested this pattern was due to other frog species' larvae used as a food source.

All age classes (sub-adult, adult frogs, and larvae) overwinter underwater; in high elevations they are restricted to relatively deep lakes (over 5 feet deep) that do not freeze solid in winter (Knapp 1993, Knapp and Matthews 2000).

Breeding occurs soon after spring thaw, ranging from April at lower elevations to June or July in high elevations (Vredenburg et al. 2005). During spring thaw, frogs emerge to the surface to bask in the sun, or travel over ice and snow to other nearby bodies of water (Pope and Matthews 2001), while larvae seek warmer water near shore (after spring turnover in large bodies of water) (Bradford 1984). Sierra Nevada yellow-legged frog lay their eggs in clusters submerged in shallow areas (Bradford 1983), under banks or attached to rocks, gravel, or vegetation (Vredenburg et al. 2005). Larvae require at least 1 year before metamorphosis to the adult stage. The time required to reach reproductive maturity is believed to vary between 3 and 4 years after metamorphosis (Vredenburg et al. 2005), and adult survivorship is very high (Matthews and Pope 1999).

During summer, frogs and larvae seek the warmest thermal regimes throughout the day and night (Bradford 1984). Adults are rarely far from water, usually less than 1 meter and almost always on a wet substrate while basking, typically from sunrise into late morning (Bradford 1984). Bradford (1984) observed daily movements of adults corresponding to areas of warmer temperatures; in morning they basked in sun, were in water near shore from mid-day until nightfall, and submerged in warmer deeper water for most of the night, usually under rocks or in crevices. Larvae exhibited similar selection for warmer temperatures throughout the day and night, as well as seasonally; they stay in deeper, warmer water below the thermocline until spring turnover, at which time they move to shallow water near the shoreline for the daytime and deeper, warmer water at night (Bradford 1984). Highest summer densities and overall total numbers are found in lakes lacking introduced fish, possessing high numbers of Pacific tree frog (Pseudacris regilla) tadpoles, more than 1 meter in depth and near-shore habitat with warm-water temperatures (Pope and Matthews 2001). Sierra Nevada yellow-legged frog individuals typically travel in or along aquatic corridors, and researchers have documented maximum upstream/downstream movements up to approximately 2 miles (USFWS 2014). Sierra Nevada yellow-legged frog individuals may also make overland movements of up to approximately 0.26 mile (USFWS 2014)

USFWS has designated Critical Habitat for this species (USFWS 2016). Parts of the Project Area and vicinity are within Critical Habitat Unit 3/Subunit 3B, encompassing Waugh Lake and Gem Lake and Rush Creek between the two lakes. There are four records of Sierra Nevada yellow-legged frog within 1 mile of the Project Area (CNDDB 2020). There are no Recovery Plans currently available for this species.

Yosemite toad (*Anaxyrus canorus*) – Federal Threatened (FT), California Species of Conservation Concern (CSC)

The current geographic range for Yosemite toad is similar to the historical range, which spanned elevations from 4,790 to 11,910 feet from Alpine to Fresno Counties (USFWS 2014). The Yosemite toad is considered a high-elevation endemic species (Stebbins 2003 in Liang 2010) and habitat models confirmed that the species is more likely to occur at higher elevations (Liang 2010). Breeding and rearing habitat occurs in shallow warm waters, most commonly in wet meadows, including both standing and flowing water, but also in small permanent and ephemeral ponds, lake edges, and slow moving streams and sloughs (Forest Service 2015). On the Sierra National Forest, Liang (2010) found that seasonal waters in relatively flat meadows facing a southwesterly direction with warmer water temperatures were most likely to be used by toads for breeding. Breeding site characteristics are likely related to the short season available to the species and generally are associated with warm-water environments conducive to rapid development (Forest Service 2015).

Yosemite toad breed from mid-April to mid-July, depending on local conditions (i.e., snowmelt), and are active during the summer months (Zeiner et al. 1988). Eggs and larvae develop in the shallow water areas and metamorphosis occurs by late summer of the same year (Kagarise Sherman and Morton 1984, Liang 2010). After the breeding period, adult Yosemite toads disperse into upland habitats (including meadows, ephemeral streams, seeps and springs, and uplands [Martin 2008, Liang 2010]), where the majority of their life is spent. Overwintering habitat has not been well characterized. It has been suggested that adult and juvenile Yosemite toads overwinter in the root tangles at the bases of willows, in crevices beneath rocks and stumps, and in the burrows of mountain voles (*Microtus montanus*), pocket gophers (*Thomomys* spp.), Belding's ground squirrels (*Spermophilus beldingi*), and yellow-bellied marmots (*Marmota flaviventris*; Kagarise Sherman 1980, Davidson and Fellers 2005, also see Forest Service 2015). Martin (2008) suggested that the forest soils in which these overwintering burrows were located probably provide moist soil conditions that would prevent desiccation of toads in burrows but not wet conditions that would act to conduct cold temperatures. Quality of overwintering sites has not been examined, but large deep burrows, such as those of Belding's ground squirrels, may provide high-quality overwintering sites (see Kagarise Sherman 1980 in Forest Service 2015).

The multi-year studies of Kagarise Sherman (1980), Martin (2008), Liang (2010), and Brown et al. (2012) using marked animals reveal that adults show high site fidelity to breeding and adult habitats (Forest Service 2015). Movement and dispersal patterns of Yosemite toads are not fully understood (Forest Service 2015). Recent telemetry studies suggest that toads move greater distances than were initially reported. In a pilot study on toad movements in the Sierra National Forest, Liang followed two adults (one male and one female) from each of two breeding sites at Kaiser Peak Meadow in June (Liang 2007). The two females moved straight-line distances of 359 meters (1,178 feet) and 417 meters (1,368 feet) in 3.5 and 2.5 weeks, respectively; the two males moved distances of 301 meters (988 feet) and 1.36 kilometers (0.84 mile) in 11 and 3.5 weeks, respectively. Subsequent work on 42 radio-tracked toads at another set of meadows indicated that individuals traveled as far as 1.26 kilometers (0.78 mile) from meadows into upland habitats, but average travel distance was 275 meters (902 feet) from the breeding meadow (Liang 2010).

USFWS has designated Critical Habitat for this species (USFWS 2016). Parts of the Project Area and vicinity are within Critical Habitat Unit 5 (Tuolumne Meadows/Cathedral), encompassing Waugh Lake and Rush Creek downstream of Rush Meadows Dam. There are three records of Yosemite toads within 1 mile of the Project Area (Forest Service 2017). There are no Recovery Plans currently available for this species.

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BCC	Birds of Conservation Concern
Cal-IPC	California Invasive Plant Council
CALVEG	Classification and Assessment with LANDSAT of Visible Ecological Groupings
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFP	California Fully Protected Species
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRPR	California Rare Plant Ranking
CSC	California Species of Special Concern
CWHR	California Wildlife Habitat Relationships
Eagle Act	Bald and Golden Eagle Protection Act
ESA	Endangered Species Act
FC	Federal Candidate
FE	Federally Endangered
FEIS	Final Environmental Impact Statement
FERC	Federal Energy Regulatory Commission
Forest Service	United States Forest Service
FPD	Federally Proposed for Delisting
FPE	Federally Proposed Endangered
FPT	Federally Proposed Threatened
FSCC	Inyo National Forest Species of Conservation Concern
FT	Federally Threatened
GIS	Geographic Information System
INF	Inyo National Forest
invasive plant	non-native invasive plant
IPaC	Information for Planning and Consultation
LANDSAT	land satellite
NRIS	Natural Resource Information System
Project	Rush Creek Project
SCE	Southern California Edison Company
SE	State Endangered
SR	State Rare
ST	State Threatened

USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service

4.6 BOTANICAL AND WILDLIFE RESOURCES

This section describes botanical and terrestrial wildlife resources in the vicinity[1] of Southern California Edison Company's (SCE) Rush Creek Project (Project). The Federal Energy Regulatory Commission's (FERC) content requirements for this section are specified in Title 18 of the Code of Federal Regulations Chapter I § 5.6 (d)(3)(v), and 5.6(d)(3)(vii), respectively. In addition, this section describes rare, threatened, and endangered botanical and terrestrial wildlife resources. A description of aquatic resources in the vicinity of the Project, including rare, threatened, and endangered aquatic resources, is included in Section 4.5, Fish and Aquatic Resources.

Information in this section is primarily based on data from resource agency files, reports, and databases; published literature; and to a lesser extent, applicable field studies published by SCE in 2017, 2018, and 2020. This information will be used to determine any additional technical studies that will be necessary to facilitate an analysis of potential Project impacts on terrestrial resources.

4.6.1 Botanical Resources

This section describes botanical resources within 1 mile of the FERC Project boundary, including vegetation alliances and common plants; special-status plants; and non-native invasive plants (invasive plants).

4.6.1.1 Vegetation Alliances and Common Plants

Available information on vegetation alliances was used to characterize habitat conditions and identify common plant species that occur in the vicinity of the Project. The term "alliance" corresponds closely to what plant ecologists call a community type and foresters call a forest type or stand. An alliance is characterized by the dominant species of plants (e.g., trees, shrubs, or herbaceous species) that make up the overstory. This usage is consistent with standards developed by the Federal Geographic Data Committee as part of the National Vegetation Classification System.

Information on vegetation alliances is based on Classification and Assessment with land satellite (LANDSAT) imagery of Visible Ecological Groupings (CALVEG) mapping and vegetation alliance descriptions developed by the United States Forest Service (Forest Service) Region 5. The CALVEG system is used to classify existing vegetation present on federally managed forestlands based on LANDSAT color infrared satellite imagery. Data are verified using soil-vegetation maps and professional guidance from various sources statewide. CALVEG data for the Southern Sierra was updated by the Forest Service in 2014.

Maps of vegetation alliances within 1 mile of the FERC Project boundary were developed using CALVEG geographic information system (GIS) data layers for the Southern Sierra ecoregion (Forest Service 2014) overlain on a map of the Project facilities. The 1-mile

[1] The vicinity of the Project encompasses all lands/resources within 1 mile of the FERC Project boundary.

extent was determined to be sufficient to encompass no-disturbance buffers that state and federal agencies use when determining potential impacts to wildlife species. Examples of no-disturbance buffers considered include 0.25-mile buffer for California spotted owl and northern goshawk nests; 660-foot buffer for bald eagle nests; and 500-foot buffer for other raptor nests. Descriptions of each vegetation alliance present within 1 mile, including descriptions of common plant species found in each alliance, were obtained from the Forest Service Region 5 website.

Riparian habitats are afforded protections under Section 1600-1607 of the California Fish and Game Code (as administered by the California Department of Fish and Wildlife [CDFW]) and under Section 404 of the Clean Water Act (under the jurisdiction of the United States Army Corps of Engineers [USACE]). Wetland habitats are protected under Section 404 and 401 of the Clean Water Act (under the jurisdiction of the USACE and the Lahontan Regional Water Quality Control Board). In addition, CDFW maintains a ranking list of Sensitive Natural Communities in the State of California. Sensitive Natural Communities with ranks S1, S2, and S3 are protected under the California Environmental Quality Act (CEQA).

Refer to Table 4.6-1 for a list of vegetation alliances that occur within 1 mile of the FERC Project boundary. Map 4.6-1a-c shows the extent of each vegetation alliance. One sensitive natural community, quaking aspen (S3), is known to occur within the FERC Project boundary and extends outside the boundary (comprises approximately 175 acres). A description of each vegetation alliance, including common plant species associated with each alliance, is provided in Appendix 4.6-A.

4.6.1.2 Special-Status Plants

This section describes special-status plants that are known to occur or may potentially occur within 1 mile of the FERC Project boundary.

For the purposes of this document, a special-status plant is defined as any plant species that is granted protection by a federal or state agency. Federally listed plant species granted status by United States Fish and Wildlife Service (USFWS) under the Federal Endangered Species Act (ESA) include threatened (FT), endangered (FE), proposed threatened or endangered (FPT, FPE), candidate (FC), or listed species proposed for delisting (FPD).

State of California listed plant species, which are granted status by the CDFW under the California Endangered Species Act (CESA) include state threatened (ST), endangered (SE), rare (SR), and California Species of Special Concern (CSC).

California Native Plant Society (CNPS) maintains the California Rare Plant Ranks (CRPR), a ranking system for rare, threatened, or endangered plants in California. Under the CEQA, special-status plants include the following CRPR rankings:

- 1A (presumed extirpated in California and either rare or extinct elsewhere);
- 1B (rare, threatened, or endangered in California and elsewhere);

- 2A (presumed extirpated in California but common elsewhere); and
- 2B (rare, threatened, or endangered in California but common elsewhere).

The Inyo National Forest (INF) also maintains lists of plant species of special concern (FSCC) that were designated by the INF Forest Supervisor as part of the development of the INF's Revised Land Management Plan and Final Environmental Impact Statement (FEIS) (Forest Service 2019b).

A comprehensive list of special-status species was compiled from the following sources:

- INF FSCC list (Forest Service 2019a).
- CNPS Inventory of Rare, Threatened and Endangered Plants (CNPS 2020).
- USFWS Information for Planning, and Conservation System (IPaC) website was queried to generate a list of federal endangered and threatened species (USFWS 2020).

This comprehensive list was then evaluated to determine which plant species occur or may potentially occur within 1 mile of the FERC Project boundary based on a review of the following:

- The geographical location and elevation of the Project and vegetation alliances and other habitat features present
- A query of the California Natural Diversity Database (CNDDB) (CNDDB 2020) to obtain information on known occurrences
- INF Rationales for Plant Species Considered for Designation as Species of Conservation Concern (Forest Service 2018a)
- Supplemental information (e.g., habitat descriptions and occurrences) obtained from a review of the following Project-specific sources:
    - FERC's Environmental Assessment, Rush Creek Project (FERC Project No. 1389) (FERC 1992)
    - SCE's Survey Report for Phase I and Phase II Projects (SCE 2017, 2018)
    - SCE’s Survey Report for Gem Dam Value Upgrade (SCE 2020)

Plant species on the list are categorized as follows:

- **Known to occur:** Plants with recorded populations within 1 mile of the FERC Project boundary, as determined by CNDDB or SCE studies;

- **May potentially occur in suitable habitat:** Plants that may potentially occur within 1 mile of the FERC Project boundary based on the geographical location and elevation of the Project (i.e., 7,200 to 9,500 feet) and vegetation alliances and other habitat features present (i.e., those listed in Table 4.6-1) are categorized as potentially occurring; and

- **Unlikely to occur:** Plants that are unlikely to occur because the Project is located outside of the species' range or appropriate habitat is not present within 1 mile of the FERC Project boundary, are categorized as unlikely to occur.

Table 4.6-2 provides a comprehensive list of special-status plant species evaluated for their potential to occur within 1 mile of the FERC Project boundary. Table 4.6-2 also summarizes pertinent information for each species, including status, blooming period, and preferred habitat, with information on the location of occurrences, if applicable. Map 4.6-2 (confidential) shows known occurrences based on the results of the CNDDB query and literature review. Appendix 4.6-B provides life history information for special-status plants categorized in Table 4.6-2 as known to occur or potentially occurring.

Two populations of one special-status plant species, the whitebark pine (*Pinus albicaulis*) (FC), are known to occur within the FERC Project boundary near Rush Meadows Dam and Gem Dam. Two species have documented occurrences within 1 mile of the FERC Project boundary—the fell-fields claytonia (*Claytonia megarhiza*) (FSCC, CRPR 2B.3) and bog sandwort (*Sabulina stricta*) (CRPR 2B.3).

Seventy-five plant species have not been documented within 1 mile of the FERC Project boundary, but have the potential to occur based on the geographic location and elevation of the Project and the vegetation alliances present.

There is no USFWS-designated Critical Habitat for federally listed special-status plants within 1 mile of the FERC Project boundary; and no recovery plans are in effect.

The remaining species listed on Table 4.6-2 are considered unlikely to occur, either because the Project is outside the geographic or elevation range of the species, and/or appropriate habitat is not present within 1 mile of the FERC Project boundary.

4.6.1.3 Invasive Plants

The INF maintains lists of invasive plants of management concern for the Forest (Forest Service 2017a). The FEIS for the revision of the INF Land Management Plan (Forest Service 2019b) defines invasive species, including plants, as "alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health; species that cause, or is likely to cause harm and that is exotic to the ecosystem it has infested".

One invasive plant, cheatgrass (*Bromus tectorum*) is known to occur within 1 mile of the FERC Project boundary (SCE 2018). A population is present on the east side of Gem Lake. Thirty-seven additional invasive plants may potentially occur within 1 mile of the FERC Project boundary. Refer to Table 4.6-3 for a list of these species and the habitat(s) they typically occur in.

4.6.2 Wildlife Resources

This section describes wildlife resources within 1 mile of the FERC Project boundary, including wildlife habitats and common wildlife species; special-status wildlife; and game species.

4.6.2.1 Wildlife Habitats and Common Wildlife Species

Information on wildlife habitats was obtained to characterize habitat conditions and identify common wildlife species within 1 mile of the FERC Project boundary. Wildlife habitats present were determined on a “crosswalk” between Forest Service CALVEG alliances and CDFW’s California Wildlife Habitat relationships (CWHR) wildlife habitat classifications (Forest Service 2009). The CALVEG–CWHR crosswalk was developed by the Forest Service and CDFW as a way to determine which wildlife habitats are likely to be present based on existing vegetation communities and forest structural characteristics. Common wildlife species potentially occurring within these habitats were determined based on a review of *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988) and CDFW’s CWHR System Database, Version 9.0 (CDFW 2020a).

Refer to Table 4.6-1 for a list of the wildlife habitats that occur within 1 mile of the FERC Project boundary. Habitat descriptions, excerpted from *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988), are provided in Appendix 4.6-C. Table 4.6-4 provides a list of representative common wildlife species that are found in the wildlife habitats within 1 mile of the FERC Project boundary.

4.6.2.2 Special-Status Wildlife

This section describes information sources and methods for determining special-status wildlife that occur or may potentially occur within 1 mile of FERC Project boundary. This section addresses only terrestrial wildlife species. Aquatic species, including fish and aquatic amphibians and reptiles, are addressed in Section 4.5 – Fish and Aquatic Resources.

For the purposes of this document, a special-status wildlife species is defined as any animal species that is granted status by a federal, state, or local agency.

Federally listed species granted status by USFWS under the ESA include FT, FE, FPT, FPE, FC, or FPD. Bald and golden eagles are also protected under the Federal Bald and Golden Eagle Protection Act (Eagle Act). Also included as special-status species are those species listed by USFWS as Birds of Conservation Concern (BCC) which include “species, subspecies, and populations of all migratory non-game birds that, without additional conservation action, are likely to become candidates for listing under the ESA of 1973” (USFWS 2008a).

State of California listed terrestrial wildlife species which are granted status by the CDFW under the CESA include ST, SE, Fully Protected species (CFP), and CSC.

A comprehensive list of special-status wildlife species to be evaluated was compiled from the following sources:

- INF Species of Conservation Concern list (Forest Service 2019a);
- CDFW's *State and Federally Listed Endangered and Threatened Animals of California* (CDFW 2020b);
- List of species considered CFP under the California Fish and Game Code (Sections 3511, 4700, 5050, and 5515) (CDFW 2020c);
- USFWS IPaC website was queried to generate a list of federal endangered and threatened species (USFWS 2020); and
- USFWS's *Birds of Conservation Concern* (USFWS 2008a) was reviewed to obtain a list of BCC birds.

This comprehensive list was then evaluated to determine which wildlife species occur or may potentially occur within 1 mile of the FERC Project boundary based a review of the following:

- The geographical location and elevation of the Project and vegetation alliances and other habitat features (e.g., soil types) present;
- Occurrence records from the CNDDB, RareFind 5 (CNDDB 2020);
- CWHR System Database, Version 9.0 (CDFW 2020a);
- INF Rationales for Animal Species Considered for Designation as Species of Conservation Concern (Forest Service 2018b);
- Natural Resource Information System (NRIS) data from Forest Service Region 5 (Forest Service 2017b);
- Supplemental information (e.g., habitat descriptions and occurrences) obtained from a review of the following Project-specific sources:
  - FERC's Environmental Assessment, Rush Creek Project (FERC Project No. 1389) (FERC 1992);
  - SCE's Survey Report for Phase I and Phase II Projects (SCE 2017, 2018); and
  - SCE's Survey Report for Gem Dam Value Upgrade (SCE 2020).

Wildlife species on the list are categorized as follows:

- **Known to occur:** Wildlife species with recorded occurrences within 1 mile of the FERC Project boundary, as determined by CNDDB or SCE studies;
- **May potentially occur in suitable habitat:** Wildlife species that may potentially occur within 1 mile of the FERC Project boundary based on the geographical location and elevation of the Project (i.e., 7,200 to 9,500 feet) and wildlife habitats present are categorized potentially occurring; and
- **Unlikely to occur:** Wildlife species that are unlikely to occur because the Project is located outside the species' range or appropriate habitat is not present within 1 mile of the FERC Project boundary, are categorized as unlikely to occur.

Table 4.6-5 provides a comprehensive list of special-status wildlife species evaluated for their potential to occur within 1 mile of the FERC Project boundary. Table 4.6-5 also summarizes pertinent information for each species, including status and preferred habitat, with information on the location of the occurrence, if applicable. Map 4.6-2 (confidential) shows the results of the CNDDB query and literature search conducted for occurrences within 1 mile of the FERC Project boundary. Appendix 4.6-D provides life history information for special-status wildlife categorized in Table 4.6-5 as known to occur or potentially occurring, including information on the location of USFWS-designated Critical Habitat and applicable recovery plans.

Four special-status wildlife species—Sierra Nevada yellow-legged frog (*Rana sierrae*) (FE, ST), Yosemite toad (*Anaxyrus canorus*) (FT, CSC), bald eagle (*Haliaeetus leucocephalus*) (BCC, Eagle Act, FSCC, SE, CFP), and little willow flycatcher (*Empidonax traillii brewsteri*) (BCC, FSCC, SE)—are known to occur within 1 mile of the FERC Project boundary. Of these, only bald eagle has been observed within the FERC Project boundary.

There are five known breeding populations of Sierra Nevada yellow-legged frog within 1 mile of the FERC Project boundary (CDFW 2016a). These populations are upstream of Waugh Lake in tributary streams free of predatory fish populations. The populations are known to be positive for Chytrid fungus (*Batrachochytrium dendrobatidis*), but nevertheless are persisting, and CDFW monitors these populations on a 3–5-year schedule (CDFW 2016a). Yosemite toads are known to occur within 1 mile of the FERC Project boundary but there are no breeding populations. Refer to Map 4.6-2 (confidential) for the known locations of Sierra Nevada yellow-legged frog and Yosemite toad.

The FERC Project boundary overlaps Critical Habitat Unit 3/Subunit 3B for Sierra Nevada yellow-legged frog and Critical Habitat Unit 5 (Tuolumne Meadows/Cathedral) for Yosemite toad. Additionally, Critical Habitat Unit 2 (Mount Gibbs) for Sierra Nevada bighorn sheep (*Ovis canadensis sierrae*) is present within 1 mile of the FERC Project boundary. Though not considered Critical Habitat, the Cathedral Range Herd Unit of Sierra Nevada bighorn sheep has also been introduced to the east of the Project (CDFW 2015), but this Herd Unit does not occur within 1 mile of the FERC Project boundary. Map 4.6-3 shows the USFWS-designated Critical Habitats and Sierra Nevada Bighorn Sheep Herd Units within 1 mile of the FERC Project boundary.

Twenty-four additional species have not been documented within 1 mile of the FERC Project boundary, but have the potential to occur based on the geographic location and elevation of the Project and wildlife habitats present.

The remaining species listed on Table 4.6-5 are considered unlikely to occur, either because the Project is outside the known range of the species, and/or no appropriate habitat is present.

4.6.2.3 Game Species

Information on game species potentially present within 1 mile of the FERC Project boundary is provided in this section because of their commercial and recreational value. Game species are regulated by CDFW and are defined under the California Fish and Game Code as follows:

- Resident and migratory game birds are defined in California Fish and Game Code § 3500. Examples of upland resident game birds listed include blue grouse, wild turkey, mountain quail, and California quail. Upland migratory game birds include (but are not limited to) Wilson’s snipe, band-tailed pigeon, and mourning dove.

- Game mammals are defined in California Fish and Game Code § 3950(a) to include (but are not limited to) deer, wild pigs, bears, rabbits and hares, and tree squirrels. Note that mountain lions are included in § 3950, but are explicitly excluded as a game mammal in § 3950.1.

Game species described in the California Fish and Game Code were evaluated for their likelihood to occur based on the geographic and elevation range of the Project and wildlife habitats present. A table was then developed listing each species and its status; followed by a generalized habitat description and a summary of applicable CDFW hunting regulations.

Table 4.6-6 lists the resident and migratory game birds, and game mammals that have the potential to occur within 1 mile of the FERC Project boundary, including their habitat requirements and a summary of state hunting regulations for each species. Hunting of game species is permitted during seasons regulated by the CDFW.

A brief summary of the game species occurring within 1 mile of the FERC Project boundary, including resident game birds, migratory game birds and game mammals, is provided below.

Resident and Migratory Game Birds

Upland birds occurring within 1 mile of the FERC Project boundary that meet the definition of resident game birds (California Fish and Game Code § 3500) include (but are not limited to) sooty grouse (*Dendragapus fuliginosus*), mountain quail (*Oreortyx pictus*), California quail (*Callipepla californica*), and white-tailed ptarmigan (*Lagopus leucura*). Birds that meet the definition of migratory game birds include Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), bufflehead (*Bucephala clangula*), common merganser (*Mergus merganser*), and mourning dove (*Zenaida macroura*).

Game Mammals

Provided below is a description of mule deer (*Odocoileus hemionus*) and other game mammals occurring within 1 mile of the FERC Project boundary.

Mule Deer: Mule deer are among the most visible and widespread wildlife species in California. The Project is within Deer Hunt Zone X9a (CDFW 2020d). Deer hunting is regulated by California state law through CDFW. A hunting license and a hunting tag are required to take mule deer, and only bucks with antlers with demonstrable forks (or greater) may be taken, except during special hunts. Antlers must be forked on one side in the upper two-thirds section of the antler.

Other Game Mammals: Other game mammals occurring within 1 mile of the FERC Project boundary include, but are not limited to, Nuttall's cottontail (*Silvilagus nuttallii*), jackrabbits (*Lepus* spp.), beaver (*Castor canadensis*), gray fox (*Urocyon cinereoargenteus*), raccoon (*Procyon lotor*), American mink (*Mustela vison*), American badger (*Taxidea taxus*) (CSC), and black bear (*Ursus americanus*). Table 4.6-6 provides the status, habitat requirements, and a summary of state hunting regulations of these species.

Beginning July 1, 2019, non-lead ammunition is required when taking any wildlife with a firearm anywhere in California (California Fish and Game Code § 3004.5).

4.6.3 References

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TABLES

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Table 4.6-1. Vegetation Alliances and Wildlife Habitats Occurring Within 1 Mile of the FERC Project Boundary

CalVeg Vegetation Alliance	CalVeg Code	CWHR Wildlife Habitat
Herb-Dominated Alliances		
Alpine Grasses and Forbs Alliance	AC	Alpine Dwarf-Shrub
Annual Grasses and Forbs Alliance	HG	Annual Grassland
Wet Meadows Alliance	HJ	Fresh Emergent Wetland / Wet Meadow
Shrub-Dominated Alliances		
Alpine Mixed Scrub Alliance	AX	Alpine Dwarf-Shrub
Low Sagebrush Alliance	BL	Low Sage
Curlleaf Mountain Mahogany Alliance	BM	Bitterbrush / Eastside Pine / Pinyon-Juniper / Sagebrush
Great Basin Mixed Scrub Alliance	BQ	Bitterbrush / Low Sage / Sagebrush
Big Sagebrush Alliance	BS	Sagebrush
Great Basin – Mixed Chaparral Transition Alliance	BX	Montane Chaparral / Sagebrush
Snowbrush Alliance	CV	Montane Chaparral
Upper Montane Mixed Chaparral Alliance	CX	Montane Chaparral
Shrub Willow Alliance	WL	Montane Riparian
Tree-Dominated Alliances		
Eastside Pine Alliance	EP	Eastside Pine
Jeffrey Pine Alliance	JP	Jeffrey Pine
Lodgepole Pine Alliance	LP	Lodgepole Pine / Subalpine Conifer
Mixed Conifer–Fir Alliance	MF	Sierran Mixed Conifer / White Fir
Subalpine Conifers Alliance	SA	Subalpine Conifer
Whitebark Pine Alliance	WB	Subalpine Conifer
White Fir Alliance	WF	White Fir
Western (Mountain) Juniper	WJ	Juniper
Curlleaf Mountain Mahogany	FM	Bitterbrush / Pinyon-Juniper / Sagebrush
Willow Alliance	QO	Montane Riparian
Quaking Aspen Alliance[1]	QQ	Aspen / Montane Riparian
Non-Vegetated Areas		
Barren	BA	Barren
Urban-related Non-vegetated	IB	Barren
Water	WA	Lacustrine / Riverine

Source: Forest Service 2014, CDFW 2020a

Notes:

[1] Quaking aspen is considered a sensitive natural community by CDFW (CDFW 2020a).

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Table 4.6-2. Special-Status Plant Species Known to Occur or Potentially Occurring Within 1 Mile of the FERC Project Boundary.

Scientific/Common Name	Federal/ State Status	Inyo National Forest Status	California Rare Plant Rank (CRPR)	Blooming Period/Fertile	Habitat	Likelihood for Occurrence
Known to Occur in the FERC Project Boundary or Within 1 Mile of the Boundary						
Claytonia megarhiza fell-fields claytonia	—	FSCC	2B.3	July–September	Gravel, talus, and rocky crevices in lodgepole forest, subalpine forest, and alpine fell-fields from 8,500 to 12,600 feet.	**Known to occur within 1 mile of the FERC Project boundary**. There is an occurrence approximately 0.6 mile southwest of Waugh Lake (CNDDB 2020). Refer to Map 4.6-2 (confidential) for the location of this observation.
Pinus albicaulis whitebark pine	FC	—	—	Year-round	An alpine white pine that typically occurs on cold and windy high elevation sites in western North America in subalpine forest from 7,000 to 12,000 feet.	**Known to occur in the FERC Project boundary.** A population of whitebark pine (6 individuals) is present approximately 500 feet downstream of Rush Meadows Dam adjacent to the south bank of Rush Creek (SCE 2018). A population of 6 individuals and 9 seedlings is present along the southeastern side of Gem Lake Dam, between the bunkhouse and the Gem Lake Dam spillway (SCE 2020). Refer to Map 4.6-2 (confidential) for the location of all whitebark pine observations.
Sabulina stricta bog sandwort	—	—	2B.3	July–September	Granitic gravels, sandy wet spots, meadows and seeps, alpine areas from 8,000 to 13,000 feet.	**Known to occur within 1 mile of the FERC Project boundary.** There is an occurrence approximately 0.5 mile south of the Waugh Lake (CNDDB 2020). Refer to Map 4.6-2 (confidential) for the location of this observation.
May Potentially Occur in the FERC Project Boundary or Within 1 Mile of the Boundary						
Agrostis humilis alpine bentgrass	—	FSCC	2B.3	July–September	Wetlands and meadows within subalpine forest habitats from 5,000 to 11,200 feet.	May potentially occur in appropriate habitat.
Arabis repanda var. *greenei* Greene's rockcress	—	—	3.3	July–August	Rock outcrops, talus, gravelly soil in meadows, and open pine forest from 7,600 to 11,850 feet.	May potentially occur in appropriate habitat.
Astragalus johannis-howellii Long Valley milk-vetch	SR	FSCC	1B.2	Jun–August	Sandy areas and sagebrush scrub east of Sierra Nevada from 6,600 to 8,300 feet.	May potentially occur in appropriate habitat.
Astragalus lemmonii Lemmon's milk-vetch	—	FSCC	1B.2	May–August	Great Basin scrub, meadows and seeps, marshes and swamps (lake shores) from 3,300 to 7,220 feet.	May potentially occur in appropriate habitat.
Astragalus monoensis Mono milk-vetch	SR	FSCC	1B.2	June–August	Endemic to Mono County. Open areas, pumice flats in ashy to sandy soil or gravel with sparse vegetation. East of Sierra Nevada from 6,900 to 11,000 feet.	May potentially occur in appropriate habitat.
Astragalus serenoi var. *shockleyi* Shockley's milk-vetch	—	FSCC	2B.2	May–July	Found on alkaline or granitic alluvium within Great Basin scrub or pinyon-juniper woodland habitats from 5,000 to 7,800 feet.	May potentially occur in appropriate habitat.

Scientific/Common Name	Federal/ State Status	Inyo National Forest Status	California Rare Plant Rank (CRPR)	Blooming Period/Fertile	Habitat	Likelihood for Occurrence
Boechera bodiensis Bodie Hills rockcress	—	FSCC	1B.3	June–July	Alpine boulder and rock field, Great Basin scrub, pinyon and juniper woodland, and subalpine coniferous forest from 6,840 to 11,580 feet.	May potentially occur in appropriate habitat.
Boechera cobrensis masonic rockcress	—	—	2B.3	June–July	Sandy soils in Great Basin scrub and pinyon and juniper woodland from 4,510 to 10,185 feet.	May potentially occur in appropriate habitat.
Boechera tularensis Tulare rockcress	—	FSCC	1B.3	June–July	Rocky slopes in montane, subalpine habitats in the high Sierra Nevada from 5,900 to 11,000 feet.	May potentially occur in appropriate habitat.
Botrychium ascendens upswept moonwort	—	FSCC	2B.3	July–August (spores)	Grows in lower montane coniferous forest, meadows, and seeps from 4,900 to 7,500 feet.	May potentially occur in appropriate habitat.
Botrychium crenulatum scalloped moonwort	—	FSCC	2B.2	June–September (spores)	Meadows, marshes, bogs, and fens in lower and upper montane conifer forest from 4,100 to 10,800 feet.	May potentially occur in appropriate habitat.
Botrychium lineare slender moonwort	—	FSCC	1B.1	Unknown	Meadows and seeps, subalpine coniferous forest, upper montane coniferous forest (often in disturbed areas) from 8,395 to 8,530 feet.	May potentially occur in appropriate habitat.
Botrychium lunaria common moonwort	—	—	2B.3	August (spores)	Meadows and seeps, moist riparian areas, subalpine coniferous forest and upper montane coniferous forest from 6,400 to 11,200 feet.	May potentially occur in appropriate habitat.
Botrychium paradoxum paradox moonwort	—	—	2B.1	August (spores)	Moist meadows, shrubby slopes from 5,800 to 13,000 feet.	May potentially occur in appropriate habitat.
Bruchia bolanderi Bolander's bruchia	—	FSCC	4.2	N/A	Meadows and seeps with damp soil within montane coniferous forest from 5,500 to 9,200 feet.	May potentially occur in appropriate habitat.
Calyptridium pygmaeum pygmy pussypaws	—	FSCC	1B.2	June–August	Subalpine coniferous forest and upper montane coniferous forest from 6,495 to 10,205 feet.	May potentially occur in appropriate habitat.
Carex davyi Davy's sedge	—	FSCC	1B.3	May–August	Dry meadows and slopes in subalpine coniferous forest and upper montane coniferous forest from 4,900 to 10,500 feet.	May potentially occur in appropriate habitat.
Carex idahoa Idaho sedge	—	FSCC	2B.3	July	Meadows and seeps and subalpine coniferous forest from 9,500 to 10,700 feet.	May potentially occur in appropriate habitat.
Carex petasata Liddon's sedge	—	FSCC	2B.3	May–July	Dry to wet meadows from 1,900 to 10,900 feet.	May potentially occur in appropriate habitat.
Carex praticola northern meadow sedge	—	FSCC	2B.2	May–July	Meadows and seeps up to 10,500 feet.	May potentially occur in appropriate habitat.
Carex scirpoidea ssp. *pseudoscirpoidea* western single-spiked sedge	—	FSCC	2B.2	July–September	Rocky, occasionally limey seasonally wet places in subalpine forest and alpine fell-fields from 6,800 to 12,200 feet.	May potentially occur in appropriate habitat.
Carex stevenii Steven's sedge	—	FSCC	2B.2	August	Along creeks or dry meadows within alpine boulder and rock fields from 9,500 to 11,300 feet.	May potentially occur in appropriate habitat.

Scientific/Common Name	Federal/ State Status	Inyo National Forest Status	California Rare Plant Rank (CRPR)	Blooming Period/Fertile	Habitat	Likelihood for Occurrence
Carex vallicola western valley sedge	—	FSCC	2B.3	July–August	Dry to moist montane slopes from 5,000 to 9,200 feet.	May potentially occur in appropriate habitat.
Cinna bolanderi Bolander's woodreed	—	—	1B.2	July–September	Mesic streamsides in meadows and seeps and upper montane coniferous forest from 5,500 to 8,200 feet.	May potentially occur in appropriate habitat.
Cusickiella (=Draba) quadricostata Bodie Hills cusickiella	—	—	1B.2	May–July	Sagebrush scrub and pinyon-juniper woodland from 6,700 to 9,300 feet.	May potentially occur in appropriate habitat.
Cymopterus globosus globose cymoptera	—	FSCC	2B.2	March–June	Sandy substrates and open flats within Great Basin scrub habitats from 4,000 to 7,200 feet.	May potentially occur in appropriate habitat.
Draba asterophora var. *asterophora* Tahoe draba	—	—	1B.2	July–August	Decomposed granite, open talus slopes, rock outcrops and crevices in subalpine coniferous woodland and alpine rock fields from 8,200 to 11,500 feet.	May potentially occur in appropriate habitat.
Draba cana canescent draba	—	—	2B.3	July	Rock crevices and outcrops in subalpine to alpine meadows from 8,000 to 13,000 feet.	May potentially occur in appropriate habitat.
Draba cruciata Mineral King draba	—	—	1B.3	June–August	Gravelly substrates in subalpine coniferous forest from 8,200 to 10,875 feet.	May potentially occur in appropriate habitat.
Draba incrassata Sweetwater Mountains draba	—	—	1B.3	July–August	Alpine boulder and rock field from 8,200 to 13,010 feet.	May potentially occur in appropriate habitat.
Draba praealta tall draba	—	—	2B.3	July–August	Wetlands, streambanks, or riparian areas in montane or subalpine moist meadows, forests, or cliffs in the high Sierra Nevada from 8,200 to 11,200 feet.	May potentially occur in appropriate habitat.
Dryoptera filix-mas male fern	—	FSCC	2B.3	July–September	Rocky and granitic substrates within upper montane coniferous forest habitats from 6,100 to 10,400 feet.	May potentially occur in appropriate habitat.
Erigeron aequifolius Hall's daisy	—	—	1B.3	June–August	Broadleafed upland forest, lower montane coniferous forest, pinyon and juniper woodland, upper montane coniferous forest from 4,920 to 8,005 feet.	May potentially occur in appropriate habitat.
Erigeron uncialis var. *uncialis* limestone daisy	—	FSCC	1B.2	May–July	Great Basin scrub, pinyon and juniper woodland, and subalpine coniferous forest from 6,230 to 9,515 feet.	May potentially occur in appropriate habitat.
Eriogonum mensicola Pinyon Mesa buckwheat	—	FSCC	1B.3	July–September	Rocky or gravelly substrates within Great Basin scrub, pinyon-juniper woodland, or upper montane coniferous forest habitats from 6,000 to 9,400 feet.	May potentially occur in appropriate habitat.
Eriogonum nutans var. *nutans* nodding buckwheat	—	—	2B.3	May–September	Sagebrush scrub, northern juniper woodland, chenopod scrub, and Great Basin scrub from 4,000 to 10,000 feet.	May potentially occur in appropriate habitat.
Festuca minutiflora small-flowered fescue	—	—	2B.3	July	Moist, shady banks in subalpine forest, bristlecone pine forest, and alpine fell-fields from 9,000 to 13,300 feet.	May potentially occur in appropriate habitat. There is an occurrence approximately 4.2 miles north from the Project Area (CNDDB 2020).

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Hackelia brevicula Poison Canyon stickseed	—	FSCC	3.3	July–August	Dry creek bottoms and openings (often rocky) within broadleaf upland forest, Great Basin scrub, and subalpine coniferous forest habitats from 8,600 to 10,700 feet.	May potentially occur in appropriate habitat.
Helodium blandowii Blandow's bog moss	—	FSCC	2B.3	N/A	Grows in wet meadows, fens, and seeps in subalpine coniferous forest and alpine lakes from 6,100 to 9,000 feet.	May potentially occur in appropriate habitat.
Hulsea brevifolia short-leaved hulsea	—	FSCC	1B.2	May–August	Granitic or volcanic soils in openings and under canopy in mixed conifer and red fir forest from 4,500 to 10,500 feet.	May potentially occur in appropriate habitat.
Hulsea vestita ssp. *inyoensis* Inyo hulsea	—	FSCC	2B.2	April–June	Rocky soils in chenopod scrub, Great Basin scrub, and pinyon and juniper woodland from 5,400 to 10,000 feet.	May potentially occur in appropriate habitat.
Jamesia americana var. *rosea* fivepetal (rosy-petalled) cliffbush	—	FSCC	4.3	May–September	Granitic or carbonate rocky soils in alpine boulder and rock field, Great Basin scrub, pinyon and juniper woodland, and subalpine coniferous forest from 6,600 to 12,400 feet.	May potentially occur in appropriate habitat.
Kobresia myosuroides (= bellardii) seep kobresia	—	FSCC	2B.2	August	Alpine boulder and rock field on mesic soils, carbonate meadows and seeps, and subalpine coniferous forest from 5,000 to 10,900 feet. Only known from Mono County in California.	May potentially occur in appropriate habitat.
Lupinus duranii Mono Lake lupine	—	FSCC	1B.2	May–August	Sparsely vegetated open pumice flats in loose sandy or gravelly soil in Great Basin scrub, subalpine coniferous, and upper montane coniferous forest from 6,500 to 9,900 feet.	May potentially occur in appropriate habitat.
Lupinus lepidus var. *culbertsonii* Hockett Meadows lupine	—	—	1B.3	July–August	Meadows and seeps, and mesic, rocky soils in upper montane coniferous forest from 8,005 to 9,845 feet.	May potentially occur in appropriate habitat.
Lupinus padre-crowleyi Father Crowley's lupine	SR	FSCC	1B.2	July–August	Decomposed granite soils in Great Basin scrub, riparian forest, riparian scrub, and upper montane coniferous forest from 7,215 to 13,125 feet.	May potentially occur in appropriate habitat.
Meesia longiseta long seta hump moss	—	—	2B.3	N/A	Moss found in bogs, fens, meadows and seeps in upper mountain coniferous forest from 5,700 to 10,000 feet.	May potentially occur in appropriate habitat.
Meesia uliginosa broad-nerved hump moss	—	—	2B.2	July–October (spores)	Grows in permanently wet, primarily spring-fed meadows and fens in montane to subalpine coniferous forest from 4,200 to 9,200 feet.	May potentially occur in appropriate habitat.
Mentzelia torreyi Torrey's blazing star	—	FSCC	2B.2	June–August	Great Basin scrub, Mojavean desert scrub, and pinyon and juniper woodland from 3,835 to 9,300 feet.	May potentially occur in appropriate habitat.
Monardella beneolens sweet-smelling monardella	—	FSCC	1B.3	June–September	Alpine boulder and rock field, subalpine coniferous forest, and upper montane coniferous forest from 8,120 to 11,485 feet.	May potentially occur in appropriate habitat.

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Parnassia parviflora small-flowered grass-of-Parnassus	—	—	2B.2	August–September	Wetlands, riparian areas, and rocky seeps in the high Sierra Nevada from 6,300 to 9,500 feet.	May potentially occur in appropriate habitat.
Pedicularis crenulata scalloped-leaved lousewort	—	—	2B.2	June–July	Meadows and seeps, and wetland-riparian areas from 7,000 to 7,700 feet.	May potentially occur in appropriate habitat.
Petrophyton caespitosum ssp. *acuminatum* marble rockmat	—	FSCC	1B.3	August–September	Rocky crevices in lower montane coniferous forest and upper montane coniferous forest from 3,330 to 7,545 feet.	May potentially occur in appropriate habitat.
Phacelia monoensis Mono County phacelia	—	FSCC	1B.1	May–July	Great Basin scrub and pinyon and juniper woodland from 6,230 to 9,515 feet.	May potentially occur in appropriate habitat.
Physaria ludoviciana silver bladderpod	—	FSCC	2B.2	May–June	Great Basin scrub habitats.	May potentially occur in appropriate habitat.
Pohlia tundrae tundra thread moss	—	—	2B.3	N/A	Alpine meadows and seeps from 8,888 to 9,900 feet.	May potentially occur in appropriate habitat.
Polyctenium williamsiae Williams' combleaf	—	FSCC	1B.2	March–July	Great Basin scrub, marshes and swamps, pinyon and juniper woodland, playas, and vernal pools from 4,415 to 8,860 feet.	May potentially occur in appropriate habitat.
Potamogeton praelongus white-stemmed pondweed	—	—	2B.3	July–August	Deep water in lakes, marshes, and swamps from 6,000 to 10,000 feet.	May potentially occur in appropriate habitat.
Potamogeton robbinsii Robbins' pondweed	—	—	2B.3	July–August	Shallow to deep water of ponds, lakes, and slow-flowing rivers from 5,000 to 10,900 feet.	May potentially occur in appropriate habitat.
Potentilla pulcherrima beautiful cinquefoil	—	FSCC	2B.2	July	Great basin scrub habitats.	May potentially occur in appropriate habitat.
Ranunculus hydrocharoides frog's-bit buttercup	—	FSCC	2B.1	June–September	Freshwater marshes and swamps and sinks, flats, and lake margins from 3,700 to 9,000 feet.	May potentially occur in appropriate habitat.
Salix brachycarpa var. *brachycarpa* short-fruited willow	—	—	2B.3	June–August	Subalpine forest, alpine fell-fields, and wetland or riparian areas, especially on limestone, from 4,900 to 8,200 feet.	May potentially occur in appropriate habitat.
Sclerocactus polyancistrus redspined fishhook cactus	—	FSCC	4.2	April–July	Carbonate soils in Great Basin scrub, Joshua tree woodland, and Mojave desert scrub from 2,100 to 7,800 feet.	May potentially occur in appropriate habitat.
Silene oregana Oregon campion	—	—	2B.2	July–September	Sagebrush scrub and subalpine conifer forest from 4,900 to 8,200 feet.	May potentially occur in appropriate habitat.
Solorina spongiosa fringed chocolate chip lichen	—	FSCC	2B.2	N/A	Carbonate moss mats in meadows and seeps in subalpine coniferous forest.	May potentially occur in appropriate habitat.
Sphaeromeria potentilloides var. *nitrophila* fivefinger chickensage (alkali tansy-sage)	—	FSCC	2B.2	June–July	Alkaline soils in meadows and seeps and playas from 7,000 to 8,000 feet.	May potentially occur in appropriate habitat.

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Tetradymia tetrameres dune horsebrush	—	FSCC	2B.2	August	Sandy soils in Great Basin scrub from 4,000 to 7,200 feet.	May potentially occur in appropriate habitat.
Thelypodium integrifolium ssp. *complanatum* foxtail thelypodium	—	FSCC	2B.2	June–October	Alkaline or subalkaline, mesic soils in Great Basin scrub and meadows and seeps from 3,600 to 8,400 feet.	May potentially occur in appropriate habitat.
Thelypodium milleflorum many-flowered theylopodium	—	FSCC	2B.2	April–June	Chenopod scrub and sandy soils in Great Basin scrub from 4,000 to 8,400 feet.	May potentially occur in appropriate habitat.
Trichophorum pumilum little bulrush	—	FSCC	2B.2	August	Riverbanks and carbonate soils in bogs and fens, marshes and swamps, and riparian scrub from 9,500 to 10,900 feet.	May potentially occur in appropriate habitat.
Trifolium bolanderi Bolander's clover	—	—	1B.2	June–August	Mesic soils in meadows and seeps and lower and upper montane coniferous forest from 6,700 to 8,700 feet.	May potentially occur in appropriate habitat.
Trifolium dedeckerae (= kingie ssp. *dedeckerae)* Dedecker's clover	—	FSCC	1B.3	May–July	Granitic, rocky soils in pinyon and juniper woodland, lower and upper montane coniferous forest, and subalpine coniferous forest from 7,000 to 11,700 feet.	May potentially occur in appropriate habitat.
Triglochin palustris marsh arrow-grass	—	—	2B.3	July–August	Meadows and seeps, freshwater marshes and swamps, and subalpine coniferous forest from 7,495 to 12,140 feet.	May potentially occur in appropriate habitat.
Viola pinetorum ssp. *grisea* gray-leaved violet	—	—	1B.2	April–July	Meadows and seeps, subalpine coniferous forest, and upper montane coniferous forest from 5,000 to 11,400 feet.	May potentially occur in appropriate habitat.
Viola purpurea ssp. *aurea* golden violet	—	FSCC	2B.2	April–June	Sandy slopes in sagebrush scrub and pinyon-juniper woodland from 3,200 to 8,200 feet.	May potentially occur in appropriate habitat.
Unlikely to Occur in the FERC Project Boundary or Within 1 Mile of the Boundary						
Abronia alpina alpine sand verbena (Ramshaw Meadows abronia)	—	FSCC	1B.1	July–August	Meadows and seeps (granitic, gravelly margins) from 7,870 to 8,860 feet. Only known from the Ramshaw Meadows area of the Kern Plateau.	Unlikely to occur. The Project is outside the geographic range of the species.
Allium atrorubens var. *atrorubens* Great Basin onion	—	FSCC	2B.3	May–June	Sagebrush scrub and pinyon-juniper woodland from 4,000 to 7,000 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Astragalus cimae var. *sufflatus* inflated milk-vetch	—	FSCC	1B.3	April–June	Great Basin scrub, pinyon and juniper woodland from 4,920 to 6,810 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Astragalus inyoensis Inyo milk-vetch	—	FSCC	4.2	May–June	Pinyon-juniper woodland from 5,000 to 8,900 feet.	Unlikely to occur. The Project vicinity does not support pinyon-juniper woodland habitat.
Astragalus kentrophyta var. *elatus* spiny-leaved milk-vetch	—	FSCC	2B.2	June–September	Subalpine forest from 9,600 to 10,700 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Astragalus lentiginosus var. *kernensis* Kern Plateau milk-vetch	—	FSCC	1B.2	June–July	Meadows and seeps, subalpine coniferous forest from 7,345 to 9,020 feet. Only known from the Kern Plateau and vicinity.	Unlikely to occur. The Project is outside the geographic range of the species.

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Astragalus ravenii Raven's milk-vetch	—	FSCC	1B.3	July–September	Alpine boulder and rock field, upper montane coniferous forest from 11,005 to 11,350 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Astragalus subvestitus Kern County milk-vetch	—	FSCC	4.3	June–July	Found on sandy or gravelly substrates within meadows, Great Basin scrub, or pinyon-juniper woodland habitats from 7,700 to 9,200 feet. Only known from the Kern Plateau region on the Inyo National Forest.	Unlikely to occur. The Project is outside the geographic range of the species.
Atriplex pusilla smooth saltbush	—	—	2B.1	June–September	Found on alkali soils in Great Basin scrub, meadows and seeps near hot springs from 4,300 to 6,700 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Boechera pendulina rabbit-ear rockcress	—	FSCC	2B.1	April–June	Gravelly or rocky soils within Great Basin scrub or pinyon-juniper woodland habitats from 10,100 to 10,700 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Boechera pinzliae Pinzl's rockcress	—	FSCC	1B.3	July	Gravelly granitic soil in alpine and subalpine areas in the White and Inyo Mountains from 9,800 to 11,200 feet.	Unlikely to occur. The Project is outside the elevational and geographic range of the species.
Boechera shockleyi Shockley's rockcress	—	FSCC	2B.2	May–June	Carbonate or quartzite, rocky or gravelly soils in pinyon and juniper woodland from 2,870 to 7,580 feet. Only known from the White and Inyo Mountains.	Unlikely to occur. The Project is outside the geographic range of the species.
Boechera (=*Arabis*) *tiehmii* Tiehm's rockcress	—	FSCC	1B.3	July–August	Rock outcrops, gravelly soil on windswept rocky ridges and in crevices in the high Sierra Nevada from 9,800 to 11,800 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Botrychium minganense Mingan moonwort	—	FSCC	2B.2	July–September (spores)	Meadows, marshes, bogs, and fens in lower and upper montane conifer forest from 4,500 to 7,000 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Botrychium tunux moosewort	—	—	2B.1	August–September (spores)	Alpine boulder and rock field at approximately 10,005 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Botrychium yaaxudakeit giant moonwort	—	—	2B.1	August (spores)	Alpine boulder and rock field (meadows) at approximately 10,500 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Calochortus excavatus Inyo County star-tulip	—	FSCC	1B.1	April–July	Chenopod scrub, meadows and seeps from 3,770 to 6,560 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Carex duriuscula spikerush sedge	—	FSCC	2B.3	July–August	Great Basin scrub and subalpine coniferous forest from 11,600 to 13,700 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Carex tiogana Tioga Pass sedge	—	FSCC	1B.3	July–August	Coarse, wet, limey soil; subalpine to alpine meadows, seeps, and lake margins from 9,800 to 11,000 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Chaetadelpha wheeleri Wheeler’s dune-broom	—	FSCC	2B.2	April–September	Sandy substrates within dunes, Great Basin scrub, or Mojavean desert habitats from 2,650 to 6,400 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Cladium californicum California sawgrass	—	—	2B.2	June–September	Meadows and seeps, marshes and swamps alkaline or freshwater from 195 to 5,250 feet.	Unlikely to occur. The Project is outside the elevational range of the species.

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Cordylanthus eremicus ssp. *kernensis* Kern Plateau bird's beak	—	FSCC	1B.3	July–September	Great Basin scrub, Joshua tree woodland, pinyon and juniper woodland, upper montane coniferous forest from 5,495 to 9,845 feet. Only known from the Kern Plateau and vicinity.	Unlikely to occur. The Project is outside the geographic range of the species.
Crepis runcinata ssp. *hallii* Hall's meadow hawksbeard	—	FSCC	CBR	May–July	Mesic areas with alkaline soils within Mojavean desert or pinyon-juniper woodland habitats from 4,200 to 4,900 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Cryptantha incana Tulare cyptantha	—	—	1B.3	June–August	Gravelly or rocky soils in lower montane coniferous forest from 4,690 to 7,055 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Cuniculotinus (=Chrysothamnus) gramineus Panamint rock-goldenrod	—	FSCC	2B.3	June–August	Carbonate or rocky substrates within pinyon-juniper woodlands and subalpine coniferous forest habitats from 6,800 to 9,700 feet. Only known from the Inyo and Panamint mountains.	Unlikely to occur. The Project is outside the geographic range of the species.
Dedeckera eurekensis July gold	SR	FSCC	1B.3	May–August	Carbonate substrates in Mojave and desert scrub from 3,985 to 7,220 feet	Unlikely to occur. No appropriate habitat is present in the Project vicinity.
Draba californica California draba	—	FSCC	4.2	July–August	Meadows and seeps within alpine boulder and rock fields from 10,000 to 14,000 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Draba monoensis White Mountains draba	—	FSCC	1B.2	August	Alpine boulder and rock field, meadows and seeps from 9,840 to 12,990 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Draba sharsmithii Mt. Whitney draba	—	FSCC	1B.3	July–August	Alpine boulder and rock field, subalpine coniferous forest from 10,825 to 12,990 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Elymus scribneri Scribner's wheat grass	—	—	2B.3	July–August	Alpine boulder and rock fields from 9,510 to 13,780 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Eremothera boothii ssp. *boothii* Booth's evening-primrose	—	—	2B.3	April–September	Sandy flats and slopes in Joshua tree and pinyon/juniper woodland from 2,600 to 7,900 feet.	Unlikely to occur. No appropriate habitat is present in the Project vicinity.
Eremothera boothii ssp. *intermedia* Booth's hairy evening-primrose	—	—	2B.3	June	Sandy soils in sagebrush scrub from 4,900 to 7,054 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Ericameria gilmanii Gilman's goldenbush	—	FSCC	1B.3	August–September	Subalpine coniferous forest, upper montane coniferous forest from 6,885 to 11,155 feet. Only known from a single population in the White Mountains on the Inyo National Forest.	Unlikely to occur. The Project is outside the geographic range of the species.
Erigeron compactus compact daisy	—	FSCC	2B.3	May–July	Rocky or gravelly substrates within pinyon-juniper woodland habitats from 4,300 to 9,700 feet.	Unlikely to occur. No appropriate habitat is present in the Project vicinity.
Erigeron multiceps Kern River daisy	—	—	1B.2	June–September	Meadows and seeps, and openings in upper montane coniferous forest from 4,920 to 8,315 feet. Known only from the Kern Plateau.	Unlikely to occur. The Project is outside the geographic range of the species.

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Eriogonum alexanderae (=Eriogonum ochrocephalum var. ochrocephalum) Alexander's buckwheat	—	FSCC	1B.1	May–July	Shale or gravelly substrates within Great Basin scrub or pinyon-juniper woodland habitats. Known only between Potato Peak and Bodie Mountain.	Unlikely to occur. The Project is outside the geographic range of the species.
Eriogonum wrightii var. *olanchense* Olancha Peak buckwheat	—	FSCC	1B.3	July–September	Alpine boulder and rock field and gravelly, rocky areas in subalpine coniferous forest from 10,695 to 11,600 feet	Unlikely to occur. The Project is outside the elevational range of the species.
Erythranthe utahensis Utah monkeyflower	—	—	2B.1	April	Meadows and seeps, pinyon and juniper woodland from 2,000 to 6,560 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Goodmania luteola yellow spinecape	—	FSCC	4.2	April–August	Alkaline or clay substrates within meadows, seeps, or playas within Mojavean desert scrub or valley/foothill grassland habitats from 70 to 7,400 feet.	Unlikely to occur. No appropriate habitat is present in the Project vicinity.
Greeneocharis (=Cryptantha) circumscissa rosulata Rosetta cushion cryptantha	—	FSCC	1B.2	July–August	Alpine boulder and rock field, subalpine coniferous forest from 9,675 to 12,010 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Grusonia pulchella beautiful cholla	—	FSCC	2B.2	May	Sandy substrates within desert dunes, Great Basin scrub, or Mojavean desert scrub habitats from 5,000 to 6,600 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Hackelia sharsmithii Sharsmith's stickseed	—	FSCC	2B.3	July–September	Granitic or rocky substrates within alpine boulder/rock fields or subalpine coniferous forest habitats from 10,000 to 12,400 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Hesperidanthus jaegeri Jaeger's hesperidanthus	—	FSCC	1B.2	May–July	Great Basin scrub, pinyon and juniper woodland, and subalpine coniferous forest from 7,000 to 9,185 feet. Known only from the Inyo Mountains.	Unlikely to occur. The Project is outside the geographic range of the species.
Hordeum intercedens vernal barley	—	—	3.2	March–June	Coastal dunes, Coastal scrub, valley and foothill grassland (saline flats and depressions), vernal pools from 15 to 3,280 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Horkelia hispidula White Mountains horkelia	—	FSCC	1B.3	June–August	Alpine dwarf scrub, Great Basin scrub, and subalpine coniferous forest from 9,840 to 11,155 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Ivesia campestris field ivesia	—	FSCC	1B.2	May–August	Edges of meadows and seeps, subalpine coniferous forest, and upper montane coniferous forest from 6,500 to 11,400 feet. Endemic to the Kern Plateau.	Unlikely to occur. The Project is outside the geographic range of the species.
Ivesia kingii var. *kingie* alkali ivesia	—	FSCC	2B.2	May–August	Mesic, alkaline, or clay soils in Great Basin scrub, meadows and seeps, and playas from 4,000 to 7,100 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Ladeania lanceolata (=Psoralidium lanceolatum) lanceleaved scurf-pea	—	FSCC	2B.3	April–August	Sandy soils in Great Basin scrub from 4,000 to 8,400 feet. Only known east of Highway 395 in Mono County.	Unlikely to occur. The Project is outside the geographic range of the species.
Lomatium foeniculaceum ssp. *inyoense* Inyo biscuitroot	—	FSCC	4.3	June–July	Carbonate soils in subalpine coniferous forest from 7,300 to 10,700 feet. Only known from the White and Inyo Mountains in California.	Unlikely to occur. The Project is outside the geographic range of the species.
Lupinus gracilentus slender lupine	—	—	1B.3	July–August	Subalpine coniferous forest from 6,000 to 11,500 feet. Currently known only from the Yosemite Valley.	Unlikely to occur. The Project is outside the geographic range of the species.

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Mentzelia inyoensis Inyo blazing star	—	FSCC	1B.3	April–October	Rocky, carbonate soils in Great Basin scrub and pinyon and juniper woodland from 3,795 to 6,495 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Oreocarya (=*Cryptantha*) *roosiorum* bristlecone cryptantha	SR	—	1B.2	June–July	Carbonate, rocky soils in subalpine coniferous forest from 8,005 to 10,595 feet. Only known from the Inyo Mountains.	Unlikely to occur. The Project is outside the geographic range of the species.
Oxytropis deflexa var. *sericea* blue pendant-pod oxytrope	—	FSCC	2B.1	June–August	Meadows and seeps and upper montane coniferous forest from 9,300 to 11,200 feet. Known only from the White Mountains.	Unlikely to occur. The Project is outside the geographic range of the species.
Penstemon calcareus limestone beardtongue	—	FSCC	1B.3	April–May	Carbonate and rocky soils in Joshua tree woodland, Mojave desert scrub, and pinyon and juniper woodland from 3,500 to 6,800 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Phacelia inyoensis Inyo phacelia	—	FSCC	1B.2	April–August	Alkaline meadow margins and desert scrub seeps from 3,000 to 10,500 feet.	Unlikely to occur. No appropriate habitat is present in the Project vicinity.
Phacelia nashiana Charlotte's phacelia	—	FSCC	1B.2	March–June	Granitic, sandy soils in Joshua tree woodland, Mojave desert scrub, and pinyon and juniper woodland from 2,000 to 7,400 feet in elevation.	Unlikely to occur. No appropriate habitat is present in the Project vicinity.
Physocarpus alternans Nevada ninebark	—	FSCC	2B.3	June–July	Rocky carbonate soils in pinyon and juniper woodland from 6,000 to 10,400 feet.	Unlikely to occur. No appropriate habitat is present in the Project vicinity.
Plagiobothrys parishii Parish's popcornflower	—	FSCC	1B.1	March–June	Alkaline or mesic soils in Great Basin scrub and Joshua tree woodland from 2,460 to 4,595 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Polemonium chartaceum Mason's sky pilot	—	FSCC	1B.3	June–August	Alpine boulder and rock field, subalpine coniferous forest from 10,790 to 14,010 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Populus angustifolia narrow-leaved cottonwood	—	FSCC	2B.2	March–April	Riparian forests on the east slope of the Sierras and other mountain ranges from 4,000 to 6,000 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Potentilla morefieldii Morefield's cinquefoil	—	FSCC	1B.3	July–September	Carbonate substrates in alpine boulder and rock field from 10,710 to 13,125 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Puccinellia simplex California alkali grass	—	—	1B.2	March–May	Alkaline, vernally mesic areas in chenopod scrub, meadows and seeps, valley and foothill grassland, and vernal pools from 5 to 3,050 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Salix nivalis snow willow	—	—	2B.3	June–July	Alpine cirques from 10,000 to 11,500 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Sibaropsis hammittii Hammitt's clay-cress	—	—	1B.2	March–April	Openings in chaparral and valley and foothill grassland from 2,360 to 3,495 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Sphenopholis obtusata prairie wedge grass	—	FSCC	2B.2	April–July	Mesic soils in cismontane woodland and meadows and seeps from 1,000 to 6,700 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Stipa divaricata small-flowered ricegrass	—	FSCC	2B.3	June–September	Gravelly or carbonate soils in pinyon and juniper woodland from 2,300 to 9,900 feet.	Unlikely to occur. No appropriate habitat is present in the Project vicinity.

Scientific/Common Name	Federal/ State Status	Inyo National Forest Status	California Rare Plant Rank (CRPR)	Blooming Period/Fertile	Habitat	Likelihood for Occurrence
Strepthantus gracilis alpine jewelflower	—	FSCC	1B.3	July–August	Granitic, rocky soils in subalpine coniferous forest and upper montane coniferous forest from 9,300 to 11,700 feet. Only known from the Kings-Kern Divide at the intersection of Tulare, Fresno, and Inyo counties.	Unlikely to occur. The Project is outside the geographic range of the species.
Streptanthus howellii Howell's jewelflower	—	—	1B.2	July–August	Serpentinite and rocky soils in lower montane coniferous forest from 1,000 to 4,920 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Streptanthus oliganthus masonic mountain jewelflower	—	FSCC	1B.2	June–July	Volcanic or granitic soils in pinyon-juniper woodland from 6,600 to 10,200 feet.	Unlikely to occur. No appropriate habitat is present in the Project vicinity.
Stuckenia filiformis ssp. *alpina* slender-leaved pondweed	—	—	2B.2	May–July	Shallow, clear water of freshwater wetlands, lakes, and drainage channels from 900 to 7,100 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Stylocline masonii Mason's neststraw	—	—	1B.1	March–May	Sandy soils in chenopod scrub and pinyon and juniper woodland from 325 to 3,935 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Taraxicum ceratophorum horned dandelion	—	FSCC	2B.1	June–July	Carbonate soils in alpine boulder and rock fields, meadows and seeps, and mesic valley and foot hill grassland from 9,600 to 12,100 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Townsendia leptotes slender townsendia	—	FSCC	2B.3	June–August	Alpine boulder and rock fields from 10,900 to 12,700 feet.	Unlikely to occur. The Project is outside the elevational range of the species.
Transberingia bursifolia ssp. *virgata (=Halimolobos virgata)* virgate halimolobos	—	FSCC	2B.3	July	Meadows and seeps and pinyon and juniper woodland from 6,600 to 10,000 feet. Known only from the Inyo and White mountains.	Unlikely to occur. The Project is outside the geographic range of the species.

Sources: CNDDB 2020, SCE 2018, SCE 2020

LEGEND:

Federal Status
FC = Candidate Species
FE = Federal Endangered
FT = Federal Threatened
FSCC = Inyo National Forest Service Species of Conservation Concern

State Status
SR = California Rare
ST = California Threatened
SE = California Endangered
CRPR = California Native Plant Society Rare Plant Rank
1B = rare, threatened or endangered in California and elsewhere
2B = rare in California but more common elsewhere
3 = need more information
4 = plants of limited distribution, a watch list
_.1 = Seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat)
_.2 = Moderately threatened in California (20 – 80% of occurrences threatened)
_.3 = Not very threatened in California (less than 20% of occurrences threatened or no current threats known)

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Table 4.6-3. INF Invasive Plants of Management Concern Potentially Occurring Within 1 Mile of the FERC Project Boundary

Scientific Name(s)	Common Name(s)	INF Priority/Goal Rating	Habitat in Which Species Typically Occurs[1]				
			Scrubland and Chaparral	Grassland	Riparian	Forest	Alpine
Acroptilon repens	Russian knapweed	High/Eradicate	X	X	X	X	
Ailanthus altissima	tree-of-heaven	Moderate/Eradicate		X	X	X	
Bassia hyssopifolia	five-hook bassia (bassia)	Low/Contain	X	X	X		
Bromus madritensis ssp. *rubens*	red brome	Locally high; generally low/Contain	X	X	X		
Bromus tectorum	cheatgrass	Locally high; generally low/Contain	X	X		X	
Centaurea stoebe ssp. *micranthos (= maculosa)*	spotted knapweed	High/Eradicate	X	X	X	X	
Cirsium vulgare	bull thistle	Moderate/Eradicate	X	X	X	X	
Descurainia sophia	tansy mustard	Very low/Contain	X	X	X		
Elaeagnus angustifolia	Russian olive	Moderate/Eradicate		X	X		
Iris missouriensis	western blue flag	— (on list)			X	X	
Lepidium appelianum (=Cardaria pubescens)	hairy whitetop (hairy hoary cress)	High/Eradicate		X			
Lepidium chalepense (=Cardaria chalepensis)	lens-podded hoary cress	High/Eradicate		X	X		
Lepidium draba (=Cardaria draba)	heart-podded hoary cress	High/Eradicate		X	X		
Lepidium latifolium	perennial pepperweed	High/Eradicate		X	X		
Linaria dalmatica ssp. *dalmatica* (= *Linaria genistifolia* ssp. *dalmatica*)	dalmatian toadflax	High/Eradicate	X	X		X	
Lotus corniculatus	birdfoot trefoil	Moderate/Eradicate			X		
Melilotus albus	white sweet clover	Moderate/Contain	X	X	X	X	
Ranunculus testicularis	bur buttercup	Low/Contain	X				
Salsola paulsenii	barbwire Russian thistle	Low/Contain	X				
Salsola tragus	Russian thistle	Low/Contain	X	X			
Saponaria officianalis	bouncing bet	High/Contain			X		
Schismus arabicus	Mediterranean grass	— (on list)	X	X			
Schismus barbatus	common Mediterranean grass	— (on list)	X	X			
Sisymbrium irio	London rocket	Very low/Contain	X	X	X		
Spartium junceum	Spanish broom	High/Eradicate	X	X	X	X	
Tamarix aphylla	athel	High/Eradicate			X		
Tamarix chinensis	Chinese tamarisk	High/Eradicate	X	X	X		
Tamarix parviflora	smallflower tamarisk	High/Eradicate	X	X	X		
Tamarix ramosissima	saltcedar	High/Eradicate	X	X	X		
Taraxacum officinale	dandelion	Very low/Contain	X	X	X	X	
Tragopogon dubius	goat's beard	— (on list)	X	X		X	
Tragopogon hybridus	pasture goatsbeard	— (on list)	X	X		X	

Scientific Name(s)	Common Name(s)	INF Priority/Goal Rating	Habitat in Which Species Typically Occurs[1]				
			Scrubland and Chaparral	Grassland	Riparian	Forest	Alpine
Tragopogon porrifolius	salsify	— (on list)	X	X		X	
Tragopogon pratensis	meadow salsify	— (on list)	X	X		X	
Trifolium repens	white clover	Low/Contain	X	X	X	X	
Ulmus pumila	elm	Low/Contain		X			
Verbascum thapsus	woolly (common) mullein	Moderate/Contain		X	X	X	

[1] Habitat information was obtained from the California Invasive Plant Council (Cal-IPC) Invasive Plant Inventory. There is no crosswalk available between Cal-IPC habitat types and CALVEG alliances. Therefore, the habitat types that most closely matched CALVEG vegetation alliances in the Project vicinity were selected. These habitats included the following: 1) scrub and chaparral; 2) grasslands, vernal pools, meadows, and other herb communities; 3) riparian and bottomland habitat; 4) forest; and 5) alpine.

Table 4.6-4. Common Wildlife Species and CWHR Wildlife Habitats

Common Wildlife		CWHR Wildlife Habitats																				
		Herb-Dominated Habitats				Shrub-Dominated Habitats						Tree-dominated Habitats								Non-Vegetated Areas		
Common Name	**Scientific Name**	**Alpine Dwarf-Shrub**	**Annual Grassland**	**Fresh Emergent Wetland**	**Wet Meadow**	**Bitterbrush**	**Low Sage**	**Montane Chaparral**	**Montane Riparian**	**Pinyon-Juniper**	**Sagebrush**	**Aspen**	**Eastside Pine**	**Jeffrey Pine**	**Juniper**	**Lodgepole Pine**	**Sierran Mixed Conifer**	**Subalpine Conifer**	**White Fir**	**Lacustrine**	**Riverine**	**Barren**
Amphibians																						
Great Basin spadefoot	*Spea intermontana*			X	X	X	X		X	X	X		X		X					X	X	
Sierra treefrog	*Pseudacris sierrae*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
western toad	*Anaxyrus boreas*		X	X	X	X	X	X	X	X	X		X	X		X	X		X	X	X	
Reptiles																						
California kingsnake	*Lampropeltis californiae*		X	X	X	X		X	X	X	X		X	X	X		X		X			
California mountain kingsnake	*Lampropeltis zonata*		X		X			X	X					X			X		X			
common gartersnake	*Thamnophis sirtalis*		X	X	X			X	X	X	X		X	X	X		X		X	X		
gophersnake	*Pituophis catenifer*		X	X	X	X	X	X	X	X	X		X	X	X		X		X			
northern alligator lizard	*Elgaria coerulea*		X		X			X	X	X			X	X	X	X	X	X	X			
northern rubber boa	*Charina bottae*				X			X	X			X		X		X	X		X			
sagebrush lizard	*Sceloperus graciosus*					X	X	X		X	X		X	X	X	X	X		X			
side-blotched lizard	*Uta stansburiana*		X																			X
Sierra gartersnake	*Thamnophis couchii*		X	X	X			X	X			X								X	X	
southern alligator lizard	*Elgaria multicarinata*		X		X			X	X								X		X			
terrestrial gartersnake	*Thamnophis elegans*		X	X	X			X	X		X	X	X	X	X	X	X	X	X	X	X	
tiger (Great Basin) whiptail	*Aspidoscelis tigris*		X			X	X	X	X	X	X				X		X					
western (Great Basin) rattlesnake	*Crotalus oreganus*		X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X			X
western fence lizard	*Sceloperus occidentalis*		X		X	X	X	X	X	X	X		X	X	X	X	X		X			
Birds																						
American crow	*Corvus brachyrhynchos*		X						X								X		X	X	X	
American dipper	*Cinclus mexicanus*								X											X	X	X
American kestrel	*Falco sparverius*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X
American robin	*Turdus migratorius*		X		X			X	X	X		X	X	X	X	X	X	X	X			

Common Wildlife		CWHR Wildlife Habitats																				
		Herb-Dominated Habitats				Shrub-Dominated Habitats						Tree-dominated Habitats								Non-Vegetated Areas		
Common Name	**Scientific Name**	**Alpine Dwarf-Shrub**	**Annual Grassland**	**Fresh Emergent Wetland**	**Wet Meadow**	**Bitterbrush**	**Low Sage**	**Montane Chaparral**	**Montane Riparian**	**Pinyon-Juniper**	**Sagebrush**	**Aspen**	**Eastside Pine**	**Jeffrey Pine**	**Juniper**	**Lodgepole Pine**	**Sierran Mixed Conifer**	**Subalpine Conifer**	**White Fir**	**Lacustrine**	**Riverine**	**Barren**
Anna's hummingbird	*Calypte anna*							X	X					X			X		X			
band-tailed pigeon	*Patagioenas fasciata*							X	X	X			X	X		X	X		X			
barn owl	*Tyto alba*		X	X	X	X	X	X	X	X	X		X	X	X		X		X			X
barn swallow	*Hirundo rustica*		X	X	X	X		X	X	X	X		X	X			X		X	X	X	
belted kingfisher	*Megaceryle alcyon*			X	X				X											X	X	X
Bewick's wren	*Thryomanes bewickii*							X	X						X				X			
black-backed woodpecker	*Picoides arcticus*															X	X	X				
black-billed magpie	*Pica hudsonia*				X	X			X		X				X							
black-crowned night-heron	*Nycticorax nycticorax*			X	X			X	X						X					X	X	
black-headed grosbeak	*Pheucticus melanocephalus*								X	X			X	X	X		X		X			
black-throated gray warbler	*Setophaga nigrescens*							X	X	X		X	X	X	X		X		X			
black-throated sparrow	*Amphispiza bilineata*					X	X	X			X											
blue-gray gnatcatcher	*Polioptila caerulea*					X		X		X	X				X							
Brewer's blackbird	*Euphagus cyanocephalus*		X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
Brewer's sparrow	*Spizella breweri*				X	X	X	X		X	X				X							
broad-tailed hummingbird	*Selasphorus platycercus*				X			X	X	X									X			
brown creeper	*Certhia americana*								X	X			X	X		X	X		X			
brown-headed cowbird	*Molothrus ater*		X	X	X	X			X	X	X	X	X	X	X	X	X		X			
bufflehead	*Bucephala albeola*			X					X	X		X	X	X		X				X		
Bullock's oriole	*Icterus bullockii*								X	X		X	X	X								
California gull	*Larus californicus*		X	X	X															X	X	X
Canada goose	*Branta canadensis*		X	X	X															X	X	
canyon wren	*Catherpes mexicanus*								X													X
Cassin's vireo	*Vireo cassinii*								X			X	X	X	X	X	X		X			
cattle egret	*Bubulcus ibis*		X	X																X	X	

Common Wildlife		CWHR Wildlife Habitats																				
		Herb-Dominated Habitats				Shrub-Dominated Habitats						Tree-dominated Habitats								Non-Vegetated Areas		
Common Name	Scientific Name	Alpine Dwarf-Shrub	Annual Grassland	Fresh Emergent Wetland	Wet Meadow	Bitterbrush	Low Sage	Montane Chaparral	Montane Riparian	Pinyon-Juniper	Sagebrush	Aspen	Eastside Pine	Jeffrey Pine	Juniper	Lodgepole Pine	Sierran Mixed Conifer	Subalpine Conifer	White Fir	Lacustrine	Riverine	Barren
cedar waxwing	*Bombycilla cedrorum*								X	X			X	X	X		X		X			
chipping sparrow	*Spizella passerina*		X		X			X	X	X		X	X	X	X	X	X	X	X			
Clark's nutcracker	*Nucifraga columbiana*	X			X					X			X	X	X	X	X	X	X			
cliff swallow	*Petrochelidon pyrrhonota*		X	X	X	X	X	X	X	X							X			X	X	
common merganser	*Mergus merganser*			X	X				X											X	X	
common nighthawk	*Chordeiles minor*		X	X	X	X	X	X		X	X		X	X	X	X	X		X	X	X	X
common poorwill	*Phalaenoptilus nuttallii*		X		X	X	X	X		X	X	X	X	X	X		X		X	X	X	X
common raven	*Corvus corax*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Cooper's hawk	*Accipiter cooperii*		X					X	X	X		X	X	X	X	X	X		X			
dark-eyed junco	*Junco hymenalis*	X			X	X		X	X	X	X	X	X	X	X	X	X	X	X			
downy woodpecker	*Picoides pubescens*		X		X			X	X	X		X	X	X	X	X	X	X	X			
dusky flycatcher	*Empidonax oberholseri*							X	X	X		X	X	X		X	X	X	X			
eared grebe	*Podiceps nigricollis*			X																X	X	
European starling	*Sturnus vulgaris*		X	X	X	X			X	X	X	X	X	X	X		X		X			
evening grosbeak	*Coccothraustes vespertinus*							X	X	X		X	X	X	X	X	X		X			
fox sparrow	*Passerella iliaca*					X	X	X	X	X	X	X	X	X	X	X	X		X			
golden-crowned kinglet	*Regulus satrapa*							X	X	X		X	X	X	X	X	X	X	X			
gray flycatcher	*Empidonax wrightii*					X				X	X		X		X							
gray-crowned rosy-finch	*Leucosticte tephrocotis*	X			X	X	X			X	X							X				X
great blue heron	*Ardea herodias*		X	X	X				X	X			X		X		X		X	X	X	
great egret	*Ardea alba*		X	X	X				X											X	X	
great horned owl	*Bubo virginianus*		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X
green heron	*Butorides virescens*			X					X								X			X	X	
green-tailed towhee	*Pipilo chlorurus*					X	X	X	X	X	X	X	X	X	X	X			X			
hairy woodpecker	*Picoides villosus*								X	X		X	X	X	X	X	X	X	X			

Common Wildlife		CWHR Wildlife Habitats																				
		Herb-Dominated Habitats				Shrub-Dominated Habitats						Tree-dominated Habitats								Non-Vegetated Areas		
Common Name	**Scientific Name**	**Alpine Dwarf-Shrub**	**Annual Grassland**	**Fresh Emergent Wetland**	**Wet Meadow**	**Bitterbrush**	**Low Sage**	**Montane Chaparral**	**Montane Riparian**	**Pinyon-Juniper**	**Sagebrush**	**Aspen**	**Eastside Pine**	**Jeffrey Pine**	**Juniper**	**Lodgepole Pine**	**Sierran Mixed Conifer**	**Subalpine Conifer**	**White Fir**	**Lacustrine**	**Riverine**	**Barren**
Hammond's flycatcher	*Empidonax hammondii*								X	X		X	X	X			X		X			
hermit thrush	*Cathartes guttatus*					X		X	X	X	X	X	X	X	X	X	X	X	X			
hermit warbler	*Setophaga occidentalis*								X			X	X	X		X	X		X			
horned grebe	*Podiceps auritus*																			X		
house finch	*Haemorhous mexicanus*		X		X	X	X	X	X	X	X	X	X	X	X		X		X			
lark sparrow	*Chondestes grammacus*		X		X	X	X			X	X		X	X	X							
lazuli bunting	*Passerina amoena*				X	X		X	X	X			X	X			X		X			
MacGillivray's warbler	*Geothlypis tolmiei*				X			X	X					X		X	X					
mallard	*Anas platyrhynchos*		X	X	X				X											X	X	
mountain bluebird	*Sialia currucoides*	X	X		X	X	X		X	X	X	X	X	X	X	X	X	X	X			
mountain chickadee	*Poecile gambeli*							X	X	X		X	X	X	X	X	X	X	X			
mountain quail	*Oreortyx pictus*		X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
mourning dove	*Zenaida macroura*		X		X	X	X	X	X	X	X	X	X	X	X	X	X		X			
Nashville warbler	*Oreothlypis ruficapilla*							X	X			X	X	X		X	X	X	X			
northern flicker	*Colaptes auratus*	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
northern mockingbird	*Mimus polyglottus*		X					X		X												
northern pygmy owl	*Glaucidium gnoma*				X			X	X	X		X	X				X	X				
northern rough-winged swallow	*Stelgidopteryx serripennis*		X	X	X	X		X	X	X	X		X		X					X	X	X
northern saw-whet owl	*Aegolius acadicus*				X			X	X	X		X	X	X	X	X	X		X			
orange-crowned warbler	*Oreothlypis celata*							X	X	X		X	X	X	X	X	X		X			
osprey	*Pandion haliaetus*		X	X	X	X		X	X	X	X		X	X	X	X	X	X	X	X	X	X
pied-billed grebe	*Podilymbus podiceps*			X																X	X	
pileated woodpecker	*Dryocopus pileatus*								X				X	X		X	X		X			
pine grosbeak	*Pinicola enucleator*				X				X							X		X				
pine siskin	*Spinus pinus*		X		X				X	X			X	X	X	X	X	X	X			

Common Wildlife		CWHR Wildlife Habitats																				
		Herb-Dominated Habitats				Shrub-Dominated Habitats						Tree-dominated Habitats								Non-Vegetated Areas		
Common Name	Scientific Name	Alpine Dwarf-Shrub	Annual Grassland	Fresh Emergent Wetland	Wet Meadow	Bitterbrush	Low Sage	Montane Chaparral	Montane Riparian	Pinyon-Juniper	Sagebrush	Aspen	Eastside Pine	Jeffrey Pine	Juniper	Lodgepole Pine	Sierran Mixed Conifer	Subalpine Conifer	White Fir	Lacustrine	Riverine	Barren
pinyon jay	*Gymnorhinus cyanocephalus*					X				X	X		X	X	X							
plumbeous vireo	*Vireo plumbeus*								X	X		X	X	X	X	X						
prairie falcon	*Falco mexicanus*		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X
purple finch	*Haemorhous purpureus*				X				X	X				X			X		X			
pygmy nuthatch	*Sitta pygmaea*									X			X	X		X	X		X			
red crossbill	*Loxia curvirostra*								X	X			X	X		X	X	X	X			
red-breasted nuthatch	*Sitta canadensis*								X				X	X		X	X	X	X			
red-breasted sapsucker	*Sphyrapicus ruber*								X	X		X	X	X	X	X	X		X			
red-tailed hawk	*Buteo jamaicensis*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X			X
red-winged blackbird	*Agelaius phoeniceus*		X	X	X				X													
ring-billed gull	*Larus delawarensis*		X	X	X															X	X	
rock wren	*Salpinctes obsoletus*					X	X	X			X				X							X
ruby-crowned kinglet	*Regulus calendula*					X		X	X	X	X	X	X	X	X	X	X	X	X			
sage thrasher	*Oreoscoptes montanus*					X	X				X				X							
Say's phoebe	*Sayornis saya*		X			X	X	X		X	X				X							X
Scott's oriole	*Icterus parisorum*									X												
sharp-shinned hawk	*Accipiter striatus*		X		X	X		X	X	X	X	X	X	X	X	X	X	X	X			X
snowy egret	*Egretta thula*			X	X				X	X					X					X		
song sparrow	*Melospiza melodia*		X	X	X				X	X		X	X	X			X		X	X	X	
sooty grouse	*Dendragapus fuliginosus*	X	X						X		X	X	X	X		X	X	X	X			
spotted towhee	*Pipilo maculatus*					X		X	X	X	X	X	X	X	X		X		X			
Steller's jay	*Cyanocitta stelleri*								X	X		X	X	X	X	X	X	X	X			
Townsend's solitaire	*Myadestes townsendii*							X	X	X			X	X	X	X	X		X			
tree swallow	*Tachycineta bicolor*		X	X	X	X	X	X	X		X		X			X				X	X	
turkey vulture	*Cathartes aura*		X		X	X	X	X	X	X	X		X	X	X	X	X		X	X	X	X

Common Wildlife		CWHR Wildlife Habitats																				
		Herb-Dominated Habitats				Shrub-Dominated Habitats						Tree-dominated Habitats								Non-Vegetated Areas		
Common Name	**Scientific Name**	Alpine Dwarf-Shrub	Annual Grassland	Fresh Emergent Wetland	Wet Meadow	Bitterbrush	Low Sage	Montane Chaparral	Montane Riparian	Pinyon-Juniper	Sagebrush	Aspen	Eastside Pine	Jeffrey Pine	Juniper	Lodgepole Pine	Sierran Mixed Conifer	Subalpine Conifer	White Fir	Lacustrine	Riverine	Barren
violet-green swallow	*Tachycineta thalassina*		X	X	X	X			X	X	X	X	X	X	X		X		X	X	X	X
Virginia's warbler	*Vermivora virginiae*					X		X	X	X	X		X	X	X		X					
warbling vireo	*Vireo gilvus*								X	X		X	X	X	X	X	X		X			
western bluebird	*Sialia mexicana*		X		X			X	X	X			X	X	X		X		X			
western kingbird	*Tyrannis verticalis*		X	X	X	X	X	X		X	X				X							
western meadowlark	*Sturnella neglecta*		X		X	X	X			X	X		X	X	X	X		X	X			
western screech-owl	*Megascops kennicottii*		X		X	X	X		X	X	X	X	X	X	X	X	X	X	X			
western tanager	*Piranga ludoviciana*								X	X		X	X	X		X	X		X			
western wood-pewee	*Contopus sordidulus*								X	X		X	X	X	X	X	X	X	X			
white-breasted nuthatch	*Sitta carolinensis*								X	X			X	X	X	X	X	X	X			
white-crowned sparrow	*Zonotrichia leucophrys*	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
white-faced ibis	*Plegadis chihi*		X	X	X															X	X	
white-headed woodpecker	*Picoides albolarvatus*								X				X	X		X	X	X	X			
white-tailed ptarmigan	*Lagopus leucura*	X			X											X		X				
white-throated swift	*Aeronautes saxatalis*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Wilson's warbler	*Cardellina pusilla*							X	X	X		X	X	X	X	X	X	X	X			
yellow-rumped warbler	*Setophaga coronata*	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X			
Mammals																						
alpine chipmunk	*Tamias alpinus*	X																X				
American beaver	*Castor canadensis*		X	X	X			X	X	X		X	X			X	X	X	X	X	X	
American mink	*Mustela vison*			X					X			X								X	X	
American pika	*Ochotona princeps*	X			X		X	X	X	X	X	X	X	X		X	X	X	X			X
Belding's ground squirrel	*Urocitellus beldingi*	X	X		X	X	X	X	X	X	X	X	X	X		X	X	X	X			X
big brown bat	*Eptesicus fuscus*		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
black bear	*Ursus americanus*	X	X		X			X	X			X	X	X		X	X	X	X	X	X	

Common Wildlife		CWHR Wildlife Habitats																				
		Herb-Dominated Habitats				Shrub-Dominated Habitats						Tree-dominated Habitats								Non-Vegetated Areas		
Common Name	Scientific Name	Alpine Dwarf-Shrub	Annual Grassland	Fresh Emergent Wetland	Wet Meadow	Bitterbrush	Low Sage	Montane Chaparral	Montane Riparian	Pinyon-Juniper	Sagebrush	Aspen	Eastside Pine	Jeffrey Pine	Juniper	Lodgepole Pine	Sierran Mixed Conifer	Subalpine Conifer	White Fir	Lacustrine	Riverine	Barren
black-tailed jackrabbit	*Lepus californicus*	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
bobcat	*Lynx rufus*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Brazilian free-tailed bat	*Tadaria brasiliensis*		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X
broad-footed mole	*Scapanus latimanus*		X		X				X			X	X	X		X	X		X			
brush mouse	*Peromyscus boylii*	X	X			X	X	X	X	X	X		X	X	X		X	X	X			
bushy-tailed woodrat	*Neotoma cinerea*	X	X		X	X	X	X	X	X	X		X	X	X	X	X	X	X			
California myotis	*Myotis californicus*		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
canyon bat	*Parastrellus hesperus*		X		X	X	X	X	X	X	X	X	X	X	X		X		X		X	X
common porcupine	*Erethizon dorsatum*	X		X	X	X	X	X	X	X	X	X	X	X		X	X	X	X			
coyote	*Canis latrans*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X
dark kangaroo mouse	*Microdipodops megacephalus*					X	X				X											
deer mouse	*Peromyscus maniculatus*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X
Douglas' squirrel	*Tamiasciurius douglasii*								X	X		X	X	X		X	X	X	X			
ermine	*Mustela erminea*	X			X			X	X			X	X	X		X	X	X	X			
fringed myotis	*Myotis thysanodes*		X			X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X
golden-mantled ground squirrel	*Callospermophilus lateralis*	X	X		X			X	X	X	X	X	X	X	X	X	X	X	X			
gray fox	*Urocyon cinereoargenteus*		X	X	X		X	X	X	X	X	X	X	X	X		X		X			
Great Basin pocket mouse	*Perognathus parvus*		X			X	X	X	X	X	X		X		X		X		X			
heather vole	*Phenacomys intermedius*	X			X			X	X				X	X		X	X	X	X			
hoary bat	*Lasiurus cinereus*		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
house mouse	*Mus musculus*		X	X	X	X	X	X		X	X	X	X				X		X			
Inyo shrew	*Sorex tenellus*					X			X	X	X	X	X									
least chipmunk	*Tamias minimus*	X				X	X			X	X			X	X							
little brown bat	*Myotis lucifugus*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
lodgepole chipmunk	*Tamias speciosus*							X						X		X	X	X	X			

Common Wildlife		CWHR Wildlife Habitats																				
		Herb-Dominated Habitats				Shrub-Dominated Habitats						Tree-dominated Habitats								Non-Vegetated Areas		
Common Name	**Scientific Name**	**Alpine Dwarf-Shrub**	**Annual Grassland**	**Fresh Emergent Wetland**	**Wet Meadow**	**Bitterbrush**	**Low Sage**	**Montane Chaparral**	**Montane Riparian**	**Pinyon-Juniper**	**Sagebrush**	**Aspen**	**Eastside Pine**	**Jeffrey Pine**	**Juniper**	**Lodgepole Pine**	**Sierran Mixed Conifer**	**Subalpine Conifer**	**White Fir**	**Lacustrine**	**Riverine**	**Barren**
long-eared myotis	*Myotis evotis*	X		X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
long-legged myotis	*Myotis volans*		X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
long-tailed vole	*Microtus longicaudus*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
long-tailed weasel	*Mustela frenata*	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Merriam's shrew	*Sorex merriami*		X			X	X			X	X											
montane shrew	*Sorex monticolus*	X	X	X	X				X					X		X	X	X	X			
montane vole	*Microtus montanus*	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X			
mountain lion	*Puma concolor*	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
mountain pocket gopher	*Thomomys monticola*	X	X		X	X	X	X		X	X		X	X		X	X	X	X			
mule deer	*Odocoileus hemionus*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
northern flying squirrel	*Glaucomys sabrinus*								X			X	X	X		X	X	X	X			
northern grasshopper mouse	*Onychomys leucogaster*	X	X		X	X	X		X	X	X		X		X				X			
northern pocket gopher	*Thomomys talpoides*	X	X		X	X	X	X	X	X	X	X	X		X	X		X	X			
Nuttall's cottontail	*Silvilagus nuttallii*	X							X	X	X				X			X				
Panamint chipmunk	*Tamias panamintinus*									X						X						
Panamint kangaroo rat	*Dipodomys panamintinus*		X			X	X			X	X											
pinyon mouse	*Peromyscus truei*	X	X		X	X	X	X	X	X	X		X		X		X		X			
Piute ground squirrel	*Urocitellus mollis*					X	X			X	X											
pronghorn	*Antilocapra americana*		X			X	X			X	X				X							
raccoon	*Procyon lotor*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
river otter	*Lontra canadensis*			X	X				X											X	X	
sagebrush vole	*Lemmiscus curtatus*	X				X	X			X	X											
shadow chipmunk	*Tamias senex*					X	X	X	X	X	X	X	X	X	X	X	X	X	X			
silver-haired bat	*Lasionycteris noctivagans*		X		X			X	X	X		X	X	X	X	X	X	X		X	X	X
striped skunk	*Mephitis mephitis*		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			

Common Wildlife		CWHR Wildlife Habitats																				
		Herb-Dominated Habitats				Shrub-Dominated Habitats						Tree-dominated Habitats								Non-Vegetated Areas		
Common Name	Scientific Name	Alpine Dwarf-Shrub	Annual Grassland	Fresh Emergent Wetland	Wet Meadow	Bitterbrush	Low Sage	Montane Chaparral	Montane Riparian	Pinyon-Juniper	Sagebrush	Aspen	Eastside Pine	Jeffrey Pine	Juniper	Lodgepole Pine	Sierran Mixed Conifer	Subalpine Conifer	White Fir	Lacustrine	Riverine	Barren
Uinta chipmunk	*Tamias umbrinus*									X						X		X				
vagrant shrew	*Sorex vagrans*	X	X	X	X			X	X			X		X		X	X	X	X			
water shrew	*Sorex palustris*				X				X			X	X	X		X	X	X	X	X	X	
western harvest mouse	*Reithrodontomys megalotis*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
western jumping mouse	*Zapus princeps*	X	X		X				X		X	X	X	X		X	X	X	X			
western small-footed myotis	*Myotis ciliolabrum*		X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X	X	X
western spotted skunk	*Spilogale gracilis*		X		X	X	X	X	X	X	X	X	X	X	X	X	X		X			
white-tailed antelope ground squirrel	*Ammospermophilus leucurus*		X			X				X	X											
yellow-bellied marmot	*Marmota flaviventris*	X			X	X	X	X	X	X	X	X	X	X		X	X	X	X			X
yellow-pine chipmunk	*Tamias amoenus*					X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Yuma myotis	*Myotis yumanensis*		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

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Table 4.6-5. Special-Status Terrestrial Wildlife Species Known or Potentially Occurring Within 1 Mile of the FERC Project Boundary

Scientific/Common Name	Federal Status	Forest Service Status	State Status	Habitat	Likelihood for Occurrence
Known to Occur or Critical Habitat is Present in the FERC Project Boundary or Within 1 Mile of the Boundary					
Rana sierrae Sierra Nevada yellow-legged frog	FE	—	ST	Streams, lakes, and ponds in montane riparian, lodgepole pine, subalpine conifer, and wet meadow habitats. Breeds in shallow water in low gradient perennial streams and lakes. Known at elevations ranging from 4,500 to 12,000 feet.	**Known to occur within 1 mile of the FERC Project boundary.** **Critical Habitat is present in the FERC Project Boundary.** Critical Habitat Unit 3/Subunit 3B (USFWS 2016) encompasses Waugh Lake and Gem Lake (and Rush Creek between the two lakes). Refer to Map 4.6-3 for the location of the Critical Habitat. The CNDDB query yielded four records within 1 mile of the FERC Project boundary: • A 1993 record approximately 0.5 mile east of the Rush Creek Powerhouse in the Reversed Peak Study Area. Revisited in 2003 but no individuals were found. • A 2010 record approximately 1 mile west of the western point of Waugh Lake in a tributary stream. • A 2010 record approximately 0.25 mile south of Waugh Lake in a tributary stream. • A 2013 record approximately 1 mile south of Waugh Lake in a tributary stream and associated alpine lakes. The NRIS query yielded 98 records within 1 mile of the FERC Project boundary between 2000 and 2010 (Forest Service 2017b). These records are located in the same general vicinity as the CNDDB records. There are five known breeding populations within 1 mile of the FERC Project boundary (CDFW 2016a). Refer to Map 4.6-2 (confidential) for the location of all Sierra Nevada yellow-legged frog observations and known breeding populations.
Anaxyrus canorus Yosemite toad	FT	—	CSC	Montane meadows and forest borders; breeds in shallow pools, at lake margins, or in pools of quiet streams at elevations ranging from 6,400 to 11,300 feet.	**Known to occur within 1 mile of the FERC Project boundary.** **Critical Habitat is present in the FERC Project Boundary.** Critical Habitat Unit 5 (Tuolumne Meadows/Cathedral) (USFWS 2016) encompasses Waugh Lake and Rush Creek downstream of Rush Meadows Dam. Refer to Map 4.6-3 for the location of the Critical Habitat. The NRIS query yielded three records within 1 mile of the FERC Project boundary: • A 2002 record from adjacent to a tributary stream upstream of the western Waugh Lake. • Two 2003 records approximately 1 mile south of Waugh Lake within a large meadow system. There are no known breeding populations within 1 mile of the FERC Project boundary (CDFW 2016a). Refer to Map 4.6-2 (confidential) for the location of all Yosemite toad observations and known breeding populations.

Scientific/Common Name	Federal Status	Forest Service Status	State Status	Habitat	Likelihood for Occurrence
Haliaeetus leucocephalus bald eagle	Eagle Act, BCC	FSCC	SE, CFP	Year-round resident in ice-free regions of California. Foraging areas include regulated and unregulated rivers, reservoirs, lakes, estuaries, and coastal marine ecosystems. Majority of bald eagles in California breed near reservoirs and nests are usually located within 1 mile of foraging habitat. Nests are typically placed in the branches of large conifer trees within dense stands of trees (Jackman and Jenkins 2004).	**Known to occur in the FERC Project boundary**. • Observed flying over the Agnew Lake dam during monitoring conducted in the Project vicinity (Phase I) (SCE 2017). • A sub adult was observed flying over Waugh Lake during pre-construction surveys conducted at Rush Meadows Dam (Phase II) (SCE 2018).
Empidonax traillii brewsteri little willow flycatcher	BCC	FSCC	SE	Summer resident in wet meadow and montane riparian habitats at 2,000 to 8,000 feet in the Sierra Nevada. Most often occurs in broad, open river valleys or large mountain meadows with lush growth of shrubby willows. Requires meadows at least 1 acre in size for breeding, prefers meadows larger than 10 acres (Green et al. 2003).	**Known to occur within 1 Mile of the FERC Project boundary.** The CNDDB query yielded one record within 1 mile of the boundary: • One territorial male was observed singing in June 1982 about 0.5 mile east of the Rush Creek Powerhouse. Point counts conducted in this area between 1998–2003 did not detect any individuals. The NRIS query yielded two records within 1 mile of the boundary. • One male was observed in June 1982 across Highway 158 in a meadow near the Rush Creek Powerhouse. Another male was observed in June 1982 approximately 1 mile northeast of the Rush Creek Powerhouse.
Ovis canadensis sierrae Sierra Nevada bighorn sheep	FE	—	SE, CFP	Lives on steep, rugged slopes in the eastern Sierra Nevada in shrub, grassland, montane chaparral, subalpine conifer, or riparian habitats.	**Critical habitat is present within 1 mile of the FERC Project boundary.** **Critical Habitat is present in the Project vicinity.** Critical Habitat Unit 2 (Mount Gibbs) is present within 1 mile of the FERC Project boundary, but does not overlap the boundary (USFWS 2008b). Refer to Map 4.6-3 for the location of the Critical Habitat. In addition, the Cathedral Range Herd Unit (CDFW 2015), is located approximately 1.2 mile east of the FERC Project boundary. There are no known occurrences of this species in the FERC Project boundary or within 1 mile of the boundary. Collared individuals of the Mt. Gibbs herd commonly spend most of the year in alpine habitats and make seasonal movements between Mt. Gibbs and Mt. Lewis, approximately 10 miles north of the Project area (CDFW 2021). However, movements have been recorded between the Mount Gibbs herd and the Central recovery unit south of the Project area, and between the Mt. Gibbs herd unit and the Cathedral Range Herd Unit to the east of the Project area (CDFW 2018). Therefore, there is some potential that individuals may migrate or disperse through the Project (USFWS 2007).
May Potentially Occur in the FERC Project Boundary or Within 1 Mile of the Boundary					
Colias behrii Sierra sulphur butterfly	—	FSCC	—	Endemic to the Sierra Nevada from Tuolumne County south to Tulare County. Found in alpine and subalpine meadows above 9,000 feet. Found in association with *Vaccinium* sp. and *Gentiana newberryi* host plants (Forest Service 2018b).	May potentially occur in appropriate habitat.
Euphydryas editha monoensis Mono Lake checkerspot butterfly	—	FSCC	—	The Mono checkerspot occurs on the east side of the Sierra Nevada in meadows and conifer forests, and Mono County is the center of its distribution (Forest Service 2018b).	May potentially occur in appropriate habitat.
Speyeria nokomis apacheana apache fritillary butterfly	—	FSCC	—	Moist meadows, seeps, marshes, and streams in the eastern Sierra Nevada. Specific to the host plant *Viola nephropylla,* and is threatened by encroachment of non-native species such as *Cirsium vulgare* into meadow habitats (Forest Service 2018b).	May potentially occur in appropriate habitat.

Scientific/Common Name	Federal Status	Forest Service Status	State Status	Habitat	Likelihood for Occurrence
Accipiter gentilis northern goshawk	—	—	CSC (nesting)	Middle to high elevation, mature, dense conifer forests for foraging and nesting. Casual in foothills during winter, northern deserts in pinyon-juniper woodland, and low elevation riparian habitats.	May potentially occur in appropriate habitat.
Aquila chrysaetos golden eagle	Eagle Act	—	CFP (nesting and wintering)	Grasslands and early successional stages of forest and shrub habitats for foraging at elevations up to 11,500 feet. Secluded cliffs with overhanging ledges or large trees in open areas with unobstructed view for nesting.	May potentially occur in appropriate habitat.
Falco peregrinus anatum American peregrine falcon	BCC	—	CFP	Very uncommon breeding resident and uncommon as a migrant. Breeds in woodlands, forests, coastal habitats, and riparian areas near wetlands, lakes, rivers, or other water on high cliffs, banks, dunes, or mounds. Active nesting sites are known along the coast, in the Sierra Nevada, and in the mountains of northern California. Migrants occur along the coast and the western Sierra Nevada in spring and fall.	May potentially occur in appropriate habitat.
Asio flammeus short-eared owl	—	—	CSC (nesting)	Open areas with few trees, such as annual and perennial grasslands, prairies, dunes, meadows, irrigated lands, saline and fresh emergent wetlands. Needs elevated sites for perching and dense vegetation for roosting.	May potentially occur in appropriate habitat.
Asio otus long-eared owl	—	—	CSC (nesting)	Found in dense riparian habitat or other thickets in foothills and mountains with small, densely canopied trees for roosting and nesting. More common in Great Basin regions of California.	May potentially occur in appropriate habitat.
Psiloscops flammeolus flammulated owl	BCC	—	—	Summer resident in coniferous habitats from ponderosa pine to red fir forests from 6,000 to 10,000 feet in elevation; prefers low to intermediate canopy closure. Breeds in the North Coast and Klamath Ranges, Sierra Nevada, and in suitable habitats in mountains in southern California.	May potentially occur in appropriate habitat.
Cypseloides niger black swift	BCC	—	CSC (nesting)	Nests in moist crevices or caves, or on cliffs near waterfalls in deep canyons at elevations ranging from 6,000 to 11,000 feet. Forages widely over many habitats; seems to avoid arid regions. Known from the high elevations of the Sierra National Forest.	May potentially occur in appropriate habitat.
Stellula calliope calliope hummingbird	BCC	—	—	Prefers coniferous forests and mountain meadow habitats for breeding. In the Sierra Nevada, it typically nests above 4,000 feet elevation. Nests almost always in a lodgepole pine or aspen, immediately beneath live branches, and typically in riparian areas. Migrates and spend winter in central and southern Mexico.	May potentially occur in appropriate habitat.
Melanerpes lewis Lewis's woodpecker	BCC	—	—	Breeds east of the Sierra Nevada crest in a cavity excavated in sycamore, cottonwood, oak, or conifer trees. Winter resident in open oak savannas, broken deciduous and coniferous habitats with sufficient supply of acorns and insects.	May potentially occur in appropriate habitat.
Sphyrapicus thyroideus Williamson's sapsucker	BCC	—	—	Uncommon to fairly common, summer resident in coniferous forests from approximately 5,500 to 9,500 feet in elevation throughout California. Preferred nesting habitat is lodgepole pine.	May potentially occur in appropriate habitat.
Contopus cooperi olive-sided flycatcher	BCC	—	CSC	Uncommon to common, summer resident in a wide variety of forest and woodland habitats. Nesting habitats include mixed conifer, montane hardwood-conifer, Douglas-fir, redwood, red fir, and lodgepole pine forests from 3,000 to 9,000 feet in elevation.	May potentially occur in appropriate habitat.
Setophaga petechia yellow warbler	—	—	CSC (nesting)	Usually arrives in California in April, and migrates by October. Breeds in riparian woodlands from coastal and desert lowlands at elevations up to 8,000 feet in the Sierra Nevada. Also breeds in montane chaparral, open ponderosa pine, and mixed conifer habitats with substantial amounts of brush.	May potentially occur in appropriate habitat.

Scientific/Common Name	Federal Status	Forest Service Status	State Status	Habitat	Likelihood for Occurrence
Haemorhous cassinii Cassin's finch	BCC	—	—	A common montane resident from 4,200 to 8,000 feet in elevation. Prefers tall, open coniferous forests, in lodgepole pine, red fir, and subalpine conifer habitats, especially for breeding. Most numerous near wet meadows and grassy openings; also frequents semiarid forests.	May potentially occur in appropriate habitat.
Sorex lyelli Mt. Lyell shrew	—	—	CSC	Riparian habitats within high montane and cold steppe communities of the eastern slopes of the Sierra Nevada in the vicinity of Yosemite National Park. Uses logs, stumps, and other surface objects for cover.	May potentially occur in appropriate habitat.
Antrozous pallidus Pallid bat	—	—	CSC	Grasslands, shrublands, woodlands, and forests from sea level to 10,000 feet in elevation. Typically, day-roosts in caves, crevices, or mines. Night roosts are in more open areas. Requires open habitat for foraging. Pallid bat hibernates in winter. Maternal colonies form in April.	May potentially occur in appropriate habitat.
Corynorhinus townsendii Townsend's big-eared bat	—	—	CSC	Found in all but alpine and subalpine habitats; most abundant in mesic habitats up to 6,000 feet in elevation. Requires caves, mines, tunnels, buildings, or other man-made structures for roosting. Hibernates October through April. Locally migratory only. Extremely sensitive to disturbance and may abandon a roost if disturbed. The Inyo National Forest is known to provide hibernacula, but likely does not support maternity roosts because of its high elevation (Forest Service 2018b).	May potentially occur in appropriate habitat.
Euderma maculatum Spotted bat	—	—	CSC	Ranges from arid deserts and grasslands through mixed conifer forests up to elevations of 10,600 feet in southern California. Prefers sites with adequate roosting habitat, such as cliffs. Often limited by the availability of cliff habitat. Feeds over water and along marshes. Capable of torpor and may hibernate. May make seasonal movements from high elevations in summer to lower elevations in autumn.	May potentially occur in appropriate habitat.
Lepus americanus tahoensis Sierra Nevada snowshoe hare	—	—	CSC	Found at upper elevations in the Cascades and Sierra Nevada. Found primarily in montane riparian habitats with thickets of alder and willow, in stands of young conifers interspersed with chaparral, and on edges of meadows.	May potentially occur in appropriate habitat.
Lepus townsendii townsendii Western white-tailed jackrabbit	—	—	CSC	Open areas with scattered shrubs in sagebrush, subalpine conifer, juniper, alpine dwarf-shrub, and perennial grassland habitats in the high eastern Sierra. Also uses low sagebrush, wet meadow, and early successional stages of various conifer habitats. Moves seasonally to lower elevations in the winter.	May potentially occur in appropriate habitat.
Aplodontia rufa californica Sierra Nevada mountain beaver	—	—	CSC	Dense riparian and open brushy stages of most forest types at elevations ranging from 3,900 to 10,100 feet in elevation. Deep, friable soils are required for burrowing along cool, moist microclimates. Line in burrows located in or near deep soils near streams and springs. Typical habitat in the Sierra is montane riparian.	May potentially occur in appropriate habitat.
Gulo gulo luteus California wolverine	FPT	—	ST, CFP	Mixed conifer, red fir, and lodgepole habitats, and probably subalpine conifer, alpine dwarf-shrub, wet meadow, and montane riparian habitats. Occurs in Sierra Nevada at elevations ranging from 4,300 to 10,800 feet. Majority of recorded sightings are found above 8,000 feet in elevation. USFWS has not proposed to designate Critical Habitat for this species.	May potentially occur in appropriate habitat.
Martes caurina sierrae Sierra marten	—	FSCC	—	Martens are known from the high elevation forested plant communities. Optimal habitats are various mixed evergreen forests with more than 40% crown closure and large trees and snags for den sites. Most commonly found in red fir and lodgepole pine forests between 4,000 and 10,600 feet elevation.	May potentially occur in appropriate habitat.

Scientific/Common Name	Federal Status	Forest Service Status	State Status	Habitat	Likelihood for Occurrence
Taxidea taxus American badger	—	—	CSC	Occurs throughout most of the state in areas with dry, friable soils. It is most abundant in drier open stages of most shrub, forest, and herbaceous habitats up to 12,000 feet in elevation.	May potentially occur in appropriate habitat.
Bassariscus astutus ringtail	—	—	CFP	Found in most forest and shrub habitats in close association with rock and/or riparian areas, usually not more than 0.6 mile from water. Dens in hollow trees, snags, or other cavities. Found from seal level up to 8,800 feet.	May potentially occur in appropriate habitat.
Unlikely to Occur in the FERC Project Boundary or Within 1 Mile of the Boundary					
Euphilotes battoides mazourka square dotted blue	—	FSCC	—	Only known from badger flat adjacent to Mazourka peak from about 8,000 to 13,000 feet in elevation.	**Unlikely to occur.** The Project is outside the geographic range of this species.
Plebejus icarioides inyo Boisduval's blue	—	FSCC	—	Restricted to the Inyo Mountains around elevations of 9,000 feet.	**Unlikely to occur.** The Project is outside the geographic range of this species.
Plebulina emigdionis San Emigdio blue	—	FSCC	—	Found in southern California as far north as Inyo County, in desert shrubland and chaparral habitats and dry river courses and intermittent stream sides as well as adjacent flats.	**Unlikely to occur.** The Project is within Mono County, which is outside of the geographical range of this species.
Tuberochernes aalbui a cave obligate pseudoscorpion	—	FSCC	—	Only known from one location in Poleta Cave in the Inyo-White Mountains in Inyo County, California (Forest Service 2018b).	**Unlikely to occur.** The Project is outside the geographic range of this species.
Batrachoseps campi Inyo Mountain slender salamander	—	FSCC	CSC	This species' distribution is limited to the west and east slopes of the Inyo Mountains. Only known from 15 locations in the Inyo Mountains. Inhabits very dry mountain ranges typically in the immediate vicinity of springs, seeps, and their associated riparian growth where there is a small area of suitable habitat surrounded by inhospitable desert terrain. They are found in damp soil under rocks or in humid crevices, not in open water. Found at elevations from 1,800 to 8,600 feet (Calherps 2020).	**Unlikely to occur.** The Project is outside the geographic range of this species.
Batrachopseps robsutus Kern Plateau slender salamander	—	FSCC	—	The distribution of this species is limited to the Kern Plateau of the southeastern Sierra in Kern County from 5,580 to 9,2000 feet in elevation and also in the Scodie mountains (Calherps 2020).	**Unlikely to occur.** The Project is outside the geographic range of this species.
Anaxyrus exsul black toad	—	FSCC	CT, CPF	The distribution of this species is limited to the Deep Springs Valley between the White and Inyo Mountains in Inyo County CA at elevations ranging from 4,900 to 5,600 feet (Calherps 2020).	**Unlikely to occur.** The Project is outside the geographic range of this species.
Buteo swainsoni Swainson's hawk	BCC	—	CT (nesting)	Uncommon breeding resident and migrant in the Central Valley, Klamath Basin, Northeastern Plateau, Lassen County, and Mojave Desert. Riparian woodlands, juniper-sage flats, and oak woodlands for nesting. Grasslands and agricultural areas for foraging.	**Unlikely to occur.** The Project does not contain suitable habitat for this species.
Circus cyaneus northern harrier	—	—	CSC (nesting)	Occurs in a variety of habitats at elevations up to 10,000 feet. Forages in open areas such as meadows, wetlands, and grasslands. Breeding habitat is up to 5,700 feet in the Sierra Nevada, in areas with shrubby vegetation near foraging habitat.	**Unlikely to occur.** The Project is outside the breeding (nesting) elevation range of this species.

Scientific/Common Name	Federal Status	Forest Service Status	State Status	Habitat	Likelihood for Occurrence
Centrocercus urophasianus greater sage-grouse	—	—	CSC	Found in sagebrush, perennial grasslands, wet meadows, and desert scrub from 4,000 to over than 9,000 feet in the eastern Sierra Nevada.	**Unlikely to occur.** No appropriate habitat is present in the Project vicinity. Specifically: • Primarily associated with sagebrush habitats with greater than 10% canopy cover. Sagebrush scrub habitat in the Project vicinity is sparse and has a canopy cover of less than 10%. • Species is unlikely to occur west of Highway 395 (CDFW 2008). No known occurrences of greater sage-grouse in the Project vicinity. The nearest known occurrence is approximately 24 miles southeast of the Project vicinity.
Dendragapus fuliginosa howardi Mt. Pinos sooty grouse	—	FSCC	CSC	Restricted to the Southern Sierra Nevada and the Piute and Tehachapi mountains, Mt. Pinos/Mt. Able, and Frasier Mountain.	**Unlikely to occur.** The Project is outside the geographic range of this species.
Strix nebulosa great gray owl	—	FSCC	CE (nesting)	Nests in old growth coniferous forests and forages in montane meadows. Distribution includes high elevations of the western slope Sierra Nevada and Cascade ranges, from 2,100 to 8,100 feet in elevation (Wu et al. 2016).	**Unlikely to occur.** The Project is outside the typical elevation range of this species and the Project vicinity does not provide suitable habitat.
Strix occidentalis occidentalis California spotted owl	BCC	FSCC	CSC	Dense, old growth, multi-layered mixed conifer, redwood, Douglas-fir, and oak woodland habitats in the western slope of the Sierra Nevada, from sea level to elevations of approximately 7,600 feet.	**Unlikely to occur.** The Project is outside the geographic range of this species.
Empidonax traillii adastus willow flycatcher	—	FSCC	—	Found in the Great Basin and central Rocky Mountains south to Utah and Colorado. Found in a variety of shrubby habitats, but particularly montane riparian habitat with extensive growth of willows.	**Unlikely to occur.** The Project is outside the geographic range of this species.
Xanthocephalus xanthocephalus yellow-headed blackbird	—	—	CSC	Breeds and forages east of the Sierra Nevada in fresh emergent wetland with dense vegetation and deep water, often along borders of lakes or ponds. Winters in the Central Valley.	**Unlikely to occur.** The Project does not contain suitable habitat for this species.
Eumops perotis californicus western mastiff bat	—	—	CSC	Found in variety of habitats including desert scrub, chaparral, oak woodland, ponderosa pine, meadows and mixed conifer forests up to 4,600 feet in elevation. Distribution is likely limited by availability of significant rock features offering suitable roosting habitat.	**Unlikely to occur.** The Project is outside the elevational range of this species.
Brachylagus idahoensis pygmy rabbit	—	—	CSC	Associated with tall, dense, large-shrub stages of big sagebrush, greasewood, and rabbitbrush in Modoc, Lassen, and Mono counties.	**Unlikely to occur.** Big sagebrush scrub within the Project vicinity is sparsely distributed and does not represent suitable habitat for this species.
Vulpes vulpes necator Sierra Nevada red fox	—	—	CT	Occurs throughout the Sierra Nevada at elevations above 7,000 feet in forests interspersed with meadows or alpine forests. Open areas are used for hunting, forested habitats for cover and reproduction. Only known from two distinct populations, one located near Sonora pass on the Stanislaus National Forest, and one located north of the Project vicinity on the Lassen National Forest (Forest Service 2010).	**Unlikely to occur.** The Project is outside the geographic range of this species.

Scientific/Common Name	Federal Status	Forest Service Status	State Status	Habitat	Likelihood for Occurrence
Pekania [=Martes] *pennanti* fisher – Southern Sierra Nevada Distinct Population Segment [DPS]	FE	FSCC	ST	Large areas of mature, dense forest red fir, lodgepole pine, ponderosa pine, mixed conifer, and Jeffery pine forests with snags and greater than 50% canopy closure. Known from elevations of 4,000 to 8,000 feet.	**Unlikely to occur.** The Project is outside the geographic range of this species. The only population of fishers known on the Inyo National Forest occurs on the Kern Plateau along the boundary of the Sequoia National Forest (Forest Service 2018b).
Ovis canadensis nelsoni Nelson desert bighorn sheep	—	FSCC	CFP	Found in Mojave desert mountains from southeastern Mono County south to Imperial County. Only known from the White Mountains within the Inyo National Forest (Forest Service 2018b).	**Unlikely to occur.** The Project is outside the geographic range of this species.

Sources: *Calherps 2020, CDFW 2008, CDFW 2015, CDFW 2016a, CDFW 2016b, CDFW 2018, CDFW 2021, Forest Service 2010, Forest Service 2017b, Forest Service 2018b, Green et al. 2003, Jackman and Jenkins 2004, SCE 2017, SCE 2018, USFWS 2007, USFWS 2008b, USFWS 2016, Wu et al. 2016*

LEGEND:

Federal Status
BCC = Birds of Conservation Concern
Eagle Act = Bald and Golden Eagle Protection Act
FC = Federal Candidate Species
FE = Federal Endangered
FPD = Federal Proposed for Delisting
FPT, FPE = Federal Proposed Threatened/Endangered

Forest Service Status
FSCC = Inyo National Forest Species of Conservation Concern

State Status
CFP = California Fully Protected
CSC = California Species of Special Concern
SCT, SCE = State Candidate Threatened/Endangered
SE = California Endangered
ST = California Threatened

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Table 4.6-6. Game Species Potentially Occurring Within 1 Mile of the FERC Project Boundary

Species	Status	Habitat	General Season	Bag Limit	Possession Limit	Hunting Restrictions[1]
Resident Game Birds						
sooty grouse (*Dendragapus fuliginosus*)	—	Uncommon to common permanent resident at middle to high elevations. Occurs in open, medium to mature aged stands of fir, Douglas-fir, and other conifer habitats, interspersed with medium to large openings, and available water.	General: September 12–October 12 Archery Only: August 15–September 4 Falconry: August 15–February 28	2 sooty grouse per day	Triple the daily bag limit	Hunting license is required. No use of motor vehicles to drive birds toward target. No use of mammal (or imitation) as blind. No take of nests or eggs. No use of practice dogs on birds outside of season. Must use ten-gauge shotgun or smaller, and no shot size larger than ball bearing.
mountain quail (*Oreortyx pictus*)	—	Common to uncommon resident, found typically in most major montane habitats of the state. Found seasonally in open, brushy stands of conifer and deciduous forest, woodland, and chaparral.	Zone Q1: September 12–October 16	10 per day	Triple the daily bag limit	
California quail (*Callipepla californica*)	—	Common, permanent resident of low and middle elevations. Found in shrub, scrub, and brush, open stages of conifer and deciduous habitats, and margins of grasslands and croplands.	Zone Q1: October 17–January 31			
white-tailed ptarmigan (*Lagopus leucura*)	—	Permanent resident of high elevations on or above the tree line in areas of boulders, snowfields, rock slides, and meadows. In winter, frequents brushy areas.	General and Archery: September 12–20 Falconry: August 15–February 28	2 per day	2 per season	
Migratory Game Birds						
Canada goose (*Branta canadensis*)	—	Common resident and migrant, found throughout the state in fresh emergent wetlands, estuarine, lacustrine, and riverine habitats, ponds, pastures, croplands, and urban parks.	Early Season (Large only): October 3–7 Regular Season: October 24–January 31	10 per day	Triple the daily bag limit	Hunting license and state duck tag are required. Must use ten-gauge shotgun or smaller, and shot must be non-lead and non-toxic. Electronically-operated calling or sound-reproducing devices are prohibited. No use of practice dogs on birds outside of season. No take of nests or eggs.
mallard (*Anas platyrhynchos*)	—	Common resident and migrant, found throughout the state in fresh emergent wetlands, estuarine, lacustrine, and riverine habitats, ponds, pastures, croplands, and urban parks.	October 24–January 31	7 per day (no more than 2 females)		
bufflehead (*Bucephala clangula*)	—	Uncommon to locally common east of the Sierra Nevada crest. Breeds in tree cavities near lakes and ponds bordered by open forest.		7 per day		
common merganser (*Mergus merganser*)	—	Uncommon to locally common resident and migrant on lakes, ponds, and large streams of the Coast, Klamath, Cascade, and Sierra Nevada Ranges.				
mourning dove (*Zenaida macroura*)	—	Open woodlands, grasslands, croplands, open hardwood, hardwood-conifer, riparian, low elevation conifer, and deserts all provide adequate habitat. Requires a nearby water source.	September 1–15 and November 14–December 28	15 doves	Triple the daily bag limit	Hunting license and state duck tag are required. No use of motor vehicles to drive birds toward target. No use of mammal (or imitation) as blind. No take of nests or eggs. No use of practice dogs on birds outside of season. Must use ten-gauge shotgun or smaller, and no shot size larger than BB.

Species	Status	Habitat	General Season	Bag Limit	Possession Limit	Hunting Restrictions[1]
American crow (*Corvus brachyrhynchos*)	—	Occurs in valley and foothill hardwood and hardwood-conifer, valley foothill riparian, annual and perennial grasslands, orchard-vineyards, croplands, pasture, and urban habitats. A summer resident of higher elevations.	December 5–April 7	24	Double the daily bag	May be only taken by landowners or tenants when crows are committing depredations or concentrated in such numbers and manner as to constitute a health hazard or other nuisance. May only be taken by firearm, bow and arrow, falconry, or by toxicants approved by the Department of Food and Agriculture for the specific purpose of taking crows. It is unlawful to offer any prize or other inducement as a reward for the taking of crows in a contest, tournament, or derby.
Mammals						
Nuttall's cottontail (*Silvilagus nuttalii*)	—	This species is considered resident small game under the California Fish and Wildlife Code. Found on the east slope of the Sierra Nevada and the cascades. Prefers rocky, sage-covered hills and canyons, montane riparian, and subalpine conifer habitats from 4,500 to 10,500 feet in elevation.	General: July 1–January 31 Falconry Only February 1–March 21	5 per day	10	Hunting license is required. May use shotguns, bow and arrow, air rifles, pistols. Must use ten-gauge shotgun or smaller, and no shot size larger than BB. Coursing dogs may be used to take rabbits.
western white-tailed jackrabbit (*Lepus townsendii townsendii*)	CSC	This species is considered resident small game under the California Fish and Wildlife Code. Open areas with scattered shrubs in sagebrush, subalpine conifer, juniper, alpine dwarf-shrub, and perennial grassland habitats in the high eastern Sierra. Also uses low sagebrush, wet meadow, and early successional stages of various conifer habitats. Moves seasonally to lower elevations in the winter.	Open all year	No limit	No limit	
black-tailed jackrabbit (*Lepus californicus*)	—	This species is considered resident small game under the California Fish and Wildlife Code. Found in a variety of habitats throughout the state, particularly in grasslands and desert-shrub areas on open, early stages of forests and chaparral.				
American beaver (*Castor canadensis*)	—	This species is considered a furbearing mammal under the California Fish and Wildlife code. Found in streams, ponds, and lake margins in the Central Valley, foothills, and mountains of California.	November 1–March 31	No limit	No limit	Hunting license is required. May use firearms, bow and arrow, and approved traps with trapping permit. Dogs permitted.
gray fox (*Urocyon cinereoargenteus*)	—	This species is considered a furbearing mammal under the California Fish and Wildlife code. Uncommon to common permanent resident of low to middle elevations throughout most of the state. Frequents most shrublands, valley foothill riparian, montane riparian, and brush stages of many deciduous and conifer forest and woodland habitats. Also found in meadows and cropland areas. Suitable habitat consists of shrublands, brushy and open-canopied forests, interspersed with riparian areas, providing water.	November 24–last day of February	No limit	No limit	Hunting license is required. May use firearms, bow and arrow, and approved traps with trapping permit. Dogs permitted.

Species	Status	Habitat	General Season	Bag Limit	Possession Limit	Hunting Restrictions[1]
Raccoon (Procyon lotor)	—	This species is considered a furbearing mammal under the California Fish and Wildlife Code. Widespread, common to uncommon permanent resident throughout most of the state. Occurs in all habitats except alpine and desert types without water; marginal in Great Basin shrub types. Most abundant in riparian and wetland areas at low to middle elevations.	November 16–March 31	No limit	No limit	Hunting license is required. May use firearm, bow and arrow, or with the use of dogs, or traps in accordance with trapping regulations. When taking raccoon after dark, pistols and rifles not larger than 22 caliber rimfire and shoguns using shot no larger than No. BB are the only firearms which may be used during this night period. Dogs may permitted to pursue raccoons in the course of breaking, training or practicing dogs.
American mink (*Mustela vison*)	—	This species is considered a furbearing mammal under the California Fish and Wildlife Code. Uncommon permanent resident, generally occurring in the northern half of the state. Semiaquatic, inhabiting most aquatic habitats, including some coastal areas. Occurs at elevation up to about 9,000 feet.	November 16–March 31	No limit	No limit	Hunting license is required. May use firearms, bow and arrow, and approved traps with trapping permit.
American badger (*Taxidea taxus*)	CSC	This species is considered a furbearing mammal under the California Fish and Wildlife Code. Occurs throughout most of the state in areas with dry, friable soils. It is most abundant in drier open stages of most shrub, forest, and herbaceous habitats up to 12,000 feet in elevation.	November 24–last day of February	No limit	No limit	
black bear (*Ursus americanus*)	—	This species is considered a big game mammal under the California Fish and Wildlife Code. Widespread, common to uncommon resident occurring from sea level to high mountain regions. Occurs in fairly dense, mature stands of many forest habitats, and feeds in a variety of habitats including brushy stands of forest, valley foothill riparian, and wet meadow.	Opens with deer season – December 27 or until 1,700 bears are harvested.	1 adult/season/tag	1 adult/season/tag	Requires hunting license and hunting tags. May use approved rifles, bow and arrow, and approved shotguns. Cubs and females accompanied by cubs may not be taken.
mule deer (*Odocoileus hemionus*)	—	This species is considered a big game mammal under the California Fish and Wildlife Code.	The season in zone X-9a shall open on the third Saturday in September and extend for 24 consecutive days.	1 buck (forked horn or better)/tag	1 buck (forked horn or better)/tag	Requires hunting license and hunting tags. May use approved rifles, bow and arrow, approved shotguns, and crossbows. Only bucks with antlers with demonstrable forks (or greater) may be taken.

Notes: CSC = California Species of Special Concern

[1] Beginning July 1, 2019, non-lead ammunition is required when taking any wildlife with a firearm anywhere in California.

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MAPS

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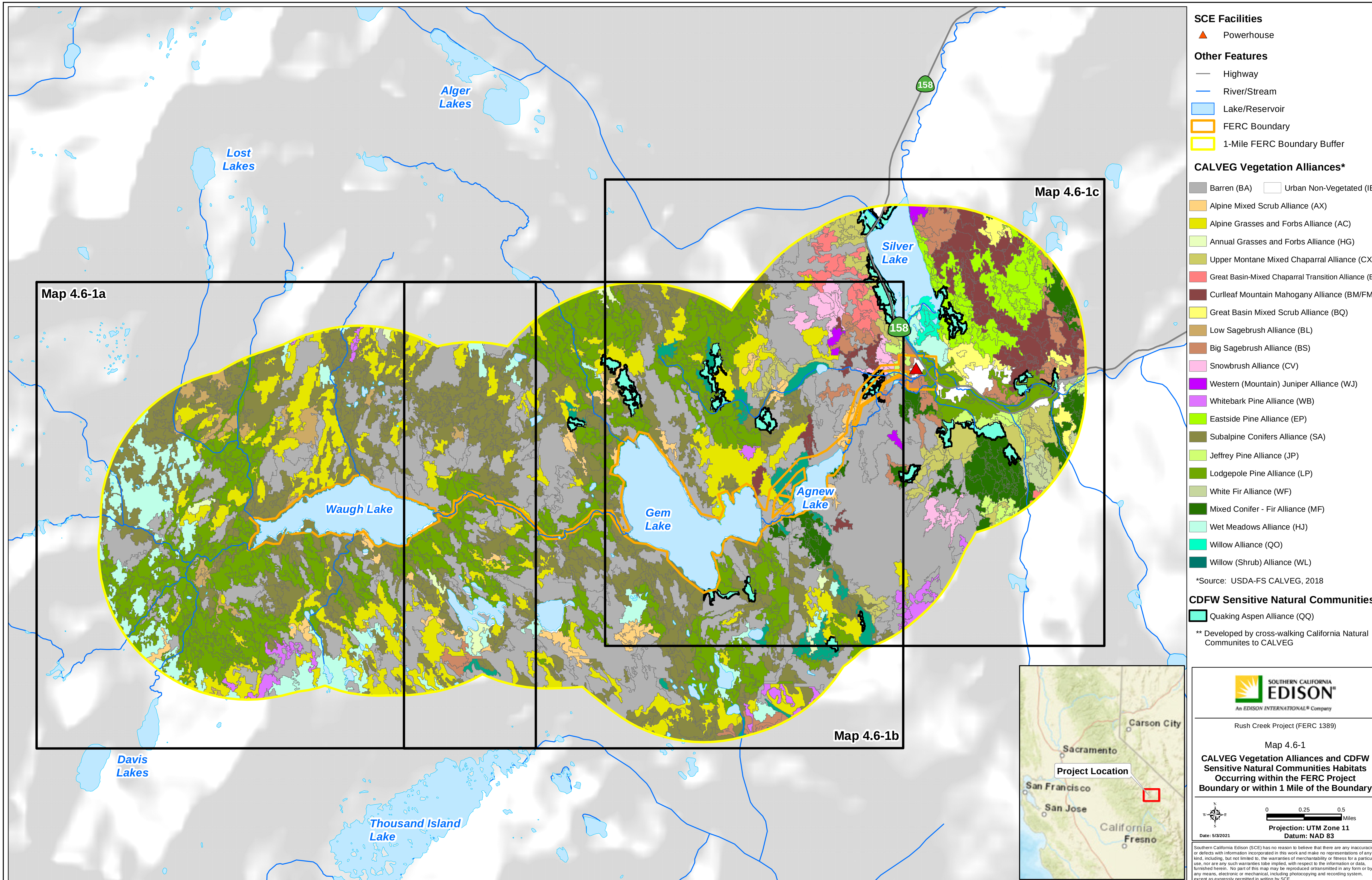

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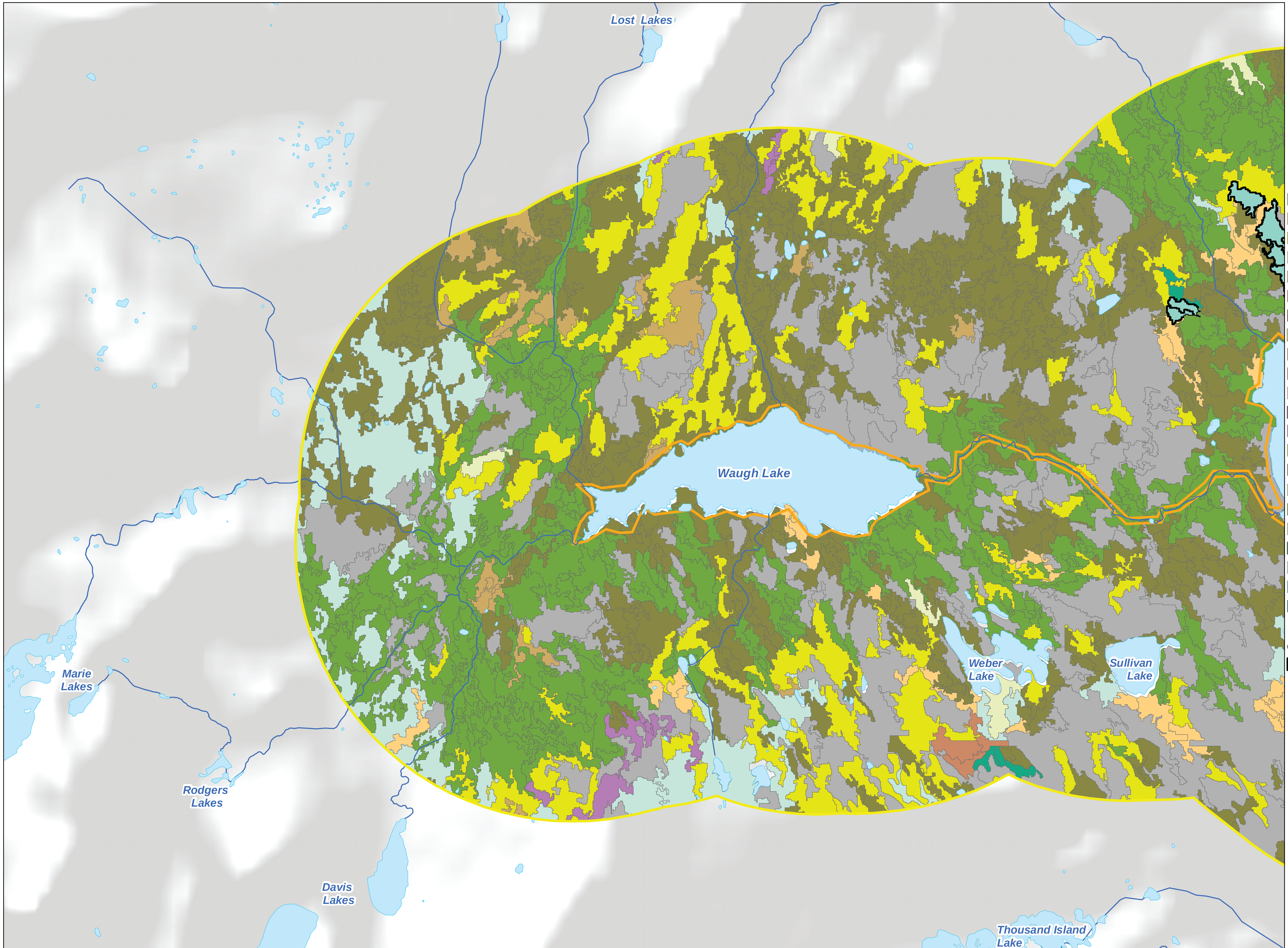

SCE Facilities

- Powerhouse

Other Features

- Highway
- River/Stream
- Lake/Reservoir
- FERC Boundary
- 1-Mile FERC Boundary Buffer

CALVEG Vegetation Alliances*

- Barren (BA)
- Urban Non-Vegetated (IB)
- Alpine Mixed Scrub Alliance (AX)
- Alpine Grasses and Forbs Alliance (AC)
- Annual Grasses and Forbs Alliance (HG)
- Upper Montane Mixed Chaparral Alliance (CX)
- Great Basin-Mixed Chaparral Transition Alliance (BX)
- Curlleaf Mountain Mahogany Alliance (BM/FM)
- Great Basin Mixed Scrub Alliance (BQ)
- Low Sagebrush Alliance (BL)
- Big Sagebrush Alliance (BS)
- Snowbrush Alliance (CV)
- Western (Mountain) Juniper Alliance (WJ)
- Whitebark Pine Alliance (WB)
- Eastside Pine Alliance (EP)
- Subalpine Conifers Alliance (SA)
- Jeffrey Pine Alliance (JP)
- Lodgepole Pine Alliance (LP)
- White Fir Alliance (WF)
- Mixed Conifer - Fir Alliance (MF)
- Wet Meadows Alliance (HJ)
- Willow Alliance (QO)
- Willow (Shrub) Alliance (WL)

*Source: USDA-FS CALVEG, 2018

CDFW Sensitive Natural Communities**

- Quaking Aspen Alliance (QQ)

** Developed by cross-walking California Natural Communites to CALVEG

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL® Company

Rush Creek Project (FERC 1389)

Map 4.6-1a

CALVEG Vegetation Alliances and CDFW Sensitive Natural Communities Habitats Occurring within the FERC Project Boundary or within 1 Mile of the Boundary

0 500 1,000 2,000 Feet

Date: 5/3/2021

Projection: UTM Zone 11
Datum: NAD 83

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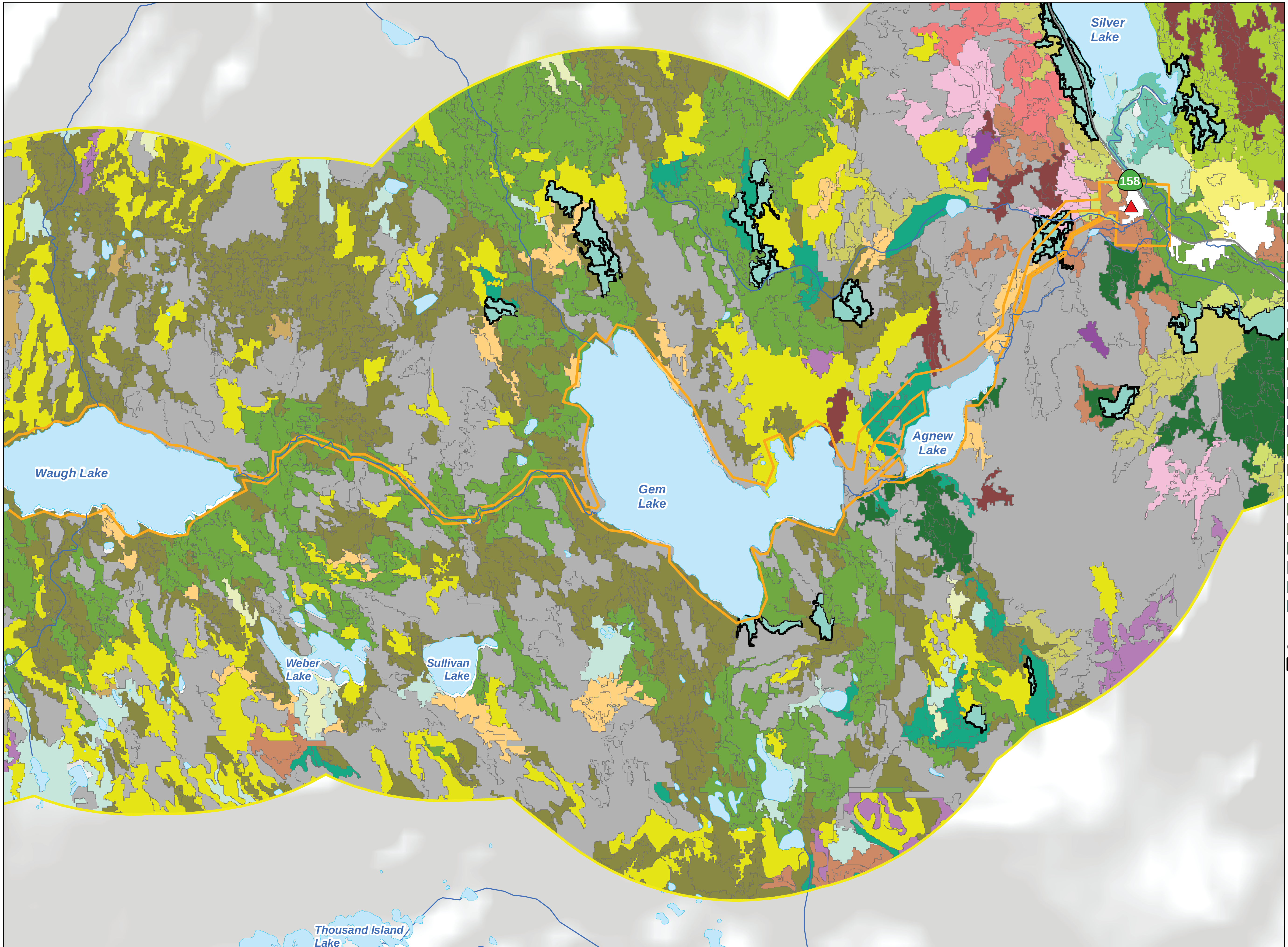

SCE Facilities

Powerhouse

Other Features

Highway
River/Stream
Lake/Reservoir
FERC Boundary
1-Mile FERC Boundary Buffer

CALVEG Vegetation Alliances*

Barren (BA)
Urban Non-Vegetated (IB)
Alpine Mixed Scrub Alliance (AX)
Alpine Grasses and Forbs Alliance (AC)
Annual Grasses and Forbs Alliance (HG)
Upper Montane Mixed Chaparral Alliance (CX)
Great Basin-Mixed Chaparral Transition Alliance (BX)
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Subalpine Conifers Alliance (SA)
Jeffrey Pine Alliance (JP)
Lodgepole Pine Alliance (LP)
White Fir Alliance (WF)
Mixed Conifer - Fir Alliance (MF)
Wet Meadows Alliance (HJ)
Willow Alliance (QO)
Willow (Shrub) Alliance (WL)

*Source: USDA-FS CALVEG, 2018

CDFW Sensitive Natural Communities**

Quaking Aspen Alliance (QQ)

** Developed by cross-walking California Natural Communites to CALVEG

SOUTHERN CALIFORNIA EDISON®
An EDISON INTERNATIONAL® Company

Rush Creek Project (FERC 1389)

Map 4.6-1b

CALVEG Vegetation Alliances and CDFW Sensitive Natural Communities Habitats Occurring within the FERC Project Boundary or within 1 Mile of the Boundary

N S W E

0 500 1,000 2,000 Feet

Date: 5/3/2021

Projection: UTM Zone 11
Datum: NAD 83

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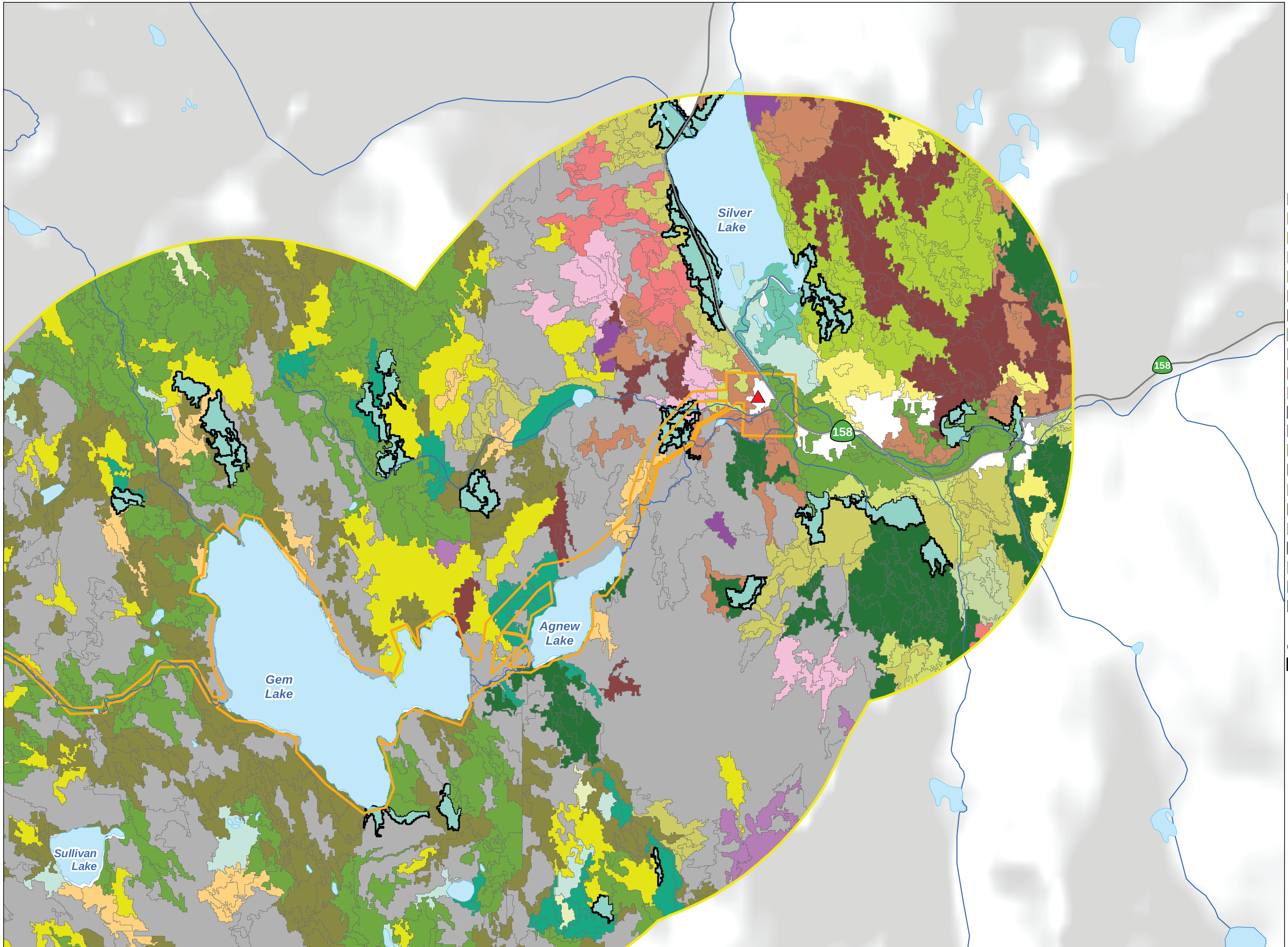

SCE Facilities

- Powerhouse

Other Features

- Highway
- River/Stream
- Lake/Reservoir
- FERC Boundary
- 1-Mile FERC Boundary Buffer

CALVEG Vegetation Alliances*

- Barren (BA)
- Urban Non-Vegetated (IB)
- Alpine Mixed Scrub Alliance (AX)
- Alpine Grasses and Forbs Alliance (AC)
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- Eastside Pine Alliance (EP)
- Subalpine Conifers Alliance (SA)
- Jeffrey Pine Alliance (JP)
- Lodgepole Pine Alliance (LP)
- White Fir Alliance (WF)
- Mixed Conifer - Fir Alliance (MF)
- Wet Meadows Alliance (HJ)
- Willow Alliance (QO)
- Willow (Shrub) Alliance (WL)

*Source: USDA-FS CALVEG, 2018

CDFW Sensitive Natural Communities**

- Quaking Aspen Alliance (QQ)

** Developed by cross-walking California Natural Communites to CALVEG

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL® Company

Rush Creek Project (FERC 1389)

Map 4.6-1c

CALVEG Vegetation Alliances and CDFW Sensitive Natural Communities Habitats Occurring within the FERC Project Boundary or within 1 Mile of the Boundary

N W E S

0 500 1,000 2,000 Feet

Projection: UTM Zone 11
Datum: NAD 83

Date: 5/3/2021

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CONFIDENTIAL INFORMATION

The following map is being withheld from public disclosure in accordance with applicable regulations. It contains details on the locations of special-status biological resources and qualifies as Confidential Information (18 CFR § 385.1112). Disclosure of such information could be harmful to these resources. To further understand FERC's regulations regarding confidential filings visit: https://www.ferc.gov/enforcement-legal/foia.

Map 4.6-2 Occurrences of Special-Status Plant and Wildlife Species within 1 Mile of the FERC Project Boundary (Confidential)

Map 4.6-2 will not be distributed to the general public. Documents containing Confidential Information may be requested by entities and organizations with jurisdiction over these resources. To request copies, please contact Matthew Woodhall, SCE Relicensing Project Manager at (909) 362-1764 or matthew.woodhall@sce.com.

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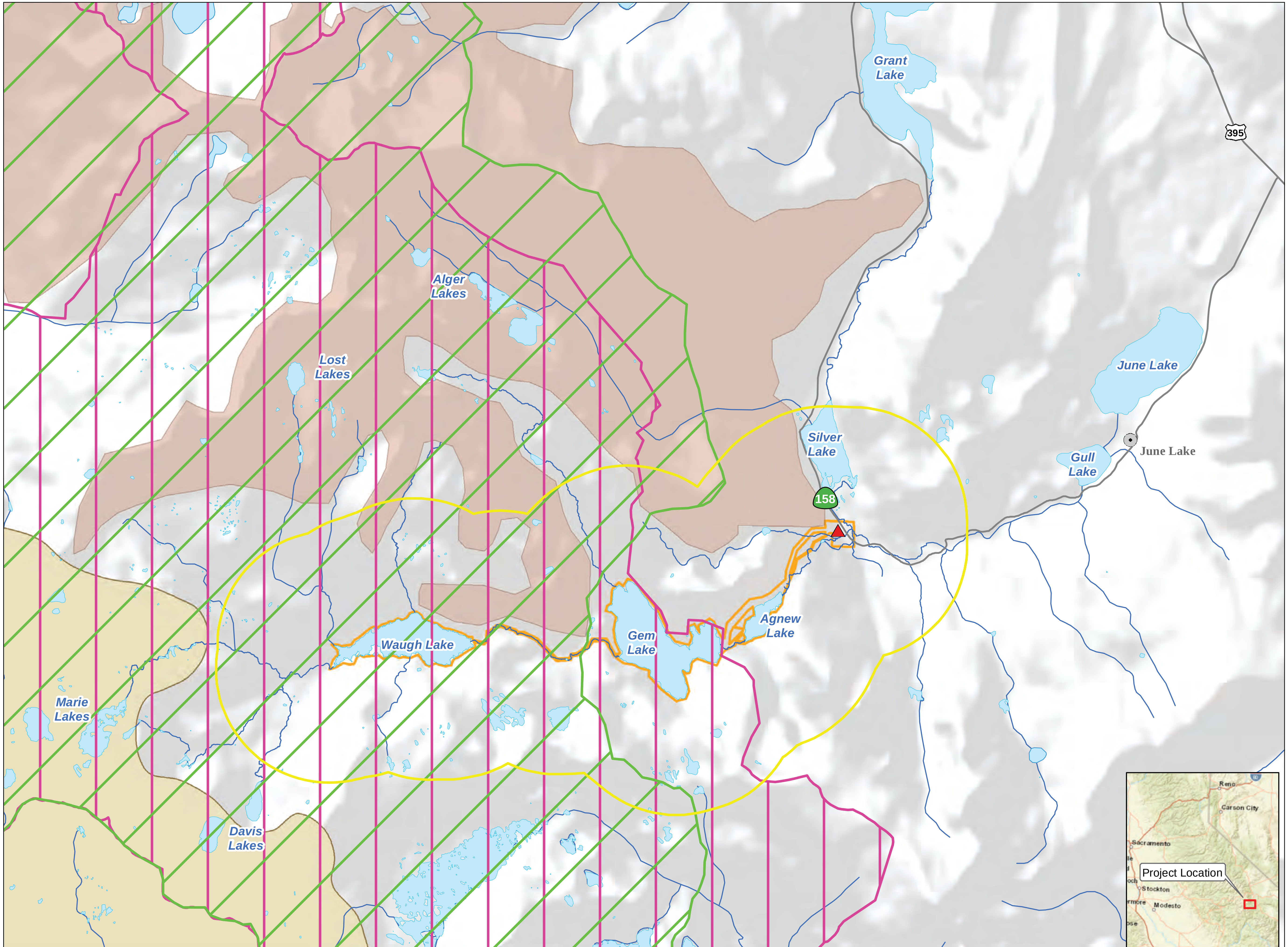

SCE Facilities

Powerhouse

Other Features

Highway

River/Stream

Lake/Reservoir

FERC Boundary

1-Mile FERC Boundary Buffer

Critical Habitat Data*

Sierra Nevada Yellow-legged Frog

Sierra Nevada Bighorn Sheep

Yosemite Toad

*USFWS ECOS 2020

Recently Designated Sierra Nevada Bighorn Sheep Herd Units

Cathedral Range Herd Unit

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL® Company

Eastern Hydro Generation

Map 4.6-3

Location of Critical Habitat and Sierra Nevada Bighorn Sheep Herd Units within the FERC Project Boundary or within 1 Mile of the Boundary

0 0.5 1 Miles

Date: 4/30/2021

Projection: UTM Zone 11
Datum: NAD 83

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